ARCHITECT

Via Chicago Architects + Diseñadores
Holiday Gift Guide
A Factory That Works

Designers on Material Innovation
AIA Year-End Wrap-Up
Solving the Housing Crisis

architectmagazine.com
The Journal of The American Institute of Architects

2022 Residential Architect Design Awards

TERRI MEYER BOAKE
LEED AP, PROFESSOR,
UNIVERSITY OF WATERLOO
SCHOOL OF ARCHITECTURE

MINDS OF STEEL

BUILDING SUSTAINABLY

Professor Terri Meyer Boake, architect Jason Smith, and engineer Ahmad Rahimian, all Nucor Minds of Steel, discuss trends in sustainable building.

“

You can recycle steel. And companies like Nucor put scrap steel into electric arc furnaces that don’t rely on coal, making it the cleanest, most efficient way to manufacture steel commercially.

TERRI MEYER BOAKE

NUCOR®

JASON SMITH

AIA, DESIGN PRINCIPAL
AT SMITHGROUP

AHMAD RAHIMIAN

PH.D., PE, SE, F.ASCE,
EVP, USA DIRECTOR,
BUILDING STRUCTURES
WSP USA

“

Sustainability has only increased in how often it comes up and the commitment to it. Healthier spaces inherently are de-stressor places, too. The more we can include those things in our designs, the better off we can make people that use them.

JASON SMITH

“

In most commercial buildings we're talking about, steel is the major material we would use. But not all steel is made the same way. When you look at companies like Nucor, they are at the forefront in addressing sustainability.

AHMAD RAHIMIAN

ON THE CUTTING EDGE

Learn more about the Minds of Steel and how Nucor is partnering with architects and engineers to bring sustainable designs to life with steel.

Aluflam North America
562-926-9520
aluflam-usa.com

CREATIVITY *with Clay*

One more reason to build with brick. Combined with the simplicity of contemporary elements, earthy and raw aesthetics deliver maximum play with minimum maintenance. Through product innovation and quality, together with outstanding service, The Belden Brick Company strives to set the brick industry Standard of Comparison. **Explore more at www.beldenbrick.com**

PRODUCT: Lakeshore Blend ARCHITECT: Williamson Williamson Inc. PHOTO: Scott Norsworthy

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

BELDEN

THE BELDEN BRICK COMPANY

COMMERCIAL | RESIDENTIAL | PAVING

Contents

Volume 111, number 08. November/December 2022.
On the cover: Filigree House in Philadelphia, by Moto Designshop; photo by Todd Mason.
Below: Marfa Suite in Marfa, Texas, by DUST Architects; photo by Casey Dunn.

Completed by DUST Architects in 2021 in Texas, Marfa Suite is a 1,296-square-foot rammed-earth residence that echoes the surrounding desert's haunting beauty.

Volume 111, number 08 Nov/Dec 2022. 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.

Building the future of housing

There's Always Another Level

Give your building a performance and aesthetic advantage. The *Solarban*® family of solar control, low-e coatings delivers myriad choices for solar control and aesthetics.

There's a *Solarban*® glass for every project. **Learn more at vitroglazings.com/solarban**

SOLARBAN® Solar Control Low-E Glass

Vitro Architectural Glass

Add measurable energy savings into your next plan.

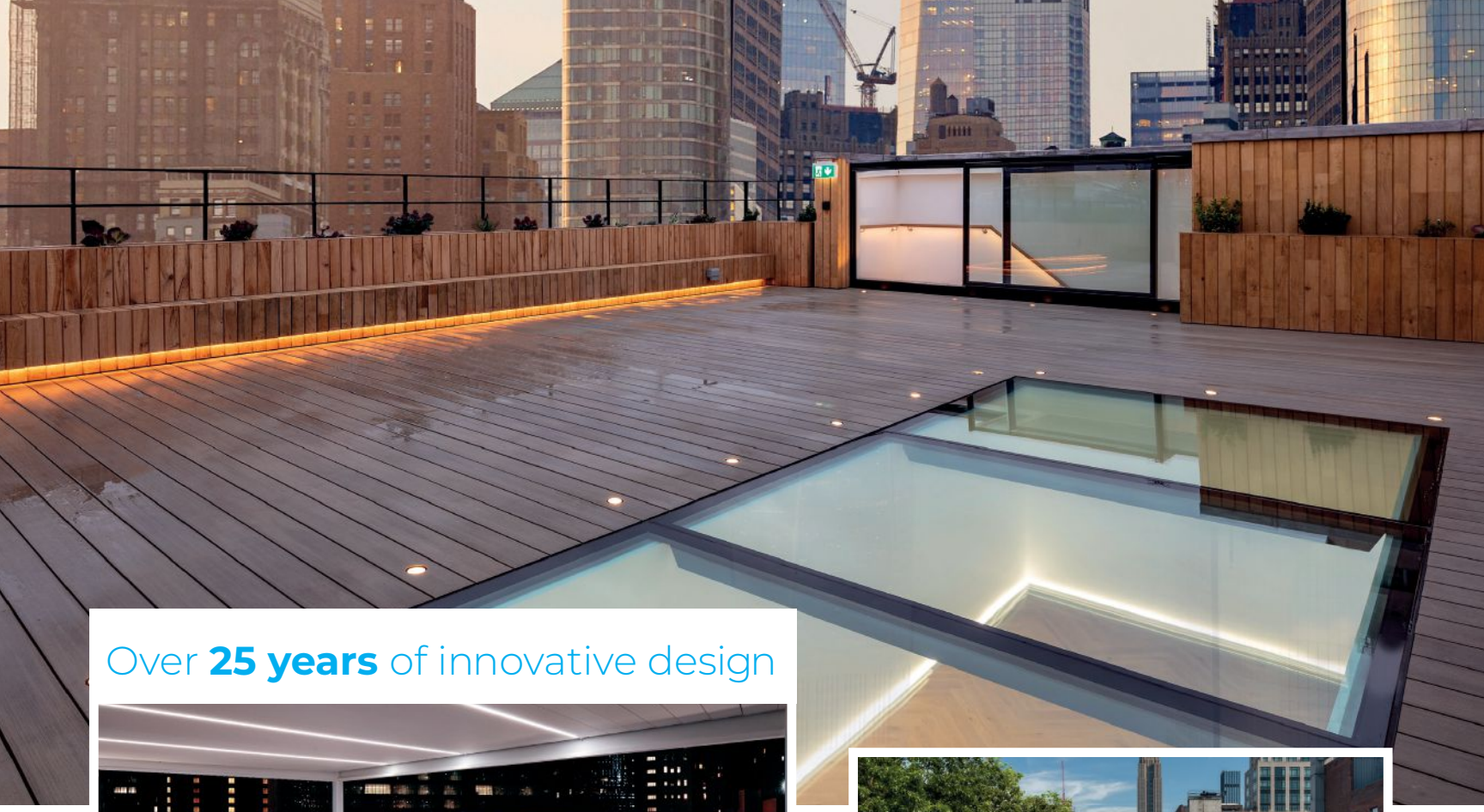
Our team of energy-efficiency experts is ready to help you with financial incentives, clean energy upgrade ideas and the installation assistance you need to reduce costs and energy usage for your clients.

We're here to help you find new opportunities.
Learn more at **ngrid.com/business-arcmag**

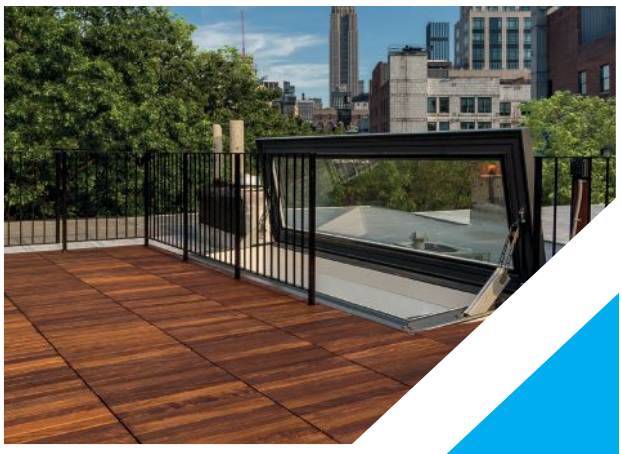
Incentive offers vary by service territory for National Grid customers. These programs are funded by the energy-efficiency charge on all customers' gas and electric bills, in New York and Massachusetts per state regulatory guidance.

Leading the way to a clean energy future
ngrid.com/fossilfree

nationalgrid



Over **25 years** of innovative design



GLAZING VISION

the glass skylight company

Access more with
Glazing Vision
roof access skylights

833-759-3667

info@glassskylights.com

glassskylights.com

ARCHITECT

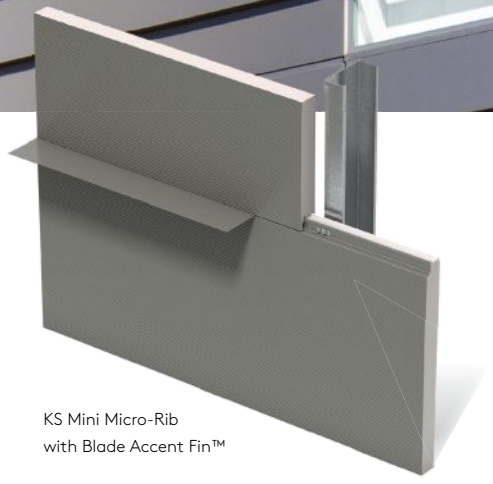
The Journal of The American Institute of Architects

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.

Building Character

Dymon Storage | Brampton, Ontario, Canada



KS Mini Micro-Rib
with Blade Accent Fin™

Give your next design something special.

Kingspan insulated metal panels empower your vision with exceptional design flexibility, efficiency and outstanding thermal, air, water and vapor barrier performance for the ultimate building envelope solution.

www.kingspanpanels.us

Kingspan®

Designing our place

For some, place might be a community center. For others, it's a home or museum or even a calling. These four winning stories from AIA's 2022 Film Challenge share a personal look at the power of people working together to create place, driving change in communities and fostering belonging, permanence, identity, safety, and prosperity. It's good design, for everyone.

A dream starts here

"If we don't do something soon, the town is definitely going to die." That's Mindy Rogers from the Chamber of Commerce on Calhoun Falls, a small town of 1,800 people on the southern border of South Carolina. With only one restaurant and one hardware store, Calhoun Falls has been facing population decline and stunted economic opportunity for years. But change is on its way. The design for a new community center—The Dream Center will turn a dilapidated downtown building into a place that harnesses the power of dreams to catalyze change for Calhoun Falls. It's what's possible when architects, community leaders, neighbors, and friends work together.

A place to call home

Safe, clean, affordable housing is one of our most basic human needs, yet many people don't have access to it. Betances Residence in Bronx, New York, set out to change that for at-risk seniors in a majority Hispanic community. The 152-unit building provides safe, healthy, permanent housing and responds to the culturally rich context of its neighborhood. It includes 10,600 sq. ft. of community space and amenities designed to Passive House standards and incorporates biophilic and active design to support resident health and well-being. "Safety to me is a big thing, and I finally got a key," says resident Edward Borrero. "My first night here I slept from 9pm to 6am...the first time in over five years."

Belonging, healing, & identity

"Our tribe's culture was dwindling. Our language was dying," says Delphine Baker, the director of the MHA Interpretive Center, located on the homelands of the Mandan, Hidatsa and Arikara Peoples in New Town, North Dakota. These three distinctly individual nations call this place home and share a common story after coming to live along the Missouri River. The site allows the MHA to repatriate and display pilfered historical artifacts, has a recording studio for elders to share stories in their native languages, and includes an earth lodge connecting present-day descendants to their ancestral past. It's also the second Net Zero energy building in North Dakota.

The change we seek

The makers of our cities must represent our cities, yet there's a staggering lack of diversity in architecture. "We are the change we seek," says Darguin Fortuna, AIA. "This is the only way to get it done." He's leading a grassroots effort in Boston to expose children to architecture in elementary, middle, and high schools to model that anyone can become an architect and to help students stay the path. "Architecture is building community," says Jeremiah Russell, AIA. "...Going into schools is going to have the biggest impact on making sure the future of architecture is equitable, diverse, and inclusive."

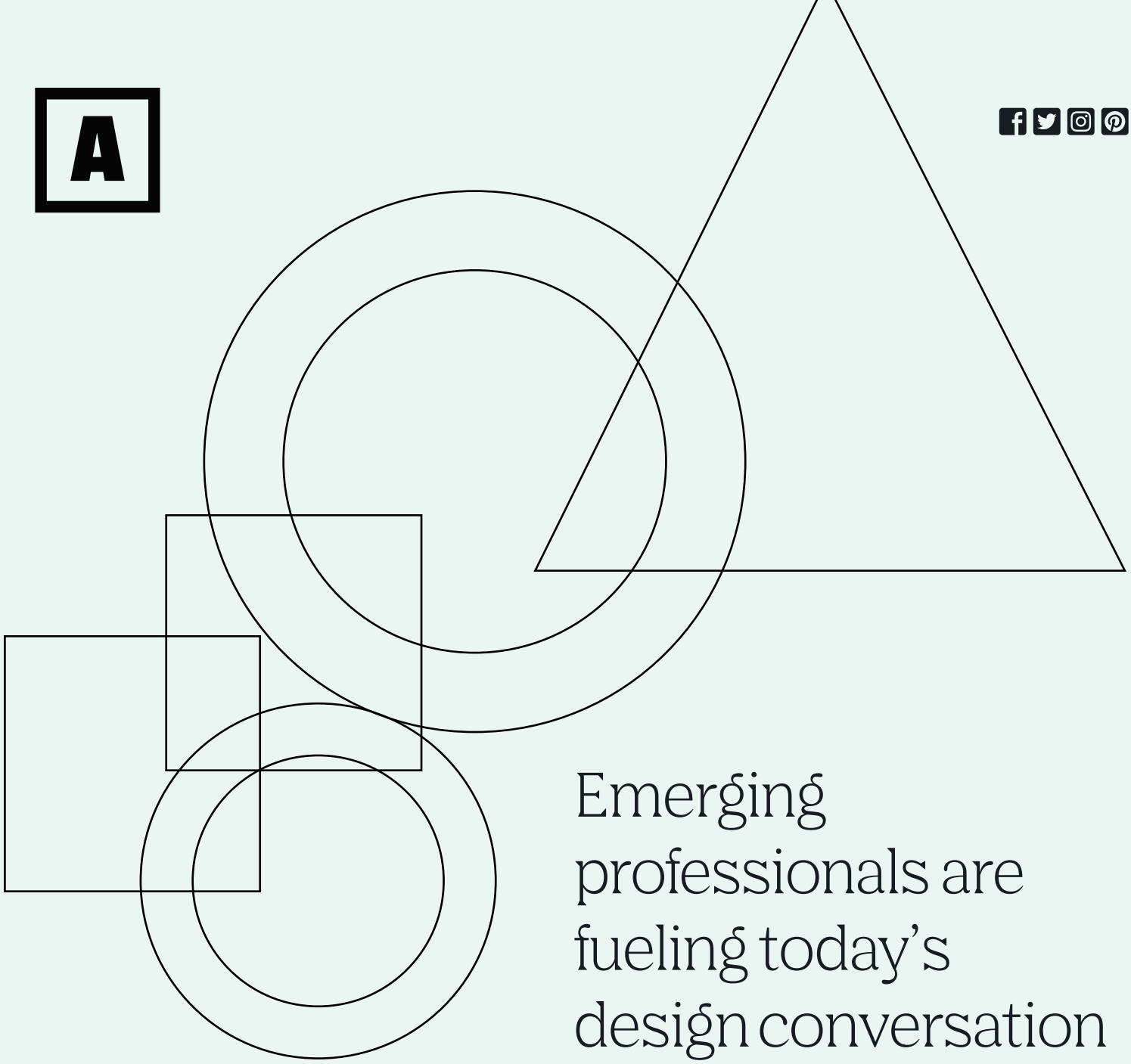
AIA Film Challenge

Watch short films about these projects and more at **aiafilmchallenge.org**

Congratulations to the 2022 winners!

The AIA Film Challenge showcases stories of architects working with civic leaders to design sustainable, equitable communities. This year's winning films share powerful stories about the difference good design makes. There are dozens more on our website at aiafilmchallenge.org.

congrats



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:
Via Chicago Architects + Diseñadores

EDITED BY MADELEINE D'ANGELO

DANA TAYLOR

Firm leadership: Cristina Gallo McCausland and Marty Sandberg, AIA

Location: Chicago and Panama City

Year founded: 2015

Education: *McCausland:* University of Notre Dame, B.Arch., Roosevelt University, M.S. in real estate; *Sandberg:* University of Notre Dame, B.Arch.

Experience: *McCausland:* FitzGerald Associates Architects, ASARQ; *Sandberg:* Antunovich Associates, Norsman Architects

How founders met: Marty made one of his legendary grilled cheeses for Cristina at Café Poche, beneath the Bond Hall auditorium at Notre Dame.

Firm size: Six

Firm mission: Raising the bar of *arquitectura cotidiana*.

First commission: Portales is a 300-year-old building at the gateway to Casco Antiguo—Panama City's colorful and eclectic colonial quarter. We completely restored the exterior façades—including the 1-meter-thick calicanto walls—and carefully inserted a new steel structure with 12 apartments beyond. A team of local artisans was able to reconstruct the ornate metal railings based on fragments we salvaged from a fire, and we worked with each of the residents to craft custom concrete tile for their living space. The corner café is now run by one of Panama's most beloved coffee producers, and the first thing residents and visitors see when they enter the neighborhood is a vibrant, teal-tinged landmark where haphazard scaffolding blocked a sidewalk for the previous five years. The best way to guarantee the preservation of great buildings isn't by freezing them in time—it's by ensuring they remain relevant and loved for the next 100 years.

Defining project: We're in the midst of helping Square Roots build out a growing network of hydroponic farms across the U.S. Every day is incredibly fast-paced while we work with the firm's tech and farming engineers to translate cutting-edge cultivation concepts into a physical building supplying fresh, reliable, ultra-local food to urban markets.

Another important project: Stitch—325 square feet of complex design puzzles, hair-pulling frustration, and, eventually, a delightful triangular home. It was originally a hot-dog stand, wedged in front of a brick three-flat that was lifted and rolled to the back of the lot when a diagonal avenue was built through Chicago's West Town in the 1920s. Existing and nonconforming in every possible way, as far as the city of Chicago was concerned. It's the smallest thing we've ever worked on, but without fail is the first project everyone asks us about. They all know the "little blue building" on Ogden Street.

How did you come up with your firm name? We savor the journey—both literally and metaphorically. It takes us north, south, occasionally in circles, but always by way of Chicago.

How would you describe the personality of your practice? Freehand Spanglish.

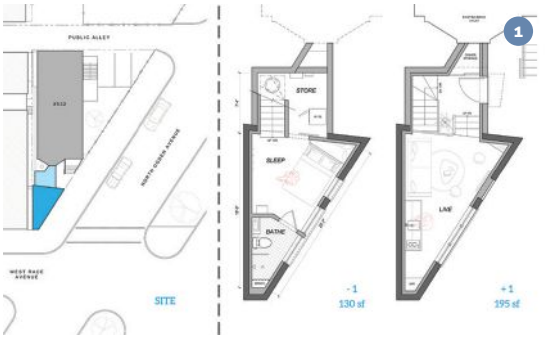
Special item in your studio space: The conference table is made from heavy timbers salvaged during the renovation and build-out of Marz Community Brewing in Chicago—one of our first projects.

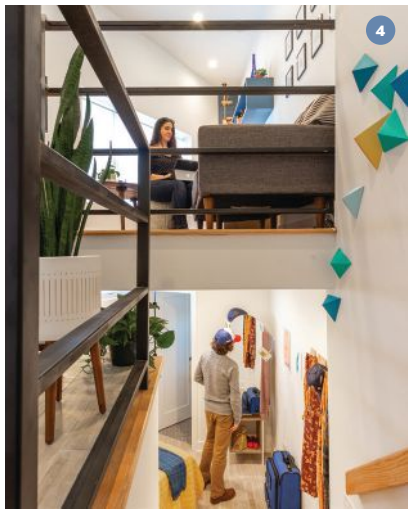
Design aggravation: Senseless demolition of vintage brick two-flats. It's baffling how many people are willing to throw away a solid building shell just to construct a cheap new home that's 3 feet wider. There's so much to be gained from creative design and adaptive reuse of our vernacular architectural heritage.

> *To read an extended version of this article and see more images of Via Chicago's work, visit bit.ly/ARNPvc.*

Next Progressives: Via Chicago Architects + Diseñadores

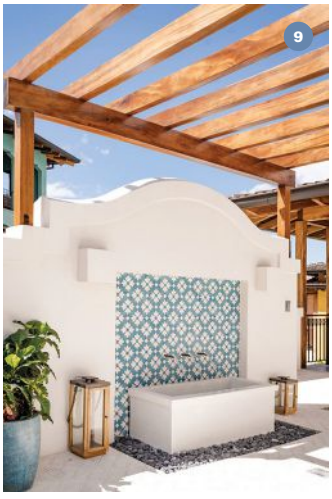
1–5. For Stitch, in Chicago's West Town neighborhood, Via Chicago transformed an angular, 165-square-foot building into a tiny residence. The resulting 325-square-foot house offers a bedroom, a bathroom, and living space organized along a split-level plan. **6–7.** Square Roots v3, completed in 2022, is a vertical farming campus for farming technology company Square Roots. The latest complex, located in Kenosha, Wis., comprises a series of stacked shipping containers installed directly adjacent to a local distribution center for Gordon Food Service. **8–11.** Located in Costa Rica's Guanacaste province, Casa Luker is a nearly 2,530-square-foot residence designed to prioritize outdoor living. **12–14.** Completed in 2020, Portales revitalizes a mixed-use building in Panama City that was damaged in a 2014 blaze. The resulting project, complete with a panoramic terrace, salvages as much of the original structure as possible.



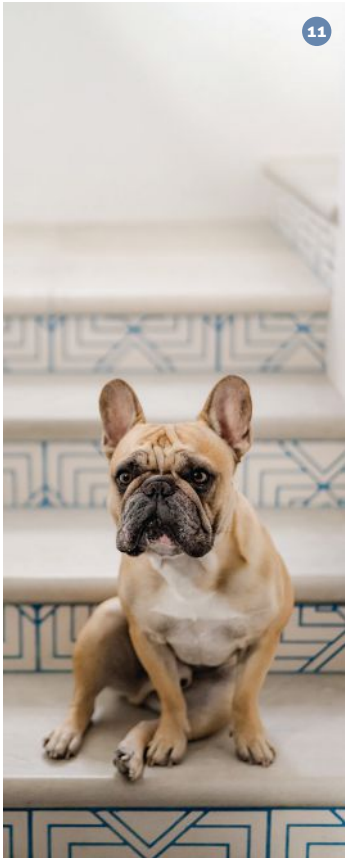


1: VIA CHICAGO; 2, 5: MARTY SANDBERG; 3–4: WILL QUAM; 6–7: SQUARE ROOTS; 8–11: SYLVIA GUARDIA; 12–14: MARTY SANDBERG


8


9


10

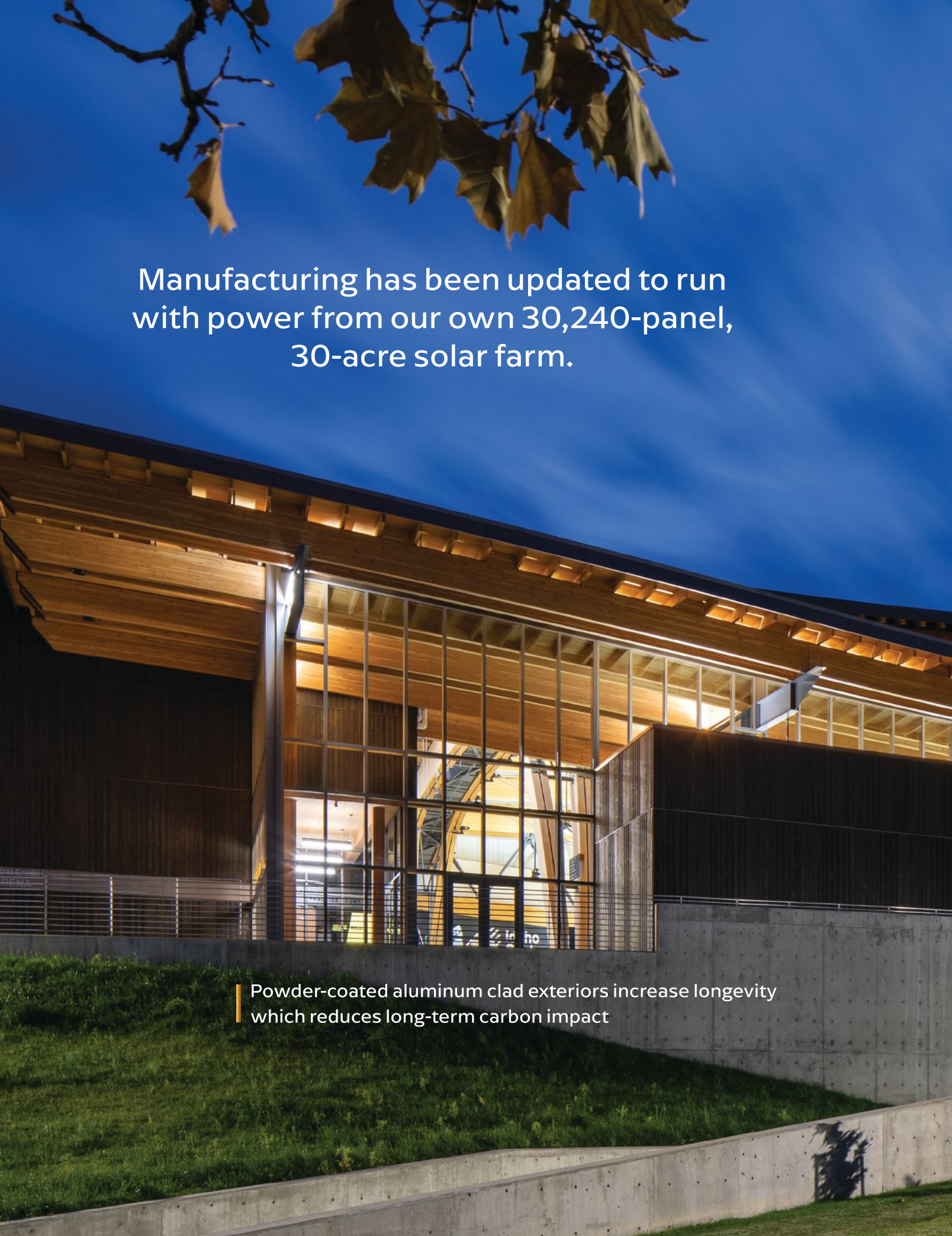

11


12


13


14

The windows you choose today are part of the world you choose tomorrow.



Manufacturing has been updated to run with power from our own 30,240-panel, 30-acre solar farm.

Powder-coated aluminum clad exteriors increase longevity which reduces long-term carbon impact

Architect: Opsis Architecture
Sport Architect: Hastings+Chivetta Architects
Builder: Hoffman Construction
Photo: Lara Swimmer

Timber curtain wall wood-beam interiors minimize their carbon footprint and thermal loss

Expansive use of glass opens up spaces, connects with nature and improves overall health and well-being


Windows that never compromise.
Stewardship that never quits.
SIERRA PACIFIC WINDOWS
WELCOME VANDAL FAMILY
Watch our brand video
SierraPacificWindows.com | A Division of
SIERRA PACIFIC INDUSTRIES
Join us on @sierrapacificwindows

SIERRA PACIFIC WINDOWS

YOU'VE NEVER SEEN DOORS LIKE THIS BEFORE.

SierraPacificWindows.com | 800-824-7744 A Division of SIERRA PACIFIC INDUSTRIES

CarbonPositive: Carbon Intelligence for Reuse Decisions

TEXT BY ERIN MCDADE, ASSOC. AIA, AND LORI FERRISS, AIA

Renovation work is on the rise. For the first time in the two decades during which The American Institute of Architects has collected data on architectural billings, renovation work has overtaken new construction as a percentage of total billings. As Zach Mortice reported recently in *Bloomberg*, "In 2005, toward the end of a pre-recession building boom, renovations made up approximately one-third of billings. That share has been increasing steadily since 2017, when it was 44.4%, up to 52% this year."

While attention often centers on carbon-smart strategies for new construction, we will not build our way to an emission-free built environment; we must reuse existing building stock effectively. Renovating a structure usually has a much lower upfront carbon footprint than building new, because renovations typically reuse the emissions-intensive parts of the building—the foundation, structure, and envelope. Retrofitting an existing building can dramatically reduce its operating emissions.

Despite this knowledge, the building industry has lacked the ability to easily compare the variables of embodied and operating emissions over specific time frames for reuse and new-construction scenarios. Thus, the potential avoided emissions associated with reuse are typically unaccounted for in design processes, owner requirements, and climate policies and regulations, representing a major data gap.

The Carbon Avoided Retrofit Estimator Tool is an online tool to help address this gap. The idea for the tool originated when Larry Strain, FAIA, founder of Siegel & Strain Architects, was asked for a resource that could identify the carbon emissions avoided by choosing to reinvest in buildings rather than replace them. With no existing resource to point to, Strain drafted the first version of the estimator. Now in partnership with Architecture 2030 and Goody Clancy, the CARE Tool empowers owners, developers, and design teams with the ability to quantify the environmental value of reuse decisions. Retrofitting an existing building to zero operating emissions will almost always be the lowest carbon option. But what if you can only reduce its operating emissions by 50%, or plan to replace it with a net-zero-operating-emissions building? And how do geography, grid intensity, and the condition of the existing building affect those considerations?

The CARE Tool estimates the avoided operational and embodied carbon emissions associated with reusing and upgrading a building or replacing it with new construction. Outputs are visualized as total embodied and operational emissions over a specified time frame as well as cumulative emissions over time, for three scenarios: the existing building, the renovated building, and the new construction. Results can be compared to determine the lowest total-carbon approach and the time frame in which that occurs.

The CARE Tool can also be used by those interested in a pre- or early-design, high-level assessment of the total emissions impact of building reuse versus replacement. With retrofits on the rise and the urgent need for climate action, tools like CARE fill a critical gap in our understanding and valuation of the existing building stock as an important climate asset.

Erin McDade is Architecture 2030's senior program director, focusing on data-driven solutions for decarbonization. Lori Ferriss is Goody Clancy's regenerative renewal practice leader and director of sustainability and climate action.

For Boston University's Alan and Sherry Leventhal Center, the local firm Goody Clancy completed an adaptive reuse of a 1953 International-style building.

ANTON GRASSL/ESTO

> *To read an extended version of this piece and more articles by Architecture 2030, visit bit.ly/ARcp2030.*

WHIRLPOOLPRO.COM/COUNTONUS

Whirlpool® MAYTAG® KitchenAid® AMANA® JENNAIR®

Children's Healthcare of Atlanta Center for Advanced Pediatrics | Atlanta, GA
Architect: Stanley, Beaman and Sears
Product: Curvalon, Flat Veneered Panels

RULON INTERNATIONAL

ACOUSTICAL WOOD CEILINGS AND WALLS

rulonco.com

Find a present for everyone on your list with gift and donation suggestions from leading designers and ARCHITECT staff.

GIFT GUIDE

TEXT BY MADELEINE D'ANGELO
AND ANDREA TIMPANO

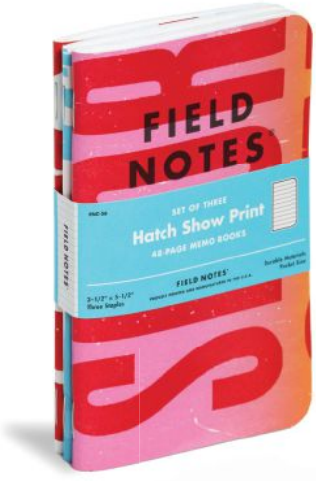
Carl Dukrow Candles, from $38, *Recommended by Ming Thompson, AIA*
Handcrafted by the Philadelphia-based maker Carl Dukrow, this collection of sculptural candles is composed using a blend of beeswax and soy wax that results in an odorless and long-lasting burn. *54celsius.com*

TOM SCANLAN

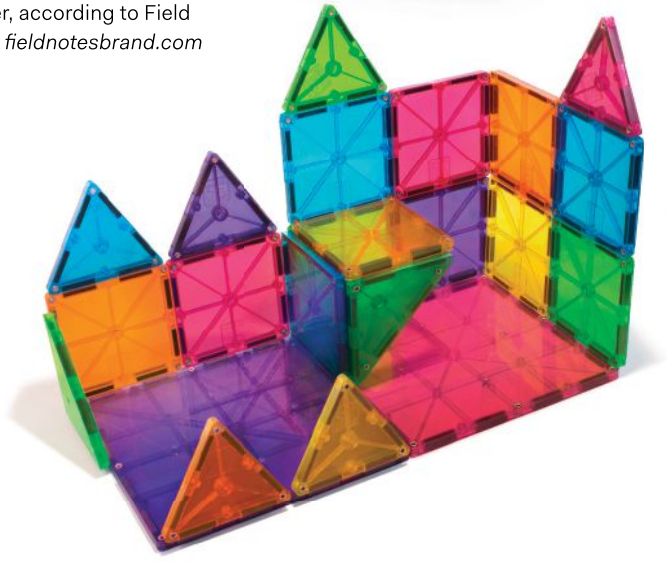
2022 GIFT GUIDE

Follies Bauhaus Set, $200
Recommended by ARCHITECT staff
Composed of nontoxic, lightweight plastic, this modular toy was created by Chloe Varelidi, a trained architect turned toy developer. Each piece in this Bauhaus-inspired collection is recyclable and washable, and adorned in geometric patterns applied using a silk screen. *playfollies.com*

Farmmm Sculptures, from $60
Recommended by ARCHITECT staff
Each piece in this collection of fuzzy, candy-colored sculptures, all handmade by the New York–based designer Sasha Topolnytska, delights the mind and the senses. Developed to foster inclusive play, the biomorphic pieces—Ivar, Bow, Misha, and Lolo shown below—double as joyful design objects and furniture. *farmmm.us*

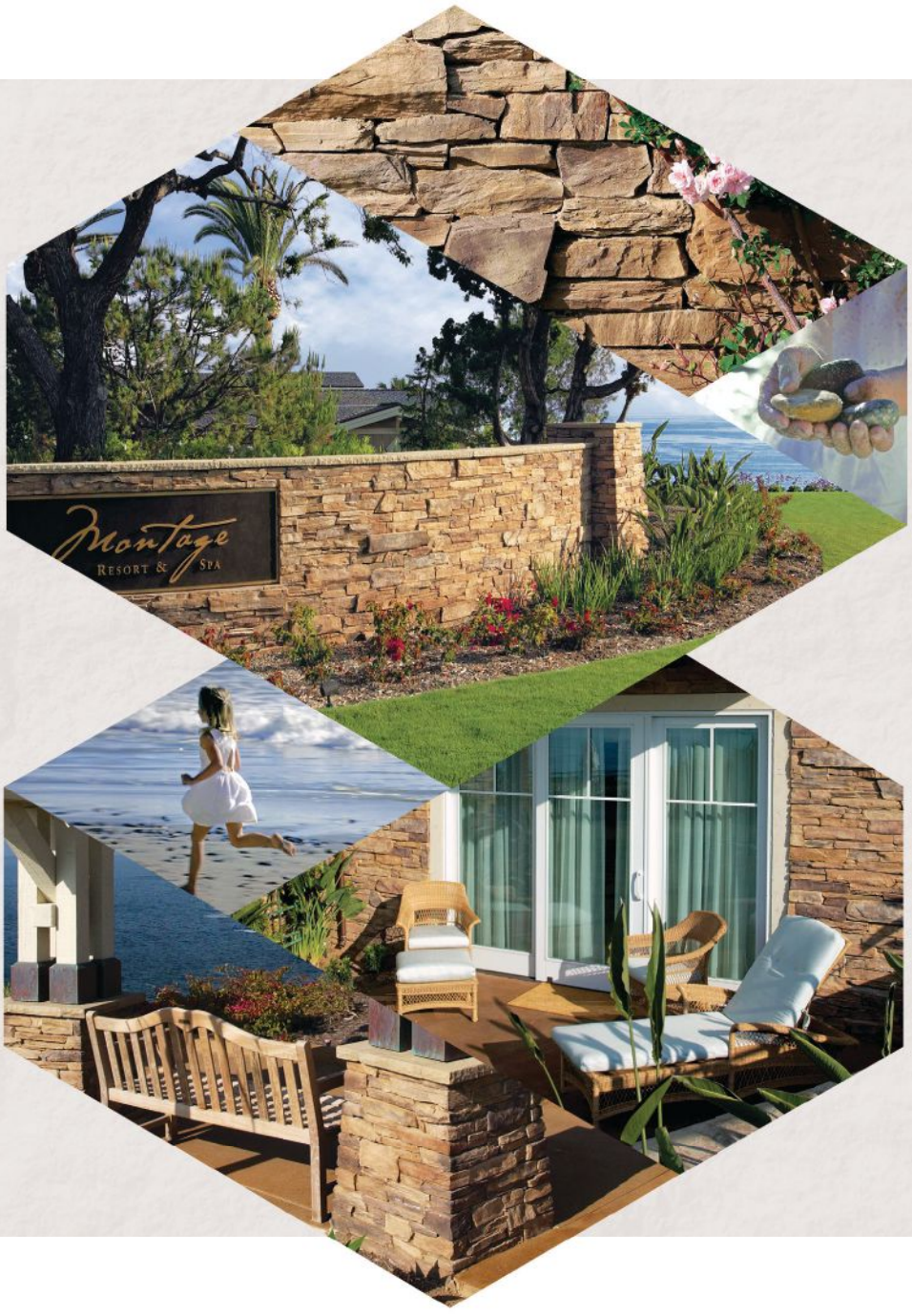


Field Notes Hatch Show Print, from $14.95
Recommended by ARCHITECT staff
Developed with the iconic Nashville Hatch Show Print letterpress, this three-pack of pocket memo books is perfect for the graphic designers in your life. Each ruled, 3 1/2" × 5 1/2" notebook is bound using Horizon SPF-200L "Bookletmaker" stitcher, according to Field Notes. *fieldnotesbrand.com*



Magna-Tiles, from $119.99
Recommended by Tall Architects
These gleaming magnetic tiles let any child—or budding architect—follow their imaginations and construct everything from robotic prototypes to the world's next Taj Mahal. Made from food-grade ABS plastic, the 100-piece set is compatible with all other Magna-Tiles sets. *magnatiles.com*

STONE THAT STIRS



Like a diamond's evolution from raw earth to unique design, every idea becomes a reality that opens your imagination. Transform spaces into experiences worth sharing. Bring your vision to life with Eldorado Stone.

Extraordinary can begin small and turn into *the start of something beautiful.*™

ELDORADO STONE™

Westlake Royal Stone Solutions™

2022 GIFT GUIDE

CW&T Pen Type-C, $60
Recommended by Che-Wei Wang and Taylor Levy
Created and recommended by the Brooklyn-based product designers behind CW&T, this engravable titanium pen accommodates Pilot Hi-Tec-C Coleto ink cartridges. Plus, given its flat shape and detachable clip, the pen makes an excellent bookmark. *cwandt.com*

CW&T Superlocal, $198
Recommended by Che-Wei Wang and Taylor Levy
This 24-hour timepiece was developed with a fully customizable dial so users can "visualize how [they] actually spend [their] day," explain Wang and Levy. The clock, which can be wall-mounted, is made from steel and finished with a resilient black Melonite coating. *cwandt.com*

Wooj Pleat Lamp, $179
Recommended by ARCHITECT staff
Shopping for the design fiend on your list? These 3D-printed table lamps come in a range of colors including emerald and amber (shown). Designed to evoke the movement of a pleated skirt and printed using recycled PETG, the striking luminaire is fully created in Wooj's New York studio and is compatible with any LED bulb. *wooj.design*

Krista Knickerbocker Concrete Pearl Necklace, $95
Recommended by Emily Grandstaff-Rice, FAIA
With degrees in economics and architecture, Krista Knickerbocker spent a decade at design firms before pursuing her true passion: making jewelry. The Massachusetts-based artist's handcrafted pieces include this sterling-silver necklace, ornamented with cast-concrete pearls. *kristaknickerbockerdesigns.com*

NYC Skyline Chess Set, $135
Recommended by James Garrett Jr., AIA
Developed by the London-based architectural designers and Skyline Chess founders Ian Flood and Chris Prosser, this chess set honors the Big Apple's built-environment gems. All 32 double-weighted acrylic pieces have a felt base and are modeled after icons including the Empire State Building and Freedom Tower. *store.moma.org*

Serax Collage Cast Iron Teapot, $119
Recommended by J. Jih, AIA
Who says a teapot can't be a work of art? Equal parts elegant and functional, this cast-iron, Japanese-inspired model from Serax—dreamed up by Brent Neve and Giel Dedeurwaerder of Belgium-based Utilise.Objects—is pretty enough to display even when it's not boiling water. *finnishdesignshop.com*

John Francis Designs Triple Basket Weave Ravioli Mold, $95
Recommended by ARCHITECT staff
Blending loves for woodworking and pasta has proven to be a winning recipe for artisan John Welch, who handmakes his ravioli molds—like this one, available in cherry, maple, and walnut—in a converted textile mill in North Chelmsford, Mass. *johnfrancisdesigns.com*

THE ULTIMATE IN SPACE
FLEXIBILITY

Transform your space to satisfy your ever-changing needs with Modernfold's Acousti-Seal® Legacy® movable wall system. A highly desired space division solution for schools with a variety of options including: work surfaces, acoustical control, and custom finishes, all on a slim 3" platform.

• ACOUSTICS • AESTHETICS • PERFORMANCE •

MODERNFOLD®

MODERNFOLD.COM

2022 GIFT GUIDE

Feeling philanthropic? Consider donating to these charitable organizations.

Kelp Forest Foundation
Recommended by Andrew Heid, AIA
From sequestering carbon to supporting marine life, underwater kelp forests are crucial to the health of the planet. Based in the Netherlands, the Kelp Forest Foundation strives to raise awareness of these vital resources while also leading important research on the benefits of kelp-centric ecosystems. *kelpforestfoundation.org*

A Rising Tide
Recommended by Christina Cho Yoo, AIA
Founded earlier this year by a team of nine designers, including recommender Christina Cho Yoo, A Rising Tide aims to spotlight Asian and Pacific Islanders who are shaping the built environment. Among its first initiatives? Developing a directory of API designers as well as educational workshops focused on the challenges of the API design community. *arisingtide.design*

Win
Recommended by Eran Chen, AIA
Since its inception in 1983, Win has become the largest provider of supportive housing in New York, sheltering as many as 2,100 families on a nightly basis. Focused on serving women and children, the organization also operates transitional housing and programs such as Camp Win: a 13-week summer camp for kids experiencing homelessness. *winnyc.org*

Giving What We Can
Recommended by Scott Duncan, AIA
This England-based organization takes the guesswork out of donations, connecting givers with so-called "high-impact" charities and nonprofits devoted to at least one of three main causes: "improving human wellbeing, improving animal welfare, and creating a better future," according to the Giving What We Can website. *givingwhatwecan.org*

THE 70TH ANNUAL

Progressive Architecture Awards

CALL FOR ENTRIES OPEN NOW!

ELIGIBILITY

Projects must have a client and a completion date after February 1, 2022. Judging will take place in January 2023. Winners will be notified in February 2023, published in the March 2023 issue of ARCHITECT. For more information and rules and regulations, visit *paawards.com*.

RECOGNITION

Winners will be featured in the March 2023 print issue of ARCHITECT with expanded coverage online at *architectmagazine.com*.

EARLY BIRD ENTRIES

DEADLINE	December 16, 2022
FEE	$195
ADDITIONAL ENTRIES	$145

REGULAR ENTRIES

DEADLINE	January 13, 2023
FEE	$245
ADDITIONAL ENTRIES	$195

HOW TO ENTER

SUBMIT YOUR WORK AT *paawards.com*
QUESTIONS? EMAIL *paawards@zondahome.com*

Zonda Media

Houston Endowment, by Kevin Daly Architects and Productora

CertainTeed SAINT-GOBAIN ARCHITECTURAL

How Crafted Chaos Transforms a $56.6 Million Florida Headquarters

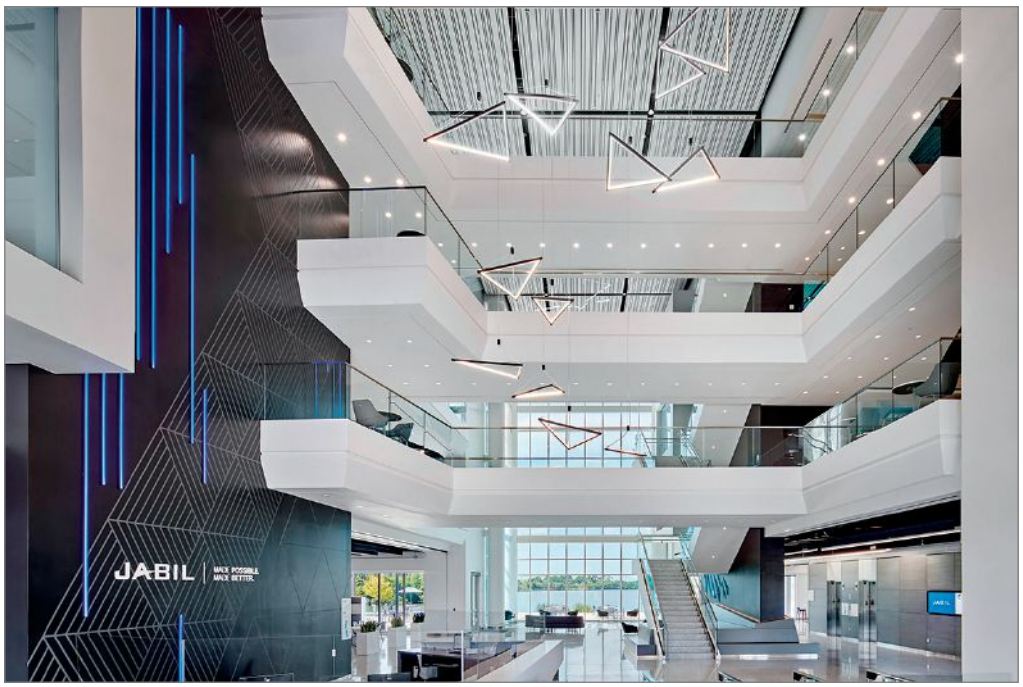
One look up this four-story atrium reveals lighting and ceiling magic.

To understand how crafted chaos serves the architect's vision, let your eyes wander to the top of the new Jabil global headquarters atrium in St. Petersburg, Fla.

You'll see how a dash of disruption generates unexpected charm and artistry for a wow-factor lobby.

The $56.6 million, 170,000-square-foot Jabil global headquarters was designed by Gensler's Tampa office. The radial-shaped structure, clad in glass and metal panels, presents a monochromatic exterior. The subdued look is continued inside with "pops of color and geometry that aligns with the Jabil brand," explains Gensler project architect Chuck Berg.

For example, a cascading chandelier of illuminated triangles (a Jabil logo element) doubles as a playful mobile. "The floating triangles extend down from the 50-foot-high ceiling height to about 12 feet from the floor," Berg says. "The lights are designed to engage occupants at all four atrium skywalks."



CEILING SYSTEM WONDER

The triangle array leads the viewer to the companion in crafted chaos, the ceiling system. "The ceiling system was proposed very early on," Berg recalls. "The Jabil team really liked the concept."

The Multi-Box Continuous metal ceiling system from CertainTeed Architectural. To support the idea of crafted chaos, the panelized system features a randomized sequence of two- and six-inch wide metal panels. The recycled aluminum (up to 92%) construction is GREENGUARD Gold Certified. Multi-Box Continuous supports unlimited combinations of panel depths and widths, along with a variety of finishes including wood-veneer cladding. "The Jabil atrium ceiling system is made to order, as are all CertainTeed Architectural ceiling systems," reports Jason Wisniewski, the project's CertainTeed Architectural representative.

MULTI-TASKING VERSATILITY

"The linear system works with the shape of the space and directs you to the lake out back," Berg says. "We needed a ceiling system that was suspended, not framed. The atrium's smoke exhaust system requires free areas around the panels. We also didn't want to install sprinklers above and below the panels. The random panel arrangement avoids a predictable, repetitive pattern. The ceiling system had to do a lot of things at once." Ceiling acoustics are controlled by perforations that create 23% open area on the face of linear planks as well as an acoustical backer behind the panels.

The one area of ceiling discussion was color. "We knew the backer would be black because of the panel gaps. As for the panels themselves, we went back and forth over white, colored stripes, or a warmer color, even a wood grain look. We ultimately circled back to white because it was consistent with the overall design aesthetic." Berg says.

REQUIRED: NOTHING BORING

Today the crafted chaos of the Jabil headquarters is a dynamic counterpoint to the structure's crisp, engineered rigor. "We didn't want just a linear ceiling," Berg says. "It needed to be a pattern … a pattern with play in it. Nothing boring. It had to be cost effective, too. We needed different ways to express design with affordable materials. Textures, patterns, and geometry helped us do that." ■

Learn more how the variety, quality, and availability of CertainTeed Architectural ceiling systems can enhance your next project at **certainteed.com/architectural**.

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

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*

Opinion: Restoring Affordability in the Housing Market

TEXT BY ALI WOLF

When mortgage interest rates dropped between 2% and 3% in 2020 and 2021, people rushed into the housing market. For a while, the low rates enabled consumers to get more bang for their buck by pushing down monthly mortgage payments even as home prices rose. The elevated demand, however, was not met with a similar level of supply. Resale inventory was snatched up quickly, and builders found they could not bring homes to the market fast enough given constraints on land, labor, and materials, plus governmental delays. The impact was a massive run-up in home prices over a historically short period of time. Through early 2022, consumers proved willing and able to look past the high top-line pricing in return for locking in a low 30-year, fixed-rate mortgage. That willingness turned into reluctance earlier this year when mortgage interest rates shot up, causing a record affordability shock.

As the rate on the 30-year, fixed-rate mortgage rose from 3% to 6% this year—according to data from Zonda, ARCHITECT's parent company and the largest home-building property technology company in North America—some 16 million households were priced out of the market. With rates now flirting with 7%, the number is closer to 21 million households. Further, Zonda's affordability ratio captures that just 39.5% of households can afford the median-priced home nationally, down from 51% at the start of 2020.

While the affordability pressure is slowing the conversion to homeownership for many Americans, it is also forcing additional creative thought from the development community.

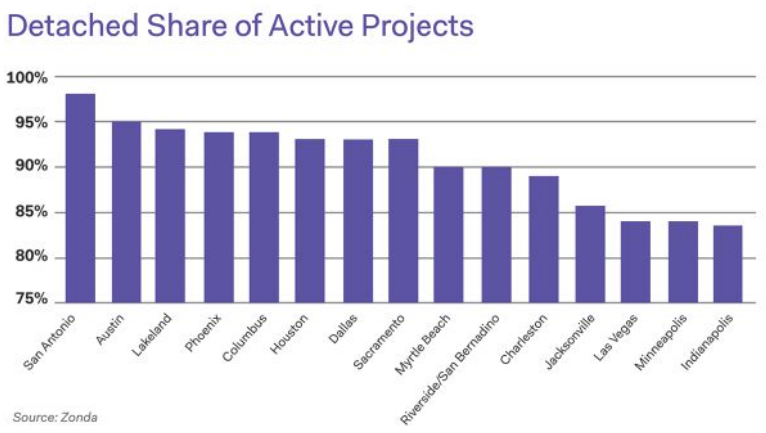
Many of the markets that saw rapid home price appreciation over the past couple of years were historically more affordable—ones where home prices and incomes were within a somewhat reasonable range. As we look at these markets, many spread across the South and Midwest, we see potential for land planning and new home product.

Even a modest change in the kind of homes being built can help address affordability; denser land planning and smaller homes generally allow for lower average selling prices. Builders in these markets are now looking at higher-density, single-family detached homes, changing the level of finishes within homes, adding accessory dwelling units where policy allows them, and, notably, constructing more attached homes such as condos, town houses, and duplexes, which are generally more affordable.

As of September 2022, 79% of new home projects are single-family detached homes, down slightly from 81% in 2018, per Zonda data. As always with housing, though, the rate varies by metro area. For instance, about 98% of active projects are detached in San Antonio, roughly 94% in Phoenix, and 93% in Dallas. In markets like these with a high share of detached homes, building more attached dwellings, especially at entry-level price points, can go a long way toward expanding homeownership.

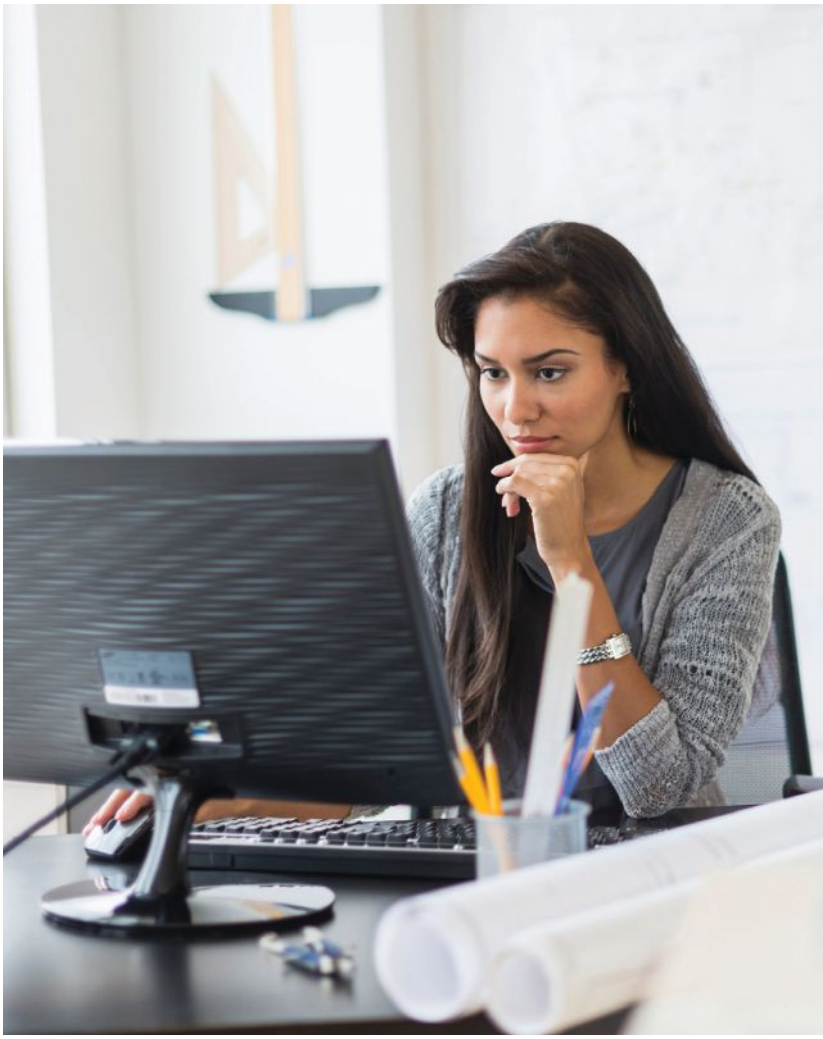
Conversely, in traditionally more expensive markets, attached product has represented a large share of new home projects for years. In New York, 87% of new home projects are attached, with 64% in San Francisco and 56% in Washington, D.C., per Zonda data.

Affordability will continue to be a headwind given high land prices, elevated inflation, regulatory costs, and growing borrowing costs. We need to focus on controlling what we can, including home design. Homes that address consumer must-haves, while also accounting for affordability, can help drive sales and increase homeownership.



Ali Wolf is the chief economist for Zonda, headquartered in Newport Beach, Calif.

> *To read more opinions, visit bit.ly/AROpinion. Interested in writing? Submit your pitch to architectmagazine@zondahome.com.*



FENESTRATION-FOCUSED CONTINUING EDUCATION COURSES

Catch up or get ahead on your continuing ed hours with free, on-demand classes on fenestration innovations, new products, architectural considerations, and more. Get the content you need to maintain your certification, membership and/or license with JELD-WEN's sponsored CEU courses today.

Learn more at
www.jeld-wen.com/en-us/for-professionals/continuing-education

SCAN THIS QR CODE
TO SEE ONLINE &
IN-PERSON CLASSES
AVAILABLE NOW

JELD-WEN

00-00000 00/22

Typology:

JST Harrisburg Production Engineering Center
Harrisburg, Pa.
Ryuichi Ashizawa Architects & Associates, Arcari + Iovino Architects

TEXT BY ELIZABETH FAZZARE

Osaka, Japan-based architecture studio Ryuichi Ashizawa Architects & Associates begins every project with a commitment to improving the land where it builds. For a recently completed Harrisburg, Pa., production facility for JST—a Japanese company that makes solderless electrical connectors—that mantra also fostered an exploration of the factory typology itself. Developed in partnership with New Jersey–based architect of record Arcari + Iovino Architects, the 79,394-square-foot building presents as perhaps the furthest aesthetic point from the typical rectilinear offices and warehouses that abut its site. Designed to evoke the form of a root system, clad entirely in alternating Douglas fir timber siding and floor-to-ceiling glazing, and surrounded by a tree-filled garden with a walking path by Osaka-based WIN Landscape Planning & Design, the JST Harrisburg Production Center reenvisions what an engineering-based workplace and factory can be—and look like.

The project began a decade ago, and after a series of starts and stops through the schematic design phase, the Japanese contractor Shimizu Corp. brought on Arcari + Iovino Architects as architect of record to develop and document its design collaboratively with design architect Ryuichi Ashizawa Architects. The client's brief called for meeting spaces and offices, a communal pantry area, and engineering and production spaces. What the design delivers is a highly contextual facility that embodies a "Japanese sense of harmony to the project," says principal Ryuichi Ashizawa. "This is also an opportunity for a Japanese client and a Japanese architect to challenge the idea of architecture in the United States ... Thus, we had three guiding dialogues: the past and the future, human beings and the natural realm, and the relationship between Japanese and American design."

Located in Harrisburg, Pa., the JST Harrisburg Production Center takes the form of a branching root system and features exterior cypress wood siding.

Using the site's natural topography, the firms introduced a series of swales to improve the water cycle, which had been damaged by surrounding industrial development. Controlling runoff means that the landscape now holds more water, and over time, natural growth will result in and encourage the life of new plantings, which include varieties of oak and maple trees, American beeches, and Heritage River birches. "The project is aimed at regenerating the forest" on the site, Ashizawa says. Along with extensive river pattern and sun studies, these swales also helped to determine the building's overall form.

The facility centers around a gently zigzagging, 0.62-mile-long communal gallery corridor hung with artworks and permeated by the sound of running water courtesy of a tiered feature in the main entrance that is an extension of the swales outside. Built with local stone, planted with indigenous ground cover and moss, and complete with a water-powered suikinkutsu, a Japanese garden device that produces music, the feature is a reminder of its environment. "I've

KAORI ICHIKAWA

> *To see more images and drawings of JST, visit bit.ly/ARJST.*

KALWALL®

high performance translucent building systems

envelop yourself in daylight...

photo: Adam Rouse
architect: Signum Architecture

Today's LEDs may last up to 50,000 hours, but then again, Kalwall will be harvesting sunlight into museum-quality daylighting™ without using any energy for a lot longer than that. The fact that it also filters out most UV and IR wavelengths, while insulating more like a wall than a window, is just a nice bonus.

FACADES | SKYROOFS® | SKYLIGHTS | CANOPIES

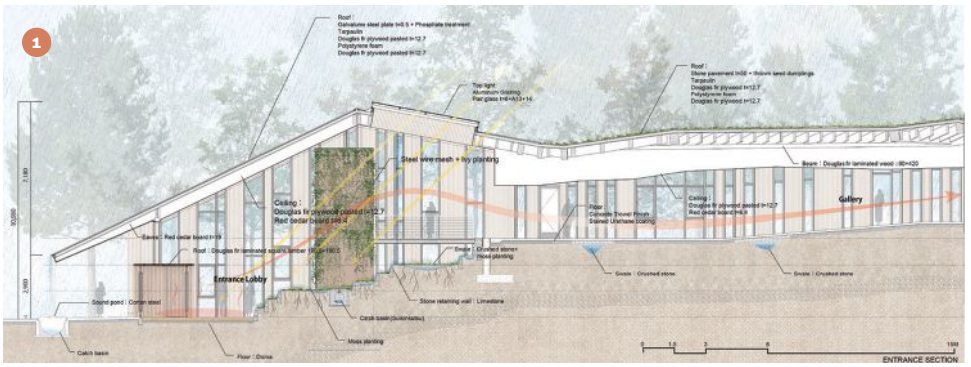
schedule a technical consultation at **KALWALL.COM**

Typology:
Ryuichi Ashizawa Architects & Associates, Arcari + Iovino Architects

spent the last 30 years of my architectural career trying to keep water out of buildings," says Edward Arcari, AIA, principal of Arcari + Iovino Architects, "but here, we worked out some details so water actually flows into the building and through the lobby."

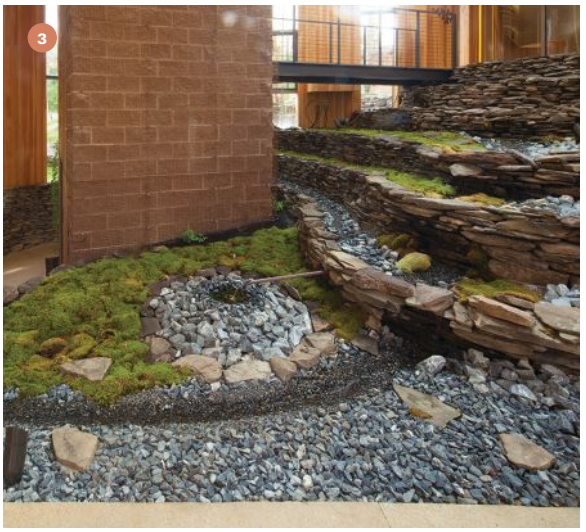
Entered from the front parking lot, the workplace teems with natural light. Conference rooms, offices, and the cafeteria are located in extended tendrils that allow necessary privacy while affording landscape views under shallow cantilevered roofs. Deeper into the building, the fir walls are less punctuated by windows to fit the functional requirements of the production spaces. The fractal plan's linear form encourages workers to move throughout the space and ends in a loading dock from which finished products are shipped. "RAA looks at and studies everything. Nothing is standard in this building," says Arcari of the bespoke project. From furniture to light switches, all interior design components were custom-made in Japan. The timber structure, however, is entirely local—fabricated and assembled on-site by Amish woodworkers based in Lancaster, Pa.

The international design partnership between Arcari + Iovino Architects and Ryuichi Ashizawa Architects was such a success that they are currently working together on six additional new JST facilities in Detroit. Arcari chalks it up to having "a visionary client, a visionary design architect, and hardworking teams to support all of that." Consistent communication between all parties, and an experienced conductor of the subcontractor orchestra, also helped. For Arcari, the project has invigorated an excitement toward new construction methods in wood. "What this project proves is that you can design a very functional operation like this and still have it be a one-of-a-kind, beautiful timber facility," he says. "It doesn't need to be in a boxy structure." With this design, says Ashizawa, "we were able to significantly change the natural environment and people's consciousness about it."



1

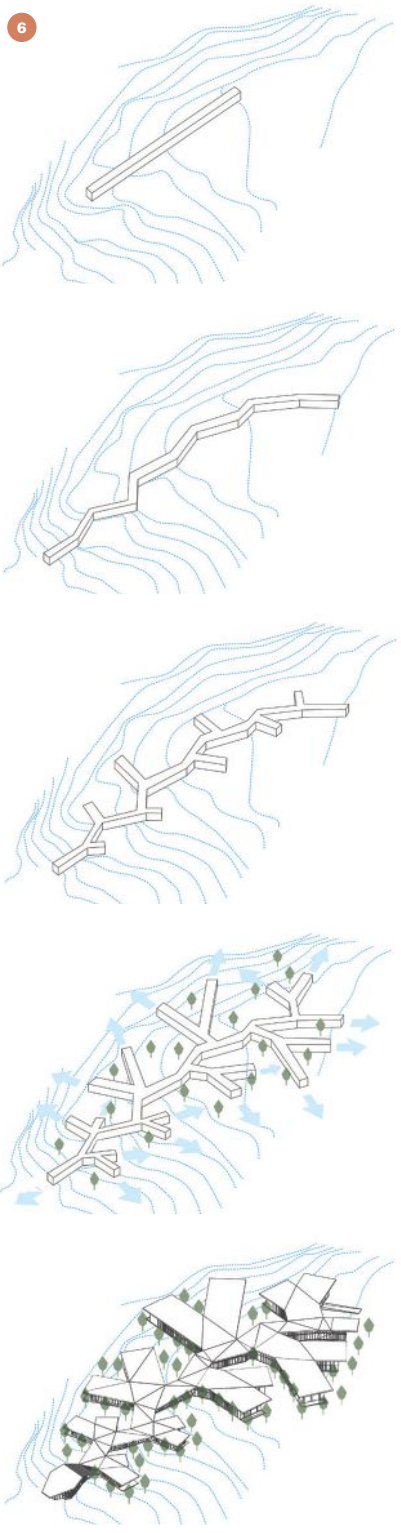
2



3

4

7

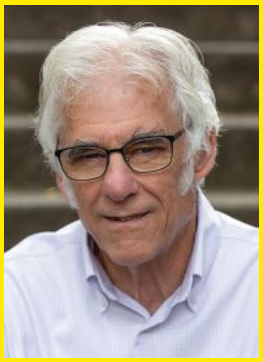


1. A section of the JST Production Center highlights the project's approximately 80-foot (24-meter) increase in grade from north to south. 2. The building's north entrance, the facility's lowest point, is defined by three external swales—trenches dug to direct the flow of water—stacked with natural stone. 3. Water that flows down the north-entrance swales creates an instrumental sound as it drains into an urn embedded in the earth. 4. The project's structure is arranged along 14 outdoor swales, maximizing the exterior envelope and "enabling people to feel the natural breeze, light, and movement of water, and relate to the dynamic scenery of the garden," according to a project description from the firms. 5. The interior furniture was custom-made in Japan from white oak. 6. The designers adjusted the building's main axis to complement the existing land and added branching wings that can be extended as the facility grows. 7. Wood columns and beams alternate with floor-to-ceiling glazing that floods the interior space with sunlight.

PHOTOGRAPHY: KAORI ICHIKAWA; DRAWINGS/MODELS: RYUICHI ASHIZAWA ARCHITECTS & ASSOCIATES

Designers Select: Material Innovation

From photovoltaic flooring to hemp-powered concrete, designers share pioneering products that are changing the way we build.



Charles F. Bloszies, FAIA
Principal
The Office of Charles F. Bloszies
San Francisco

Concreteworks: Custom Concrete Panels

concreteworks.com

"This material approach frees design expression while creating lasting structural assemblies. Utilizing CNC equipment, the fabrication studio can produce sophisticated molds for cast concrete and other cement-based materials, including super-high-strength mixes."

Onyx Solar: Photovoltaic Floor Pavers

onyxsolar.com

"This thin-film-laminated glass panel product can be made strong enough to include slip-resistant, walkable deck panels, offering a viable path to adding solar power to most commercial structures."

Ceraclad: Fiber-Cement Cladding System

ceraclad.com

"Relatively low-cost cement boards from Japan, these panels for exterior and interior uses also have a photocatalytic, self-cleaning coating option that cuts maintenance costs further. They are available in a range of finishes and patterns. We've used the product for supportive interim housing."

Ian Reves, AIA
Design Director
IA Interior Architects
Atlanta

Branch Technology: BranchMatrix

branchtechnology.com

"A friend from NASA has developed a 'C-Fab' process of large-scale, 3D printing that empowers an entirely new kind of architecture. We're curious to sculpt interior forms using BranchMatrix, inciting entirely new behaviors, moods, and modes of habitation within."

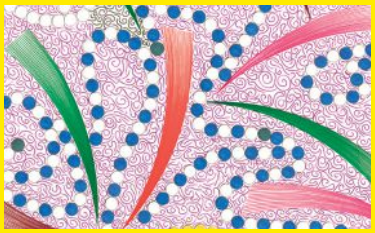
Noho: Noho Move Chair by Formway

noho.co

"From the minds that brought forward Knoll's Generation chair, Formway's Noho Move chair combines highly engineered recyclable materials into a fluid, flexible structure that's quite comfortable. Most intriguing is the wide range of uses the piece supports, ensuring a resilient life across a range of spaces."

Maharam: 6/15/20 Wallcovering

maharam.com



"Maharam's Digital Products have long featured inspiring art, textures, and tones. This composition by artist Sanou Oumar renders ephemeral dimensionality using mere rollerball pens and markers, evoking a deep sense of field and form from the most unexpected illustrative tools."

Mark Yoes, FAIA
Founding Principal
WXY
New York

Smarter Surfaces: Whiteboard Paint

smartersurfaces.com

"This high-performance commercial coating system turns most walls into writable and magnetic surfaces, creating flexible spaces for education and workplace collaboration while eliminating the need to hang whiteboards or metal sheets."

Hempitecture: Hempcrete

hempitecture.com

"This resilient biocomposite material also eats carbon by absorbing CO_2 during the curing process. Additionally, CO_2 is absorbed and offset during the life cycle of the industrial hemp plant, whether used as cast-in-place, unitary blocks, or spray applications."

GAF Energy: Timberline Solar Roofing

gaf.energy

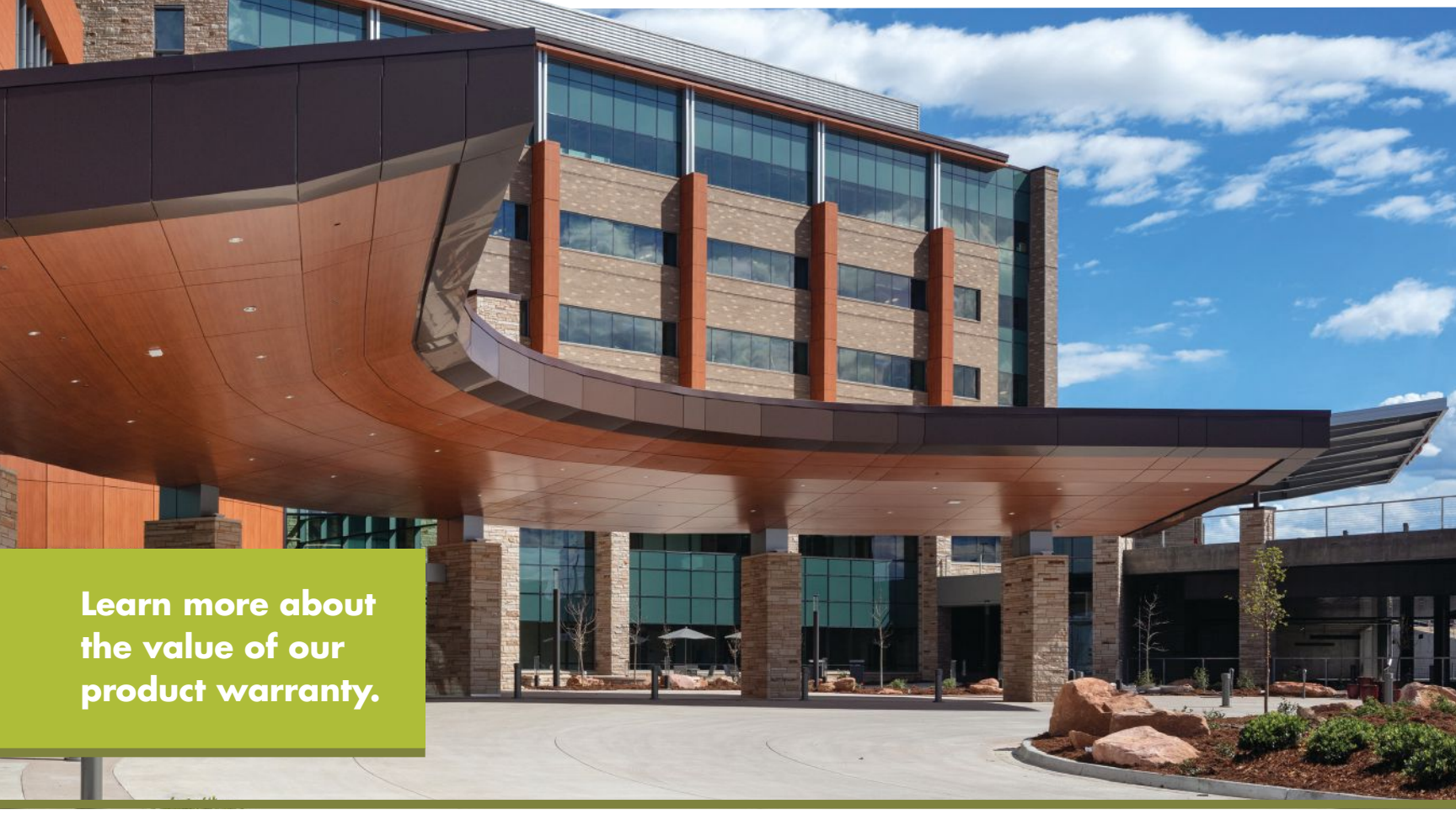
"Timberline Solar photovoltaic shingles offer a light and attractive profile for varied roof types even as they shed rain and withstand storm-force winds. Just as important, there's no drilling through shingles, tiles, or roofing membrane, so warranties remain in effect."

COURTESY, FROM TOP LEFT: LORI FULLER; JOE FLETCHER/GENSLER; ONYX SOLAR; CERACLAD; IA INTERIOR ARCHITECTS; ROBIN HILL; NOHO; MAHARAM; SATY + PRATHA; SMARTER SURFACES; HEMPITECTURE; GAF ENERGY

ALPOLIC®
METAL COMPOSITE MATERIALS

YOU DESERVE A WARRANTY

THAT STANDS FIRMLY BEHIND ITS MATERIAL.



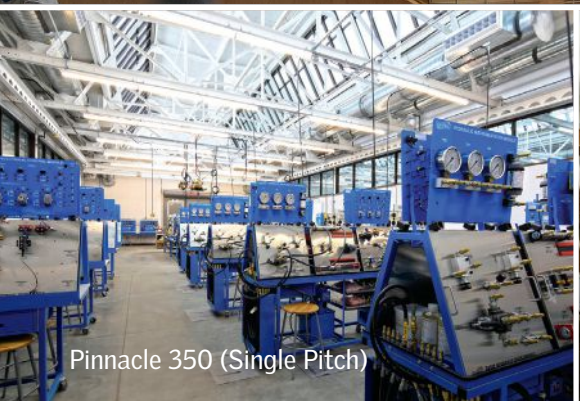
Learn more about the value of our product warranty.

ALPOLIC® metal composite material is backed by one of the strongest finish warranties in the business thanks to an easily overlooked Latin phrase, *in situ*. In the event you ever have to execute a warranty claim, in situ provides protection against replacement costs for more than just the materials.* We invite you to contact us or use our online calculator to estimate the value of our warranty for your next project.

alpolic-americas.com/warrantycalculator | 800.422.7270

Pinnacle Series (Single Pitch)

Architect: BNIM | Photo: © James Ewing/JBSA



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.

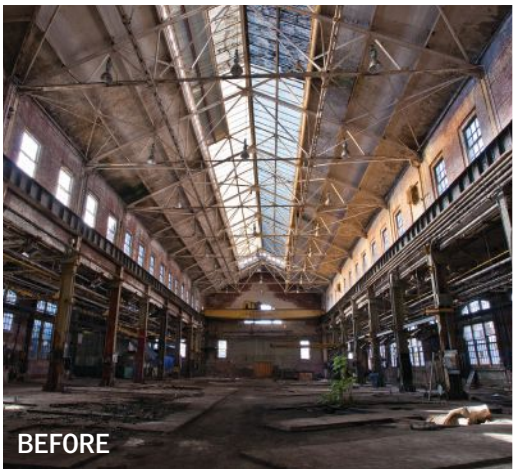
VELUX® Commercial

COMMERCIAL.VELUXUSA.COM

CASE STUDY

Urban Outfitters' Anthropologie Headquarters

VELUX's Pinnacle Structural Ridge System transformed this dilapidated old building into an inspiring, creative and light-filled work space.



VELUX's Pinnacle Structural Ridge System was chosen for its large-span capability, variable-pitch hinge design and fast on-site assembly and installation.

CHALLENGE

Building 18, formerly a metal foundry in Philadelphia's abandoned navy yards, needed extensive renovations to be converted into work spaces for Urban Outfitters' Anthropologie brand.

Attaching the massive metal skylight structure to the curbing and integrating with the roof posed a special engineering challenge. Another challenge was providing a design that met the National Park Service's stringent standards for historic renovation.

SOLUTION

"The stunning [Pinnacle Structural Ridge] skylight was the predominant feature, which raised the design to a whole other level," said David Ziel, Urban Outfitters' chief development officer.

The National Park Service uses this building project as a prototype for exemplary historical restoration.

Location
Philadelphia, PA

Project type
Refurbishment

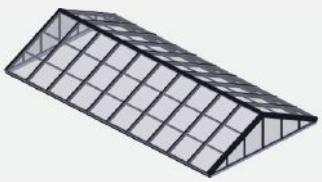
Year of construction
2015

VELUX® Commercial

COMMERCIAL.VELUX.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 350 Double Pitch

Spanning up to 40 feet wide, the Pinnacle Series Structural Ridge is a skylight structure with unlimited design possibilities.

Pinnacle 350 - Structural Ridges

RESIDENTIAL ARCHIT

Lindsey Slay Williams, ASSOC. AIA
Senior planner, community and regional planning, city of Houston

Brian Loughlin, AIA
Director of planning and urban design, Magnusson Architecture and Planning, New York

Melissa R. Daniels, ASSOC. AIA
Creator and host, *Architecture is Political* podcast; architectural designer, Maryland

Barbara Bestor, FAIA
Principal, Bestor Architecture, Los Angeles

Honor Award winner Wanaka Wedge House by Actual Architecture Co. is a three-bedroom residence in New Zealand.

RESIDENTIAL ARCHITECT DESIGN AWARDS

Each year, the Residential Architect Design Awards aim to highlight the best in single-family and multifamily architecture—forward-thinking new builds, renovations, and affordable housing initiatives that capture where the field is, and should be, moving. The eight winning projects in the pages ahead, culled from nearly 270 submissions, do just that. Carefully selected by a diverse panel of judges—who looked beyond aesthetic appeal to consider each building's problem-solving potential, environmental impact, and context within its community—this year's honorees chart a thoughtful and inspiring course for the homes of tomorrow.

TEXT BY **EDWARD KEEGAN, ASSOC. AIA,** AND **IAN VOLNER**
EDITED BY **MADELEINE D'ANGELO** AND **ANDREA TIMPANO**

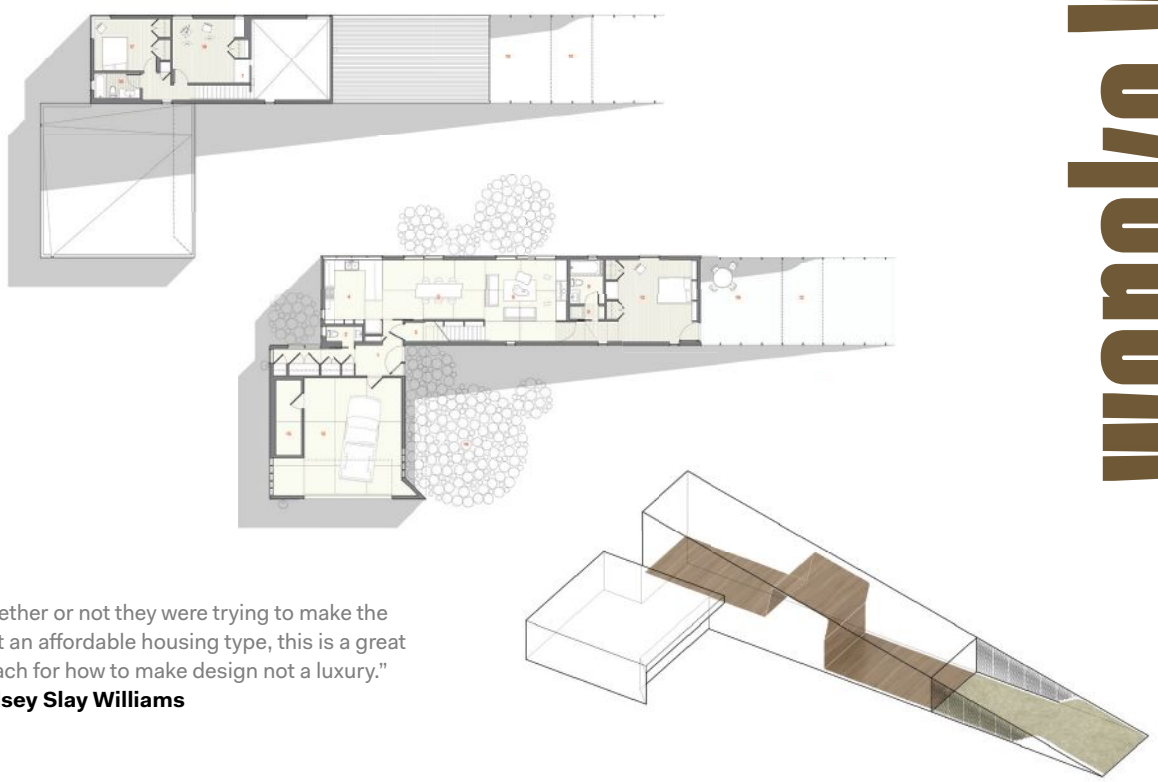
LIGHTFORGE

Wanaka Wedge House

QUEENSBERRY, NEW ZEALAND
ACTUAL ARCHITECTURE CO.

The New England coast might be a long way from the South Island of New Zealand. But with its design for Wanaka Wedge House, Actual Architecture Co. of Omaha, Neb., bridged the gap between these two seemingly disparate locales, proving the adaptability of the firm's unique approach to contemporary kit-based design.

Originally conceived for a site in eastern Maine, the 3,000-square-foot home is a far cry from the conventional, prefab catalog home. Sensitive to the needs of its sophisticated, art-loving clients, the team adapted its original concept into a luxurious bit of *urbe in rus*, adding custom features such as the locally sourced eucalyptus wood that warms select floors, ceilings, and walls. At the same time, the designers have ensured that the house is perfectly attuned to its remote Antipodean condition. Sitting on an upland slope in the scenic Otago region, the house's irregular fenestration allows multiple views of the windswept landscape, while its suite of eco-friendly features (solar-powered generators, renewably sourced lumber, regenerative plantings on the adjacent grounds) makes it a true complement to its natural surrounds. Equal parts economical and organic, Wanaka Wedge House bears out the promise of Actual's inventive prototype idea, bringing cosmopolitanism and comfort to a countryside near you. —I.V.

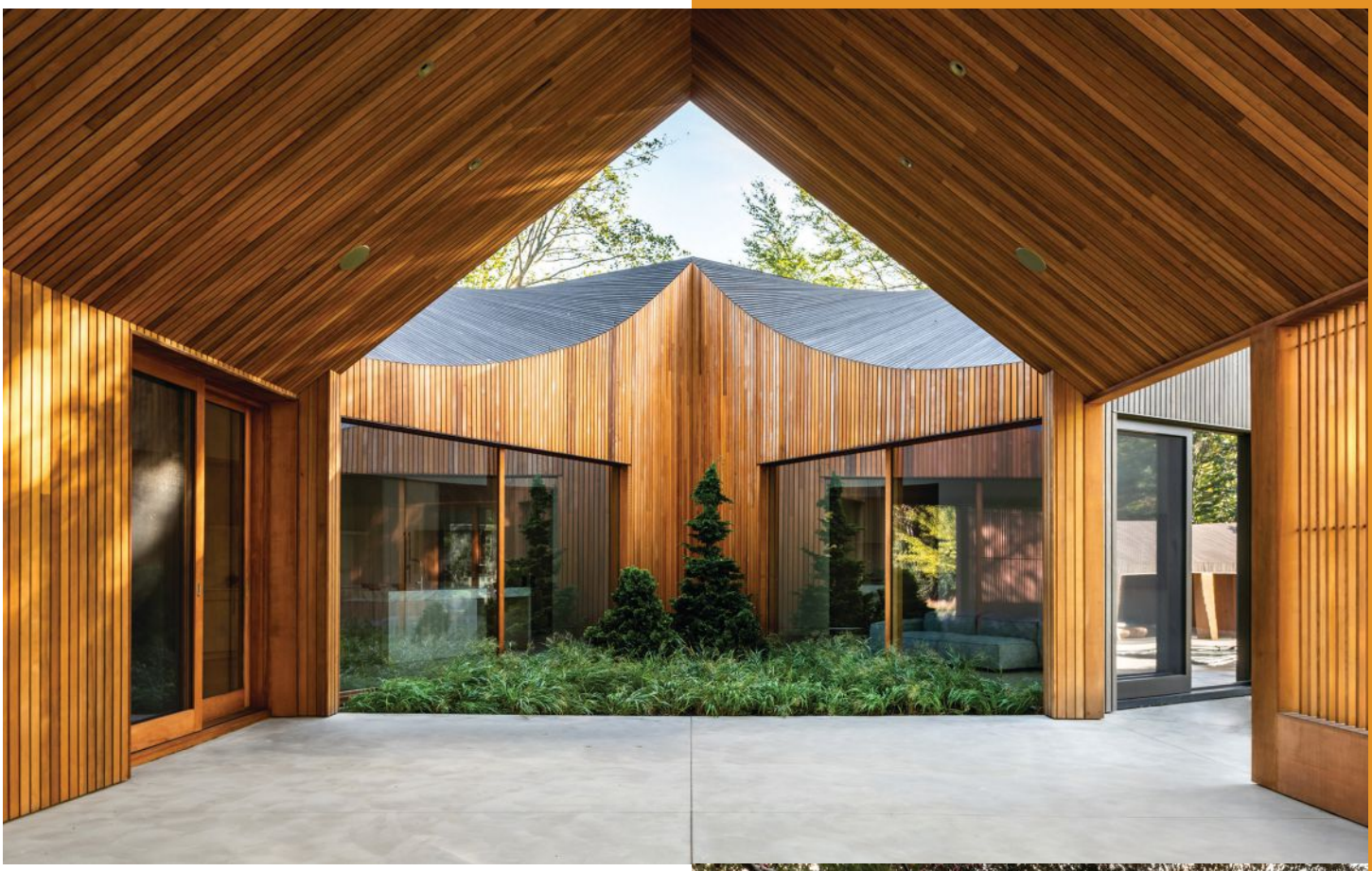


"Whether or not they were trying to make the project an affordable housing type, this is a great approach for how to make design not a luxury."
—Lindsey Slay Williams

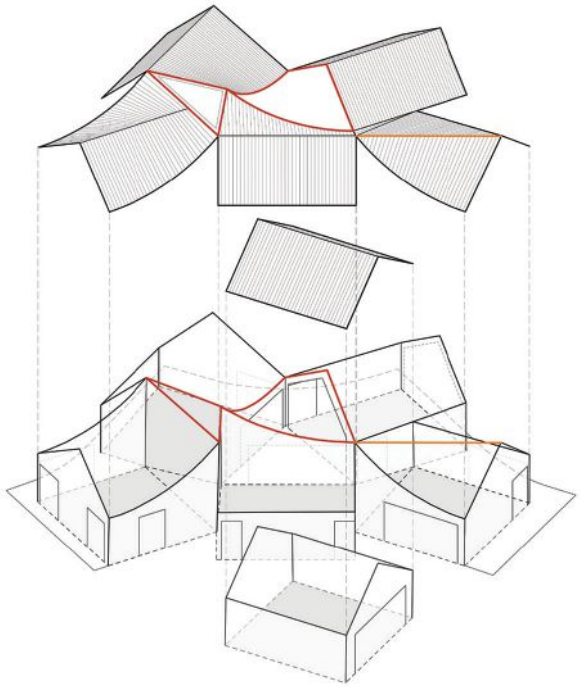
DENNIS RADERMACHER

> *To see full project credits and more images, including photographs and floor plans, visit bit.ly/AR22RADA.*

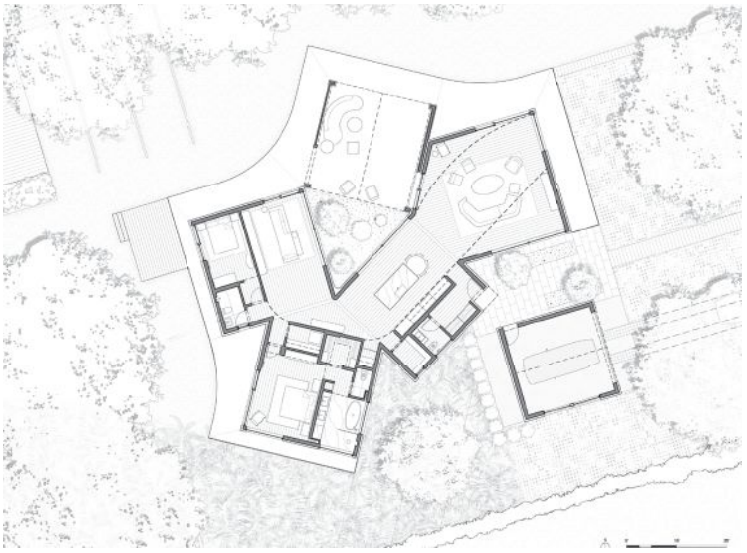
HONOR Custom Home / More Than 3,000 Square Feet



SIX SQUARE HOUSE



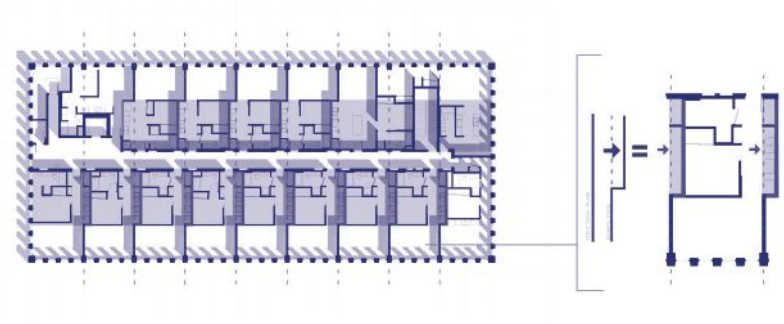
> "It's like an art pavilion that you can live in. I like the high concept, formal organization that successfully played out in the linked pavilions."
> **—Barbara Bestor**



BRIDGEHAMPTON, N.Y.
YOUNG PROJECTS

The designers at Brooklyn-based Young Projects embraced a modular approach for the 3,500-square-foot Six Square House in Bridgehampton, N.Y. Composed of six 24-by-24-foot pieces, the year-round residence—which sits near the center of a 2-acre site that includes a farmhouse and a pool area—draws inspiration from the vernacular typology of gabled barns in the area. Each module features a prototypical gable clad in deep gray, slatted Accoya that covers and links the exterior walls and roofs. The garage stands alone while the other five squares touch, forming a triangular courtyard.

Joined via a continuous ridge and an exterior module that shelters the patio, four enclosed modules serve as the heart of the house. The masses begin with the same ridge and eave dimensions, but these heights vary toward the interior of the composition, creating swooping volumes that define the living room, the kitchen, the primary bedroom, and the family room. The dynamically sculpted interior spaces—oriented for access to (and views of) the property's gardens, among other considerations—enhance cross ventilation throughout the house. —E.K.



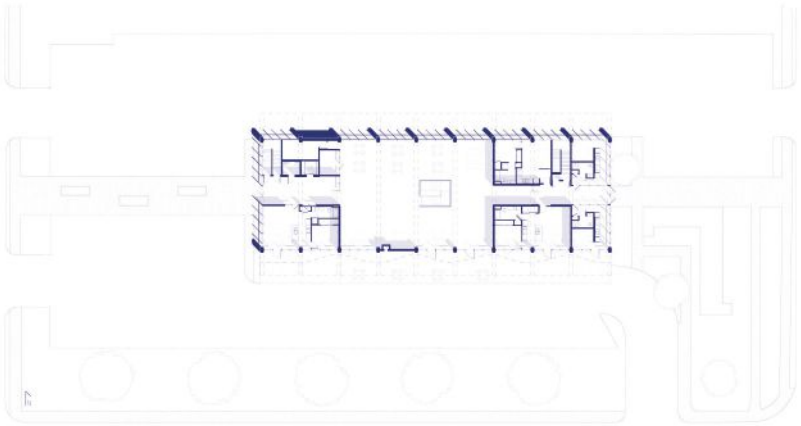
DAVENPORT, IOWA
ASK STUDIO

the BRENTON

Completed in 2020 as conversation surged around transforming vacant office space into housing, this renovation brings new life to a three-story, Midcentury Modern structure originally designed as a bank in Davenport, Iowa. Dubbed The Brenton, after the local financial institution that built it in 1966, the 39,036-square-foot building now houses 38 residential units that include market-rate and affordable rental apartments.

Despite the original building's unyielding gridded organization, Des Moines, Iowa–based Ask Studio managed to retain the structure's clarity of purpose while radically changing the functions for its continued life as a community asset. The architects kept the clear structural framework of the building, which they identified as an example of New Formalism. The original teller lobby on the ground level, for instance, has been preserved as the building's lobby and the center of common spaces for the new residents. It introduces the historical fabric of the building with its open space, long-span concrete arch structure, and original materials such as terrazzo flooring, aluminum framing, and wood doors.

The team honored the building's history upstairs, too. There, where bankers' offices once reigned, the existing double-loaded corridors running the length of the building on the second and third floors now serve studio and one-bedroom apartments. New systems, especially plumbing, required a deft touch by the architects to avoid compromising the original building's minimalist approach. In the same spirit, the interior color palette remains subdued, allowing elements of the original structure—including the terrazzo, aluminum framing, and wood doors—to remain prominent. —E.K.



"A catalyst for revitalization, The Brenton brought renewed life to this historic Midcentury renovation."
—Melissa Daniels

CAMERON CAMPBELL

HONOR Design Detail

FILIGREE HOUSE

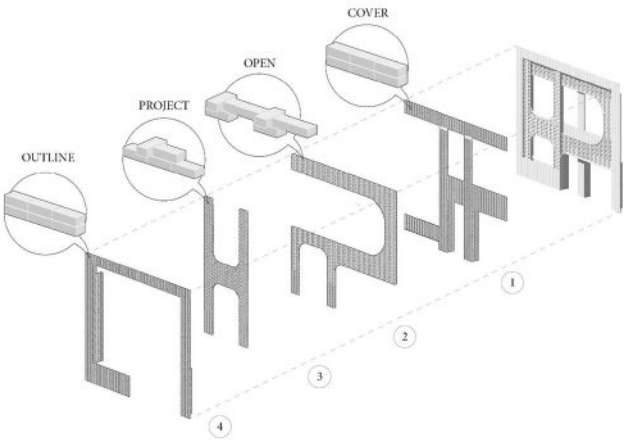
PHILADELPHIA
MOTO DESIGNSHOP

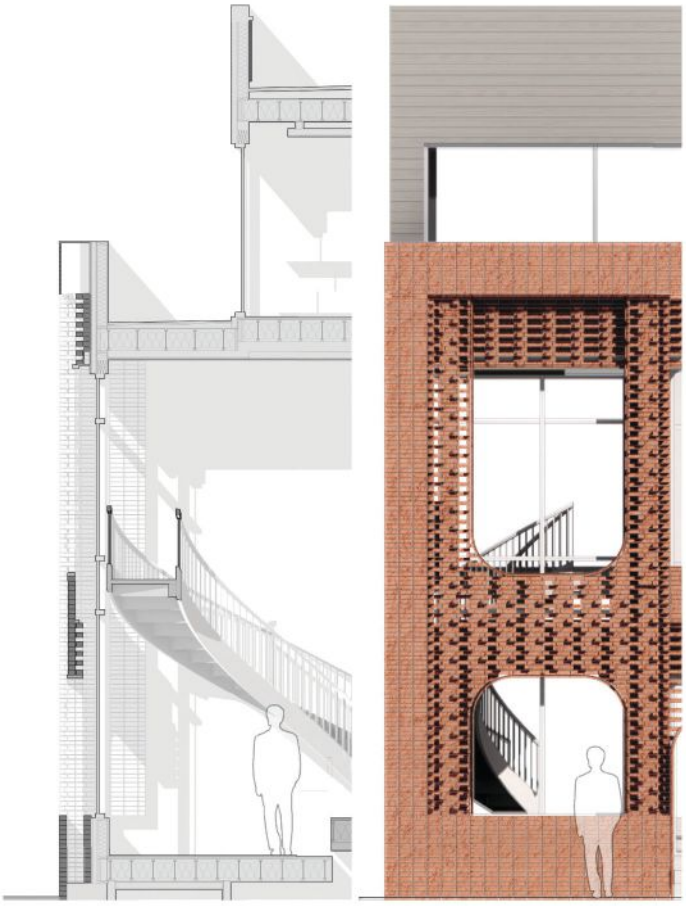
> The detail and layering of the brick façade adds a much stronger and unique presence to this row house than other examples in the same typology. That this was originally a 'spec house' makes the result that much more inspiring."
> **—Brian Loughlin**

Initially conceived as a spec house designed by the locally based Moto Designshop, it comes as no surprise that Filigree House ultimately won the heart of its developer, now the primary resident. Distinguished by its experimentation with brick, the 4,500-square-foot project becomes a thoughtful addition to Philadelphia's Graduate Hospital neighborhood.

The airy interior of the three-story, four-bedroom house is cocooned by an intricately layered brick screen, a defining element that gives the residence its name. Devised to shelter the house's extensive glazing and knit the new structure neatly into Philadelphia's traditional masonry vernacular, the brick façade rises two stories and is supported by a curved steel frame.

The four-layer screen also carefully balances light and dark while transforming brick into a contemporary and progressive expression. Each layer deploys a different bonding form, creating a rhythmic façade pattern that offers varying degrees of shade, shadow, and light. This sense of craft continues into the house with its custom kitchen and millwork, reminding visitors of the benefits that can result from exploration within traditional architectural prototypes. —E.K.





TODD MASON

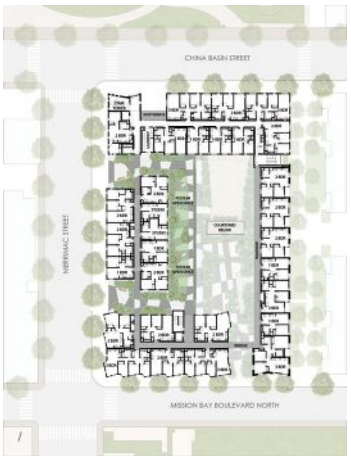
SISTER LILLIAN MURPHY COMMUNITY

BRUCE DAMONTE

SAN FRANCISCO
PAULETT TAGGART ARCHITECTS WITH ASSOCIATE ARCHITECT STUDIO VARA

At the white-hot center of America's housing debate, San Francisco has become a battleground of competing ideologies and models for bringing prices down and ending the city's pervasive homelessness problem. Into this contentious atmosphere, the Sister Lillian Murphy Community from local firms Paulett Taggart Architects and associate architect Studio Vara comes as a sort of architectural salve: A quiet, assured composition in muted white and gray, the complex exudes an air of serenity even as it provides 152 much-needed units of below-market family housing, right in the heart of the city's Mission Bay neighborhood.

The ensemble comprises four distinct volumes. A fairly standard, seven-story modern residential block sits on one side, while two rather less-typical-looking segments—one fitted with metal louvers and the other sprouting irregular, Rubix-like twists and turns in the façade—rest on the other. Most remarkably, between them, a peaked wedge of a structure presides calmly over the street corner. For all its visual appeal, the logic of this unusual plan is functional in inspiration, with the passageways between the components allowing light and air to filter through and around the complex and into the courtyard within. It is there, in the lushly planted landscape with its multilevel terraces sheltered by the building, that the project's communal character finds its fullest expression, offering a vision of inclusive civic life that just might be able to bridge the city's yawning political and economic divide. —I.V.



"I like that urbanistically it's four buildings with a courtyard inside. If you've been in San Francisco, there's not a lot of outdoor space available to people. This massing model is great as opposed to the kind of generic mega box."
—Barbara Bestor

HONOR Specialized Housing

COVENANT HOUSE

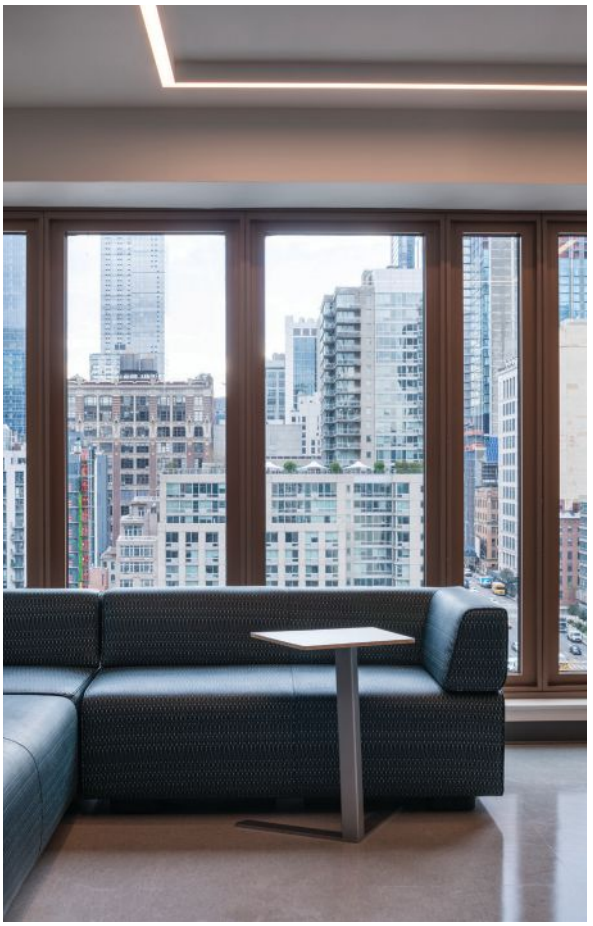
ADAM KANE MACCHIA, EXCEPT BOTTOM NEAR LEFT, CHRIS COOPER

NEW YORK
FXCOLLABORATIVE

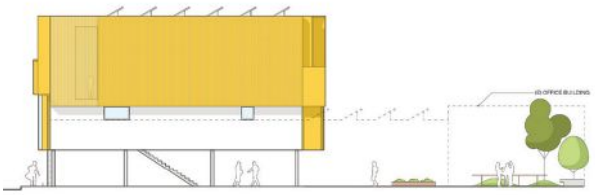
Brooklyn-based FXCollaborative designed this sleek 12-story, brick-clad structure for Covenant House New York, a 50-year-old housing provider that, until now, operated in facilities originally designed for other purposes. Located in the evolving community of Hell's Kitchen, the new 80,000-square-feet building serves the homeless youth of New York City. The four-story base houses a wide variety of programs to help as many as 1,900 at-risk young adults annually, with the tower above providing individual sleeping rooms and support spaces.

The facility is organized around a central security point just off the sidewalk. A featured wood stair, called the Stoop, welcomes visitors and provides access to the second floor where multiple gathering spaces serve the Covenant House community. The six floors of residential shelter, meanwhile, provide up to 120 beds. Individual bathrooms and bathing rooms offer privacy that respects the gender identity of all residents. The design of the outdoor spaces is just as thoughtful: An expansive, covered first-floor courtyard and a second-floor terrace are inviting hangouts for all, while a fifth-floor terrace at the building's setback accommodates staff.

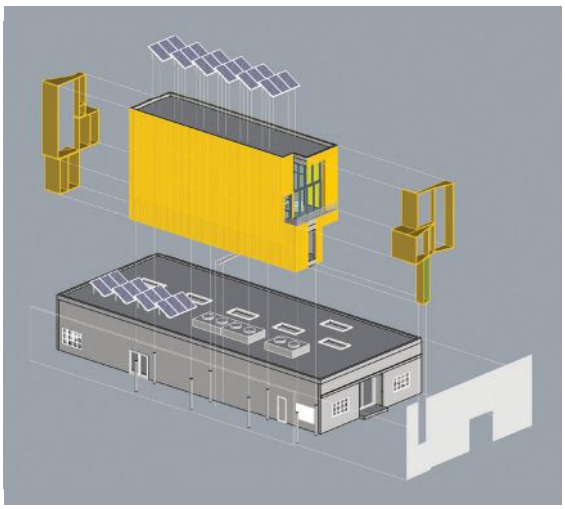
The structure's design balances solidity and transparency in much the same way that the facility provides for the dignity of the individual resident and offers gathering spaces for community. Windows deeply set in the structure's brick wall express a sturdiness of construction that reflects Covenant House's mission and aspirations for its residents. The fenestration varies between the base and tower, with wide, extensive windows for the public spaces on the lower floors and individual windows that mark the sleeping rooms in the tower above. Brick, stone, copper, and wood demonstrate these values in built form and promise a bright and durable future for the organization and its residents. —E.K.



"There is a well-balanced juxtaposition between the upper floors—wrapped with smaller windows lending a sense of privacy and intimacy—and the lower floors, filled with wide open common spaces projecting a positive image out onto the streetscape. It is well thought out, and a great example of what supportive housing can mean to its residents and contribute to a neighborhood."
—Brian Loughlin



> [In] Houston, we have so many buildings that are underutilized and such a dire need for housing. I think this is a good [example] of adding on to existing spaces, especially in industrial areas."
> **—Lindsey Slay Williams**



XANTHO WORK HOUSE

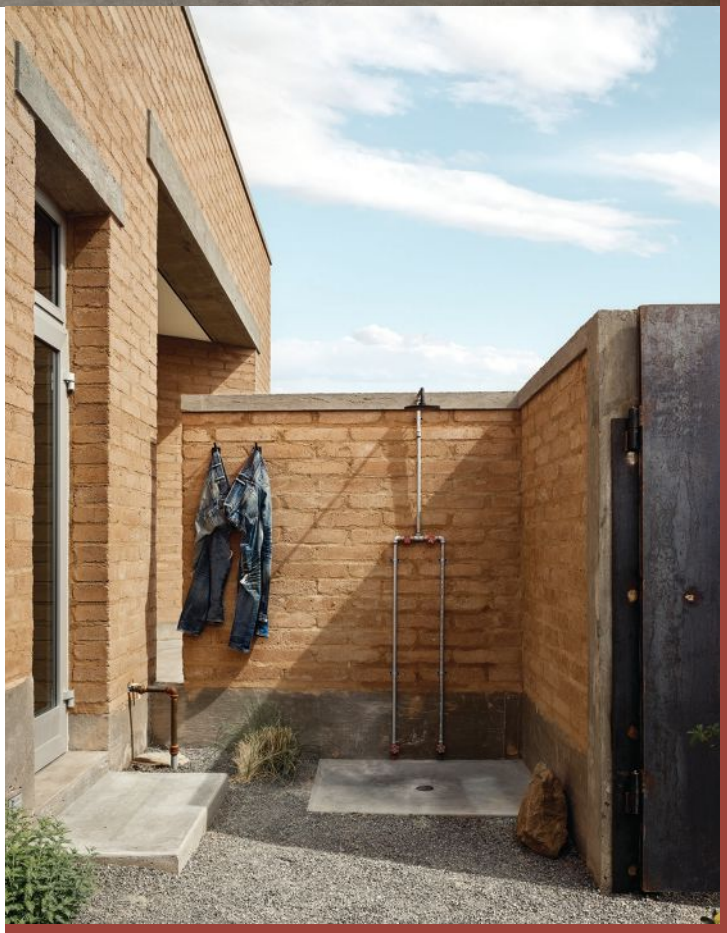
HAWTHORNE, CALIF.
BROOKS + SCARPA

With the continuing post-COVID popularity of working from home, what sorts of new architectural typologies might emerge to serve this growing sector of the American economy? One answer, from Los Angeles–based architects Brooks + Scarpa, is Xantho Work House: a novel admixture of residential and office space that manages to combine the best of both while becoming something altogether its own.

Located in the Hawthorne neighborhood of southern LA, Xantho (the name comes from a naturally occurring yellow pigment) is a hybrid design in more ways than one. A renovation of an existing workshop structure, the proposed 1,600-square-foot project is located at the outermost edge of a manufacturing and warehouse district, right where it abuts a scenic landscaped park. Brooks + Scarpa's expansion and remodeling accentuates the juxtaposition of the industrial and the domestic. Adding a two-story, 800-square-foot rooftop apartment to the shed-like base, the project will allow the client to live directly above his tech-business office; the arrangement hearkens back to the palazzos of medieval Venice with luxurious living quarters situated atop canal-front work and storage levels. Featuring expansive views in all directions and a new green wall affixed to the workshop façade, the scheme proffers a seductive and eco-friendly model for the live-work future—one that bears just a little resemblance to the pre-office past. —I.V.


Products

MERIT Custom Home / 3,000 Square Feet or Less

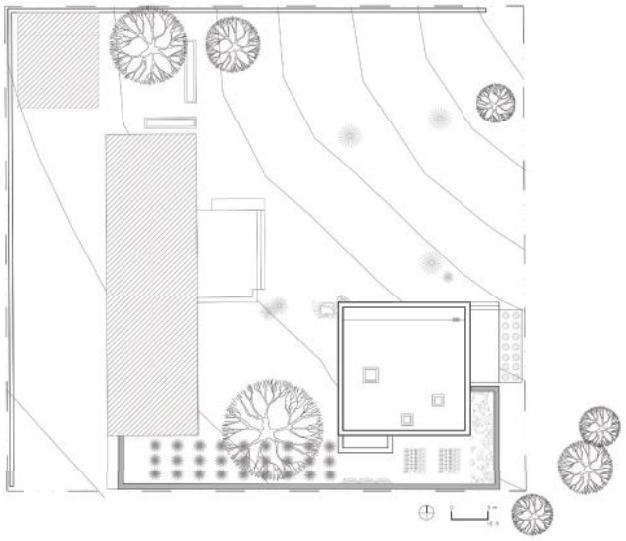


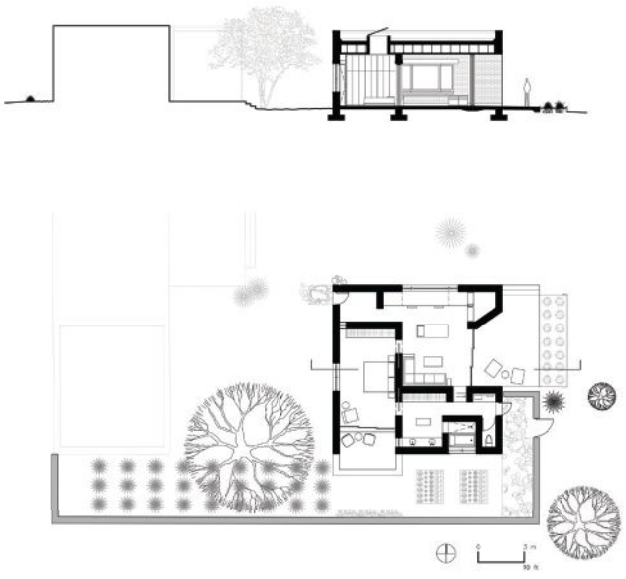
MARFA SUITE

MARFA, TEXAS
DUST ARCHITECTS

Calling the Marfa Suite house "haunted" is in no sense a put-down. The project from Tucson, Ariz.–based DUST Architects seems to be inhabited by a few very impressive, very attractive ghosts: the landscape of the Chihuahuan Desert, the eerie emptiness of which gives the town of Marfa, Texas, its peculiar allure; the work of Donald Judd, the famous Minimalist artist who first made Marfa an art-world hot spot; and the cultural memory of the American West, with a romance that DUST has successfully translated into a uniquely poetic yet practical domestic design.

With an exterior made out of compressed-earth blocks, the house presents as a rough-hewn, rustic form—an impression that carries through the modestly scaled interior with its exposed concrete floors. The site plan, including intimate garden enclosures planted with indigenous flora, is carefully calibrated to make the house feel like a part of the vast, unpeopled ecosystem, and its simple unobtrusive silhouette won't spoil the view from the neighbor's ranch. Yet Marfa Suite is also a very comfortable—and decidedly luxurious—machine for contemporary living, equipped with operable skylights, radiant-heat floors, and custom wood furniture and closets. Lilting and elegiac, Marfa Suite is a house of echoes, full of old familiar voices singing about space, place, and the past. —I.V.





"The intense crispness of the rammed-earth exterior is situated perfectly in the Texan desert."
—Melissa Daniels

LaCANTINA V2 FOLDING DOOR

LACANTINADOORS.COM

ALL THE FEATURES, FOLDED IN.

MORE GLASS AND LESS FRAME
EASIER OPERATION
STREAMLINED DESIGN

FIND A LOCAL REPRESENTATIVE FOR THE ALL NEW V2 FOLDING DOOR / 888.221.0141

LaCANTINA

AIA Architect

CEDRIC ANGELES

Managed Retreat

Planning for the future is going to mean engaging communities in a meaningful way.

As told to Christina Sturdivant Sani

Steven Bingler, AIA, is the founder and CEO of Concordia, a New Orleans–based architecture firm that helped lead recovery in Louisiana after Hurricane Katrina. He has since worked to identify solutions to climate risks in areas that are increasingly experiencing climate-related emergencies. Bingler is known for his work in managed retreat, which aims to proactively move people, structures, and infrastructure out of harm's way before disasters or other threats occur.

Adaptation means you stay where you are, and you adapt to the climate conditions as they change—in this case, as they continue to get more challenging. When they get to the point where you can no longer comfortably survive in a particular climate or place, you have no choice but to look at other measures.

Wildfires, drought, inland flooding, riverine flooding, coastal hurricanes, storm surge—all of these events are factors that we as planners are going to be faced with over the next 20, 30, 50 years. According to the science, conditions will get significantly worse as we move closer to the end of the century. The latest [estimated] number of people who will be dislocated due to coastal flooding is around 13 million, according to the University of Southern California.

It's now time for us to start planning to see how infrastructure could be redesigned in smaller towns so they can be prepared to take on some of the migration from the coast. Nobody wants to leave their home and people will do almost anything to stay where they are because that's where their families are; that's where they grew up; that's what they're used to. We've learned in our research in South Louisiana that people are jacking their houses up as much as 30 feet in the air.

We can expect the cost of these movements, migrations, and the rebuilding of some of our cities to be excessive. They'll be inflationary. It's time for us to be thinking from a budgeting point of view, nationally and internationally, about how we're going to accommodate all those costs. And it is incumbent upon professional planners and architects to take on the role of educating the community about what the conditions are, and what they can expect, because elected officials are not likely to do it.

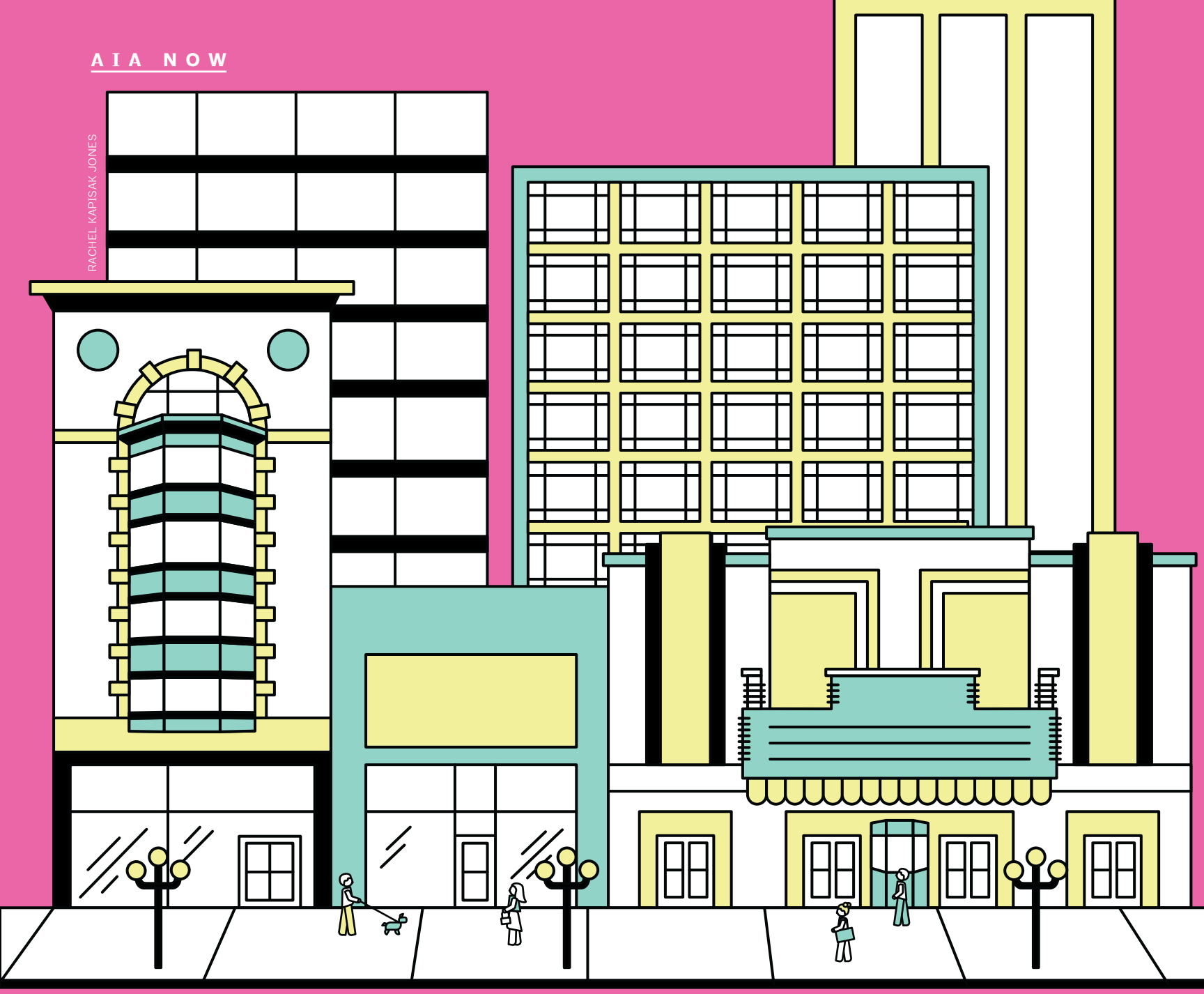
There was a time when a lot of us felt like maybe the climate crisis could be averted and that we could reduce our consumption of fossil fuels, for example. I think that's happening to some degree, but nowhere near the level that would be required for us to avoid some of the catastrophic changes that are coming. Architects have demonstrated that we can rise to the occasion: for example, by making buildings that are more energy efficient. But we're now in a more advanced stage of understanding how to live and plan with nature.

I would encourage everyone in the profession to spend time getting up to speed with the tools that are available and especially the processes for engaging communities in a meaningful way. If there's any big lesson to be learned here, it's that when people's lives are at stake, they want to be involved extensively in any planning that's defining the pathway for their future. AIA

AIATrust
Where smart architects
manage risk®

theAIATrust.com

RACHEL KAPISAK JONES



In 2022, architectural billings for renovation overtook those for new construction for the first time.

By Jennifer Riskus and Katherine Flynn

For the first time in the 20 years that AIA has collected this data, renovations—rather than new construction—breached 50% of firm billings in 2022, per AIA's Architectural Billings Index. According to AIA's chief economist Kermit Baker, HON. AIA, the last time that design services were so heavily weighted toward renovation was likely during the Great Depression. The trend is particularly strong at firms with a commercial or industrial specialization (62%) and firms with an institutional specialization (61%). The share of renovations has been increasing steadily since 2017, when new construction topped out at 44%. The trend is likely to continue as building stock ages. **AIA**

Source: AIA Architectural Billings Index

RACHEL KAPLSAK JONES

A Year of Flux in Architecture

Despite sometimes slow progress, the profession continued to move forward.

By Katherine Flynn and Daniel Jonas-Roche

Architecture in 2022—like many industries—was defined by flux.

Let's start with a net positive, as well as a first: As highlighted in this month's *AIA Now* statistic, renovation outstripped new construction this year for the first time in the 20 years that AIA has been collecting data on firm billings. AIA's chief economist Kermit Baker, HON. AIA, doesn't think these numbers will change anytime soon.

"This is a long-term trend; our economy is growing slowly—a lot slower than it has in recent memory—and I think that means we don't need new things so much as we need to reuse what we have," Baker said in an online piece, "Renovation claims 50% of firm billings for first time," for AIA in May of this year. "Until we reverse this trend, which I don't see happening, we are going to move toward an increased share in reconstruction and a decreased share in new construction."

While the trend isn't solely driven by an uptick in sustainability-conscious clients—AIA data reflects that only 3.8% of renovations are undertaken to explicitly improve building energy performance, while 1.6% are undertaken for improved resiliency—building reuse is still a critical part of reducing the carbon footprint of the built environment.

The value of renovation and reuse was reflected in one of the winners of AIA's 2022 COTE Top Ten Awards, the Roxbury Branch of the Boston Public Library. Located in Nubian Square, a longstanding hub of African American culture in the city, the redesign of the Brutalist building prioritized community connection. By repositioning the front door of the library and its relation to the street, architects at Boston-based firm Utile made the library "a real and connective front porch to the community," project architect Michael LeBlanc, AIA, told writer Anjulie Rao in "Who Cares?" in the September issue of ARCHITECT.

In the process of creating a building that was welcoming rather than forbidding or inaccessible, the Roxbury Branch retrofit also drastically lowered the building's heating and cooling costs, demonstrating that—whatever the reasons driving a renovation—sustainability and public care can, and should, complement each other.

"Care is a less-conventional lens through which to see sustainability practices in architecture," wrote Rao.

She continued, "In many ways, the AIA Framework for Design Excellence—which asks architects to create narratives around their efforts to address ideas like 'equity' and 'community connectivity'—forces architects to think clearly about care as a linchpin to 'sustainability' work."

The theme of care in architecture in 2022—and the tenets of the Framework for Design Excellence—was reinforced through the bestowal of the AIA Gold Medal on Angela Brooks and Lawrence Scarpa, co-principals of Brooks + Scarpa, who are, as AIA stated in a press release, "potent form seekers and socially responsible practitioners, a combination not easily replicated." Brooks and Scarpa made their names partially through their designs for affordable housing and sustainable architecture, with projects like Step Up Special Needs Housing in Santa Monica, Calif., and the SIX Disabled Veteran Housing in Los Angeles. Their legacy was formed not just through innovative and visually stunning design but also through a sense of communal responsibility.

"Our design solutions affect more than the client and current occupants," wrote Dan Hart, FAIA, this year's AIA president, in his September Perspective column for this magazine. "Good design positively impacts future occupants and the larger community."

Care Inside and Outside the Profession

Extending the idea of care to those working within the profession was another key theme of 2022. AIA's most-read ARCHITECT piece this year, April's "The Burnout Problem in Architecture," addressed a troubling statistic: Of 225 architects surveyed in 2021 by architectural software company Monograph, 96.9% reported experiencing some form of burnout. Anecdotally, AIA found that increased workloads during the pandemic, as well as the exacerbation of already present challenges that women and people of color face in architecture, were forcing many to reconsider their relationship to architectural practice—and in some cases, leave the profession altogether.

There was no doubt that the shock waves being felt in architecture had the potential to impact what the profession looks like for years— even decades—to come.

These elements had a role in fomenting support for a labor movement in architecture this year, calling into question long-standing assumptions about what architectural workers deserve and how workers should go about attaining better pay and working conditions.

In 2021, architectural workers in New York formed Architectural Workers United (AWU) under the umbrella of the International Association of Machinists and Aerospace Workers. It was the first union organizing in the profession in over 80 years, when the Federation of Architects, Engineers, Chemists and Technicians (FAECT) folded during McCarthyism. AWU's goal was to prompt changes to industrywide problems like long hours and pay that can be substantially lower than what other highly skilled professionals earn, especially considering architecture's long educational and licensure processes.

According to the Bureau of Labor Statistics' Current Population Survey data for 2020, women, Black, and Latinx employees are underrepresented in architecture, which is congruent with AIA's data. Women architects, the survey stated, also earn 18% less on average than male architects.

Conversations addressing the latter continued to gain momentum this year. AIA facilitated several of these, particularly through its Women's Leadership Summit and accompanying webinars tackling mental health in the architectural workforce. Norms and expectations around workload in the profession are changing as mental health professional Dr. Akua Boateng pointed out during a mental health webinar in June.

"Culture begins to shift when we realize what's good for our collective and not just for our products," she said.

Future of Sustainability

The profession of architecture continued to advance its sustainability goals this year via wins both big and small.

There's no doubt that architects are now working from a solid foundation of knowledge in the design of low-emission buildings. "We [architects] are really starting to make progress on climate action," Lori Ferriss, AIA, told AIA in June. Ferriss, director of sustainability and climate action at Goody Clancy, presented at AIA's 2022 Conference on Architecture in Chicago on the panel "Design for Climate Action & Climate Justice: Redefining Value."

Ferriss continued, "Even if we don't always implement as much as we could on our projects, we really understand how to design for decarbonization and how to think about resilience and designing for the future climate."

Convincing clients to invest in green design is one of the biggest pieces of the decarbonization puzzle, as William Richards acknowledged in his April ARCHITECT article "How to Accelerate Decarbonization in Three Easy Steps."

He wrote, "According to everyone interviewed for this piece, scaling up or down one's ambitions to decarbonize architecture, or even scaling up or down in how it can work in terms of gross square feet, might not be easy or straightforward. But, all it takes is seeing the opportunities every day to create, select, and promote strategies that eliminate carbon emissions by setting targets, making goal acquisition part of normal practice, and advocating—at the personal level and the policy level—for these strategies."

There were, in fact, several large wins this year at the policy level that Richards refers to. Supported by AIA, the Inflation Reduction Act, signed into law by President Biden in August, was heralded as the largest climate investment in U.S. history by pundits and news outlets. The legislation is estimated to cut greenhouse gas emissions in the U.S. by 40% by 2030 compared with a 2005 baseline. It includes another $330 million in grants to states and local governments to adopt the latest energy codes and an additional $670 million to adopt and implement zero-energy stretch codes—a top AIA priority for 2022.

This built on the momentum started by AIA's support of the Infrastructure Investments and Jobs Act (IIJA), passed in late 2021, which included $2 billion for FEMA's Building Resilient Infrastructure and Communities (BRIC) Program, $500 million for energy efficiency upgrades to public schools, and $225 million to stimulate cost-effective building codes implementation. All of these provisions will make it easier for architects to implement the greenest designs possible.

As Greg Menti reported for AIA in October in "New report outlines progress of 2030 Commitment," the pledge, which aims to serve as an actionable set of standards and goals for reaching net-zero emissions in the built environment by 2030, faltered a bit in its targets over the last few years due to the pandemic, supply chain disruptions, and an uneven political landscape that found sustainability taking a backseat.

"Frankly, one of the most interesting metrics is that we're only tracking about a 50% reduction over our original baseline while the current target is 80%," 2030 Commitment co-chair Ashley Mulhall, AIA, told Menti. "We've plateaued as an industry, and we've been trying to get to the bottom of it and help firms get past that hurdle."

Mulhall continued, "There was an increase in signatories, which means a lot of firms are just getting started and moving a bit slower. But we also need to stop thinking of 80% as our target, and make movements toward 100% net zero as the real target. That'll move the needle faster."

The Future of the Profession

Making the profession of architecture more equitable and diverse is a stated goal of AIA. As of 2021, the National Council of Architectural Registration Boards (NCARB) reported seeing growth over the last decade in Asian and Latinx populations, leaving representation of Black and African American professionals around 2%. This is an area for growth that architectural education, and the profession at large, will need to continue to address in the next year and beyond.

Susanō Hideko Surface, an instructor at a Seattle-based design and visual arts program, is one of a handful of educators in the U.S. today taking a new approach to better prepare students for professional practice in an industry where the odds continue to be stacked against women and minorities.

"Like other instructors, I teach the basics of how to understand and edit contracts, and how to minimize risk," they say. "In addition, I emphasize negotiating fair wages, fees, and working conditions. I teach how to document workplace harassment and how to talk to lawyers in a free, 15-minute consultation to see if they're a good fit for an anti-discrimination case. In short, I offer guidance on how to survive in white, capitalist, professional culture so artists and designers can function without internalizing orthodox thinking about how practice works."

Again and again this year, we saw that tough conversations are often an imperfect starting point for change in the profession—but they don't need to be perfect to be impactful. Indeed, there's no other place to start. **AIA**

Pledge for a better future.

AIA

Join 1,100+ design firms who have made the AIA 2030 Commitment.
aia.org/2030commitment

Change how you evaluate the materials you specify daily.
aia.org/materialspledge

Beyond Shelter

A new urban typology in Los Angeles may hold answers for the city's homelessness crisis.

By Joann Plockova

From above, they might be mistaken for an art installation, or a new Legoland park.

Their odd shapes, often long lines of varying width, are complemented by vibrant swaths of color on the ground.

Designed to become part of the urban fabric of Los Angeles, these eye-catching sites are a series of bridge home communities offering an experimental solution to the city's homelessness crisis. Constructed on overlooked lots with 8x8 pallets as their building blocks, Tiny Homes Villages go beyond shelter to provide a sense of community and dignity through design.

"It's a new urban typology in Los Angeles," says architect Michael Lehrer, FAIA, founding partner of LA-based Lehrer Architects LA, which—in collaboration with the city—has designed five Tiny Home Villages.

Lehrer Architects LA is certainly no stranger to these types of projects. For more than 20 years, the firm has been conceptualizing design-led solutions to shelter unhoused (and formerly unhoused) that embody the firm's "beauty is a rudiment of human dignity" ethos, including the award-winning Downtown Homeless Drop-In Center on Skid Row. Lehrer has served on the board of Homeless Healthcare Los Angeles for 20 years.

"All that [experience] just gives a different kind of perspective [and] understanding [of] the complexities and deeply unintuitive nature of homelessness," he says.

It was the firm's inclusion on what Lehrer describes as a competitive, pre-vetted list of about 20 architects for the city that ultimately led to its involvement in the Tiny Homes Villages. Just prior, Lehrer won the design contract for AETNA, a dormitory-style bridge home built from preassembled modular units, which opened in August 2020 in Van Nuys. Through this design-bid-build project, Lehrer's firm began its fruitful

LEHRER ARCHITECTS

Chandler Boulevard Bridge Home Village, completed in February 2021, was the first Tiny Homes Village project.

relationship with Ford Construction, which, along with the Bureau of Engineering for the city of Los Angeles, has led the five design-build Tiny Home Village projects.

"The city finds the site, initially vets the number of units that fit [and] the range of infrastructure requirements, and produces bridging documents, which the contractor bids on," says Lehrer. "We are an integral part of the Ford team."

Completed in February 2021 in just 13 weeks at a cost of $4.4 million, Chandler Boulevard Bridge Home Village was the city's first Tiny Home Village.

"[The] first project really was a beta project," says Lehrer. "This typology, tiny home villages and units, had never been used in LA."

Located in North Hollywood, Chandler includes 40 one- and two-person shelters, along with a series of carefully arranged, prefabricated modular units that house common space (from dining to showers to secure storage) and contribute to a sense of community as well as to the ability to build each village with speed. "Speed is among the virtues of these projects," says Lehrer. "Things that would [normally] take months took days or hours." As with most of the Tiny Home Village projects, Chandler's unique set of challenges is rooted in its site. "[It's a] pretty fantastically weird site," Lehrer says of the 22,000-square-foot infill lot that, squeezing into a narrow angle at one end, borders the Orange Line bus route and sits across the street from a major park.

The 65-square-foot pallet units—each including four small, operable windows, fold-down beds, shelving, AC and heating, and a door that locks—are the building blocks that allow unique configurations to fit into oddly shaped sites that are often overlooked by developers. Quick to assemble, the units also allow the communities to be built in record time to serve the city's currently 42,000 residents without homes as quickly as possible.

Once function is solved, what distinguishes the Tiny Home Villages is form.

"How do you take a little thing and up its importance, if you want to make it important?" Lehrer asks. "What are the tools at your disposal? Along with the carefully considered configuration of the units and common spaces, adding interest to elements like fencing through graphic patterns, for example, [or] color is generally the most impactful for the least amount of money," says Lehrer.

To create a strong sense of place, Lehrer says that "the first line of placemaking attack" started at the ground plane. Lines, bands, and geometric shapes were used to extend the domain, unify spaces and create them, draw the eye, or set up patterns.

MICHAEL B. LEHRER

Project architect Michael Lehrer, FAIA, says that one of the benefits of the Tiny Homes Villages is the speed with which they can be constructed.

This was followed by adding color to some of the otherwise all-white units. Starting with bold, primary colors at Chandler, new bright tones were introduced at Alexandria Park, the second Tiny Home Village, and at the time, the city's largest, housing up to 200 residents. "It's a longer, linear site," says Lehrer. "There, it was an even more complex sense of city-making." Alexandria includes, for example, a main street feeding into other, smaller streets.

At each subsequent village, the amount of paint used on the units was reduced to further lower costs. At Sunset and Alvarado, a Tiny Home Village in Echo Park that was completed in May 2021 and houses up to 74 residents in 38 units on what was a former parking lot, visual impact was achieved by strategically

Color is one cost-effective way to elevate the design impact of the Tiny Homes Village developments.

painting just the front-facing wall on some units. As the importance of the communal gathering spaces became more apparent, color was concentrated in the most central spots, including the entryway and courtyard. Diagonal placement of most of the units helped to meet the requirements of an extremely tight site. At Whitsett West in North Hollywood, formerly an encampment for people without housing, bold color was reintroduced to the challenging 1,000-square-foot site situated between a freeway and warehouses and measuring only 20 feet wide in places.

"There are no throwaway spaces," says Lehrer. "Every space has the possibility of being good or excellent or beautiful, and Whitsett [exemplifies] that. It's a really special place."

On each of the sites, design is used not only to empower residents through a sense of respect and dignity but also to enhance the neighborhood and ultimately change perceptions about unhoused communities in the culture at large.

"If you've captured the culture's imagination, you actually affect the way people think about placemaking and the importance of good places," Lehrer says. "That's probably in a way the biggest part of the mission; you're changing the culture."

Of course, Lehrer readily acknowledges that everyone has their own idea of beauty. For residents in a particularly vulnerable state, a boldly colored shelter might make them feel exposed. But on a good day, residents might feel a sense of pride that their village has drawn so much positive attention and, in the eyes of some, enhanced the landscape. And of course, rather than hiding a pressing problem, calling attention to it has its place, too. By standing out from its surroundings, the development can make it impossible to look away.

It's important to note, too, that these tiny homes are designed for temporary use. They are stepping stones to permanent housing—places to pause and regroup. But as Lehrer believes, the basic building blocks for home are the same for everyone: "safety, autonomy, agency, self-respect, and dignity."

"Then," he says, "you can actually have the possibility of a higher level of happiness." AIA

AIA PERSPECTIVE

Barriers or Bridges?

The power is in our hands.

By Dan Hart, FAIA, 2022 AIA President

I am from Austin, Texas. It is a city that shimmers on an imaginary global line stretching from the North Pole through to the South. Historian Walter Prescott Webb says this line, the 98th Meridian, is mystical. It divides the United States between forested lands and plains to the east, and mountains and deserts to the west. It has come to be the line between East and West in the U.S.—geographically, socially, and culturally. And so, Austin, in a sense, is a border town and a threshold, a complex convergence of culture and perspective.

The wonderful weirdness Austinites so passionately guard has its roots in its deep history of converging cultures. The connections between the past, present, and future are ephemeral and imaginary, yet powerful and compelling.

My service this year sits on another imaginary line in our shared history—I am the 98th president of the AIA. That synchronicity, the 98th Meridian to the 98th AIA presidency, makes me reflect even more deeply on the meaning of imaginary lines, connection, and my own responsibility.

We all take our place in a line of colleagues who came before and who will follow. That line—that connection—is imaginary, but important and powerful.

What we do daily as architects is draw lines that define, protect, delight, and inspire. Our work shows that imaginary lines can distinguish, illuminate, and bring people together.

The reverse is also true: Imaginary lines, if we are not careful, if we are not paying attention, can divide and become barriers.

That places a great deal of agency in our hands as architects, because we manifest the power of design through imaginary lines. That means we have the influence to make those lines barriers that separate us or bridges that bring us together.

When our work resonates with society, we are relevant. When we are relevant, we become valuable. When our true value is clearly understood, we have expanded opportunities to prosper as a profession. Put another way, we can do well as we do good.

We are at a pivot point, a threshold; a liminal space where things going forward are going to be different from the past we have known, a point where we must decide whether and how to realize the full potential of our society. It will not be these challenges that define us—it will be our response to them.

That is powerful and it is the magic and the superpower of architecture: to bring people together and to create places and spaces that are bridges to a better future for families, communities, the nation, and global society through design thinking.

The question we must answer through what we do, say, think, and design is: Are the imaginary lines I am creating producing division or connection?

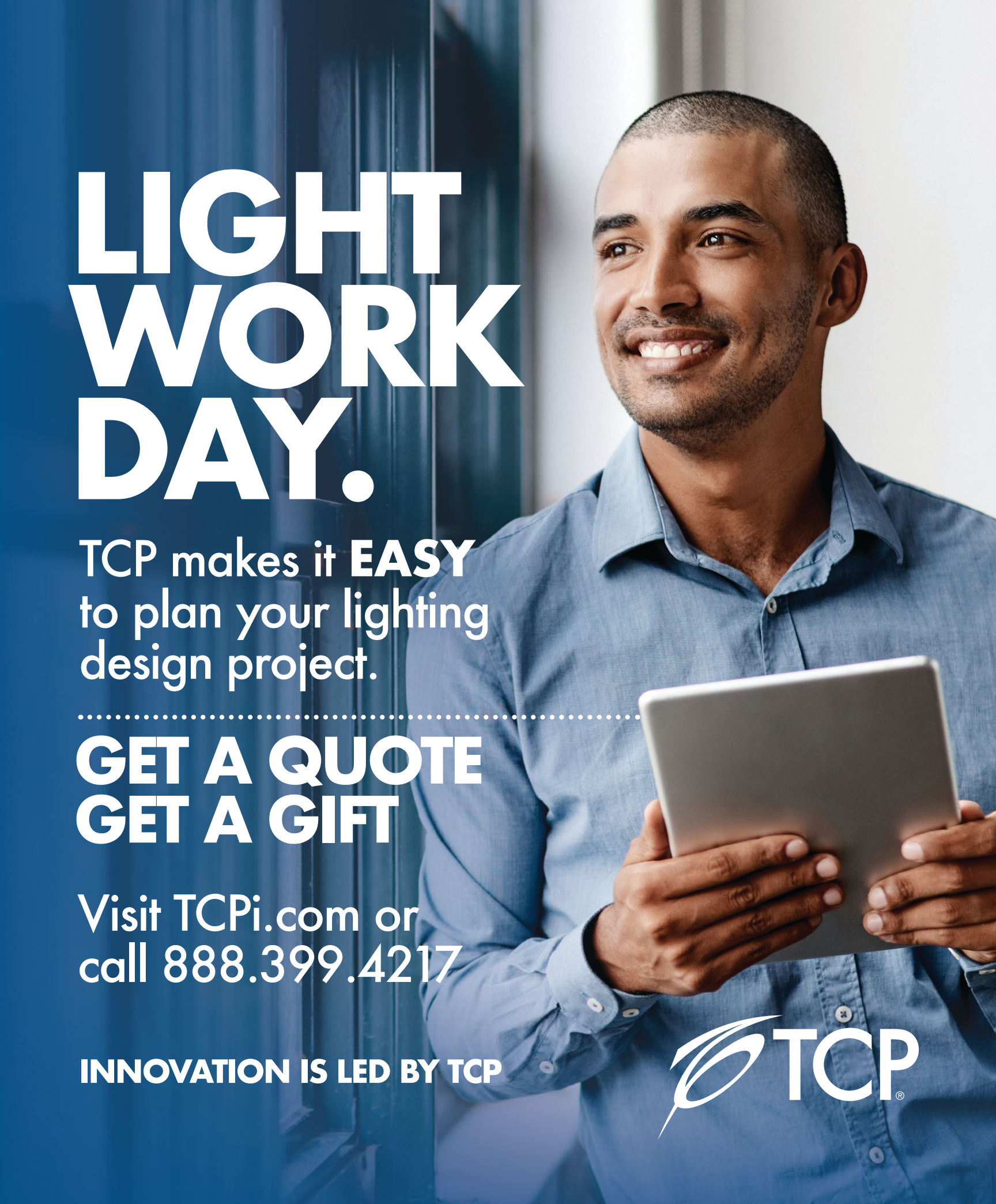
The role our profession will play in the emerging new reality and the extent to which our value will be evident, I am convinced, has everything to do with showing our relevance. It is true, we can do good as we do well. I am convinced, for us to do well, we *must* do good.

What will you do in this crucial moment?

Together, let us resolve to shape the built realm, using imaginary lines, in ways that create an enduring connection to a brighter, fairer, and more sustainable future for everyone.

The power is in our hands. AIA

PAT STEWART


LIGHT WORK DAY.
TCP makes it EASY to plan your lighting design project.
GET A QUOTE GET A GIFT
Visit TCPi.com or call 888.399.4217
INNOVATION IS LED BY TCP
TCP®

Compliance Testing for Face Brick

Presented By:

BELDEN
THE BELDEN BRICK COMPANY

LEARNING OBJECTIVES

1. Examine the requirements of face brick for use in exterior exposures.
2. Identify the test methods employed to determine brick's physical properties.
3. Appreciate why brick, a product made from naturally-occurring materials, has inherent imperfections.
4. Understand the measurement methods used to determine brick size and shape.

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/AR12221** 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 FACE BRICK

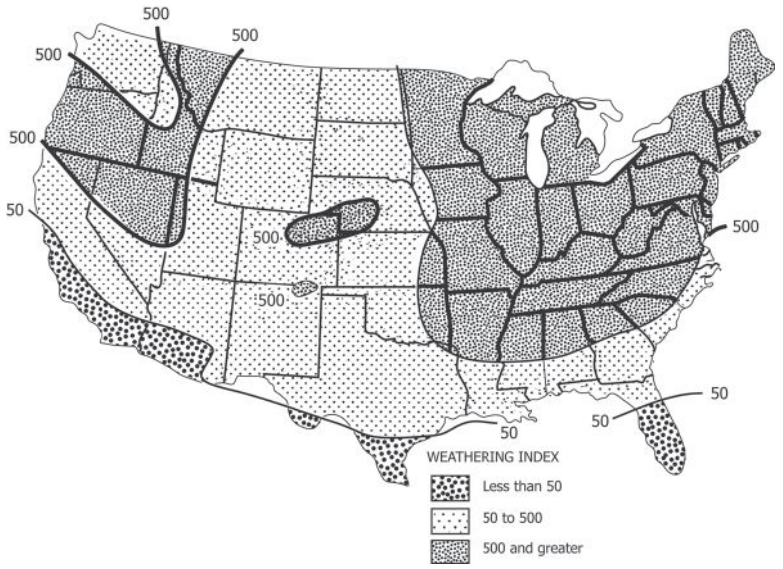
Facing brick are intended for use in both structural and nonstructural masonry, including veneer, where appearance is a requirement. Face brick are not only used for structural purposes and aesthetics, they also increase energy efficiency and are economical. You've likely specified face brick on homes, commercial buildings, fireplaces, entry walls/gates, multifamily developments, retail developments, and schools/universities. It comes in a wide selection of color, texture, and size options for a customized look and feel. Specifically intended for long-term application, face brick requires little maintenance and minimizes the amount of energy needed to heat and cool a building.

ASTM COMPLIANCE TESTING

Brick qualify for a particular classification based on their properties attained in manufacturing. The raw material, method of forming, and degree of firing influence the final physical properties of a face brick. Manufacturers work with the raw material so it is compatible with their forming and firing processes to attain a finished color and size. The goal is to provide a product that is acceptable to the user's aesthetic preferences. For brick units to conform with ASTM International's standards, compliance testing is required. The testing should be performed by an independent testing facility that is familiar with brick unit test methods and that has been evaluated to perform such testing. This evaluation includes review of testing equipment and testing personnel. Standard compliance testing is not performed on every run of brick. Rather, the compliance testing evaluates the processes employed by the manufacturer for each raw material type used in brick manufacturing. This ensures that the processes used result in brick units that conform with the appropriate unit specification's requirements. Typically, each manufacturer has in-house testing performed on each production run to ensure that the run did meet the property(-ies) tested. The in-house testing indicates to the manufacturer that the run was sufficiently produced.

Each ASTM brick unit standard has sampling and testing requirements for compliance testing. The sampling requirements are based on the size of the lot to be tested. The ASTM standards identify a sample for testing as "a number of specimens." A specimen is either an individual unit or part of an individual unit, depending on the testing that will be conducted. As the manufacturing process and raw materials are typically consistent, a small sample size is identified for lot sizes under 1,000,000 units. Additional specimens must be added to the sample size when lots increase over 1,000,000 units. Specimens are selected so they are representative of extremes in the lot.

GRADE RECOMMENDATIONS FOR FACE EXPOSURE



EXPOSURE	WEATHERING INDEX (NOTE 6)	
	LESS THAN 50	50 AND GREATER
In vertical surfaces		
In contact with earth	SW or MW	SW
Not in contact with earth	SW or MW	SW
In other than vertical surfaces		
In contact with earth	SW	SW
Not in contact with earth	SW or MW	SW

NOTE 6. The effect of weathering on brick is related to the weathering index, which for any locality is the product of the average annual number of freezing cycle days and the average annual winter rainfall in inches (millimeters), defined as follows.1

A Freezing Cycle Day is any day during which the air temperature passes either above or below 32°F (0°C). The average number of freezing cycle days in a year may be taken to equal the difference between the mean number of days during which the minimum temperature was 32°F or below, and the mean number of days during which the maximum temperature was 32°F or below.

Winter Rainfall is the sum, in inches (millimeters), of the mean monthly corrected precipitation (rainfall) occurring during the period between and including the normal date of the first killing frost in the fall and the normal date of the last killing frost in the spring. The winter rainfall for any period is equal to the total precipitation less one tenth of the total fall of snow, sleet, and hail. Rainfall for a portion of a month is prorated.

Fig. 1 indicates general areas of the United States that correspond to the weathering index categories listed. The index for geographic locations near the 50 line should be determined by analysis of weather bureau local climatological summaries, with due regard to the effect of microclimatic conditions, especially altitude.

The recommended correlation between grade of facing brick, weathering index, and exposure is found in Fig. 1. The specifier may use these recommendations or use the grade descriptions and physical requirements along with use exposure and local climatological conditions to select grade.

Data needed to determine the weathering for any locality may be found or estimated from tables of Local Climatological Data—Annual Summary with Comparative Data available from the National Oceanic and Atmospheric Administration.

TERMINOLOGY FOR THIS ARTICLE

Brick: Products made from naturally occurring clay materials that are fired in a kiln to form a ceramic product.

Compressive Strength Test: A crushing test where half brick specimens, laid flat, are capped on the top and bottom with gypsum or sulfur filler to remove any high spots on the surfaces and then placed in a compression machine which loads the brick unit until it crushes.

Edge Warpage: The result of the top and/or bottom of the brick bowing; in the wall, the brick faces would resemble a frown (concave down) or a smile (concave up).

Efflorescence: A crystalline deposit of water-soluble salts that can form on the surface of some brickwork. The principal objection is an unsightly appearance, though it typically is not harmful to brick.

Face Brick: Brick intended for use in both structural and nonstructural masonry, including veneer, where appearance is a requirement.

Grade: Identifies the brick's strength and freeze/thaw durability characteristics; there are two grades under ASTM C216 - Grade SW (Severe Weathering) and Grade MW (Moderate Weathering).

Initial Rate of Absorption: A measure of how quickly the brick will remove water from mortar spread on it.

Saturation Coefficient: Determined by taking the ratio of the cold water absorption to the boiling water absorption; the saturation coefficient is also known as the C/B ratio and is reported as a unitless number less than one (1.00).

Surface warpage: The result of the face of the brick bowing or scalloping out of plane; this is a more complex measurement than edge warpage.

Type: Identifies tolerances on physical and visual characteristics of brick affecting appearance and usability; the three Types of brick under ASTM C216 are Type FBS, Type FBX, and Type FBA.

ASTM C216

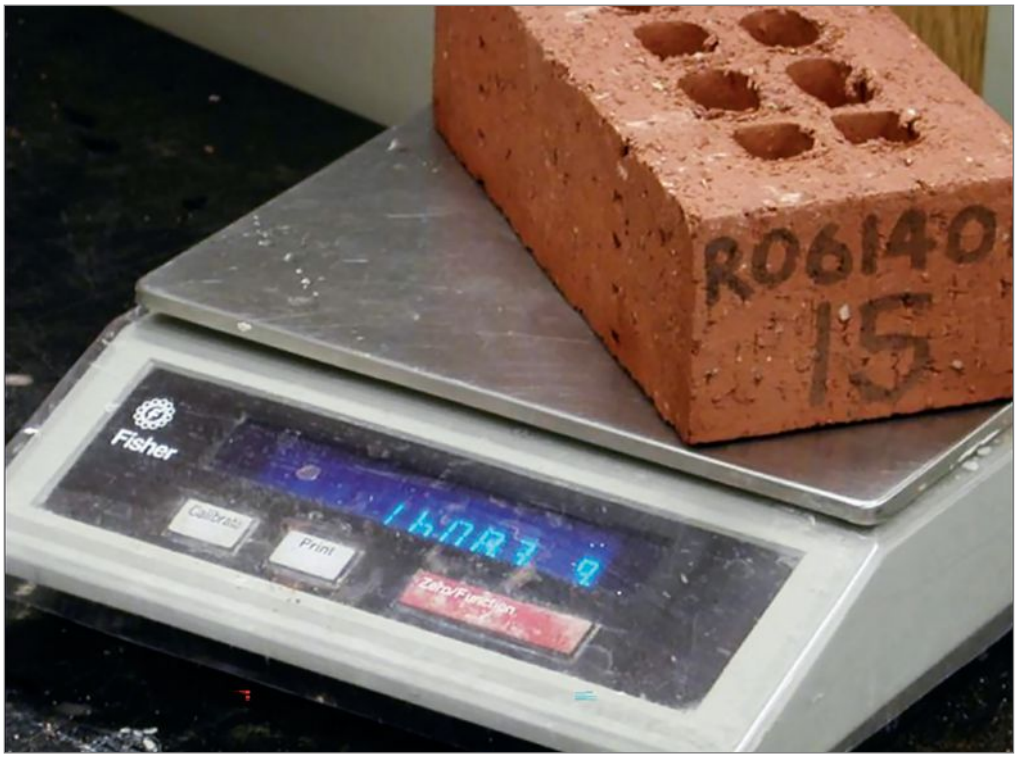
There are several different brick unit standards in ASTM International (ASTM). Different standards exist based on the intended usage of the brick or unique characteristics of the brick. This article will base its discussion on the most widely used ASTM brick unit standard, ASTM C216 Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale). The intended use of

the units covered by this standard is for the structural and/or facing components of masonry structures. Typically, these brick units are used in vertical building walls that are exposed to view. Applications include residential, commercial, industrial, institutional, and related brick buildings.

In these applications, one may ask, "What do I want the brick on these buildings to do?" The answer typically will include be strong and able to withstand weather, look good, and be usable to the mason during installation. ASTM C216 is written to address these needs.

In ASTM C216, two classifications of facing brick are identified: Grade and Type. The first classification, Grade, identifies the brick's strength and freeze/thaw durability characteristics. There are two grades under ASTM C216 - Grade SW (Severe Weathering) and Grade MW (Moderate Weathering). The Grade addresses the first two needs (be strong and withstand weather). The second classification, Type, identifies tolerances on physical and visual characteristics of brick affecting appearance and usability. There are three Types of brick under ASTM C216 - Type FBS, Type FBX, and Type FBA. The "FB" refers to facing brick, as this is the facing brick standard. The "S", "X", and "A" designations identify different appearance tolerances. FBS is identified for general purpose use. FBX is identified for use where more stringent tolerances than those of FBS are required. FBA is identified for use where unique appearance characteristics exist, such as tumbled, rock faced, molded, etc. The tolerances for appearance characteristics of Type FBA are very liberal, as they are often used to present an antique or rustic aesthetic.

If the specifier needs brick that conforms to any other standards than Grade SW, Type FBS, they must identify the Grade and Type desired. Grade SW and Type FBS are default values under ASTM C216 when Grade and Type are not specified. This way, the Standard assures the user that the brick will be serviceable in severe weather conditions and meet general purpose requirements for aesthetics. ASTM C216 provides recommendation on Grade use throughout the United States. See Figure 1.



Weighing brick specimen. Photo courtesy of The Bishop Materials Laboratory and the National Brick Research Center, Anderson, SC.

The ASTM C216 requirements for Grade include a minimum compressive strength (average of five (5) specimens tested and an individual unit tested) and a maximum water absorption (average of five (5) specimens tested and an individual unit tested). The ASTM C216 requirements for Type include maximum tolerances for size variation, chippage of finished faces, imperfections in the finished faces, and distortion. Except for efflorescence and imperfections in the finished faces, each tolerance is a measurable characteristic. Efflorescence and facial imperfections, on the other hand, are a visual assessment from a prescribed viewing distance and under specific light conditions.

ASTM C67

To ensure compliance, testing and measuring must be performed. ASTM C216 identifies the test methods used for sampling and compliance testing. These are included in ASTM C67, Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile. ASTM C67 and other ASTM test methods exist so that testing is standardized. That is, the testing is performed in the same manner and under prescribed conditions to minimize variables. This provides a level of confidence in the test results and the ability to compare the results with the unit standard requirements.

ASTM C67 currently includes thirteen (13) test methods and another nine (9) procedures for sampling, specimen preparation, and physical measurements. Each test method is outlined to help testing laboratories understand how to properly conduct the tests and procedures to minimize errors.

When specimens are received at a testing laboratory for compliance testing, the laboratory must inspect the specimens, clean them of any foreign material, dry, cool, and weigh them. Drying must be done in an oven at a temperature between 221 degrees F to 239 degrees F. Drying must last at least 24 hours, but to ensure the specimens are completely dry, they must be weighed every two (2) hours until the weight loss between these measurements is less than 0.2%. Once dry, the specimen weights are recorded in grams.

Capped brick specimen in compression test. Photo courtesy of The Bishop Materials Laboratory and the National Brick Research Center, Anderson, SC.

Compressive Strength Test

For Grade compliance, the brick is tested for compressive strength. Brickwork may be used as a structural material, so there may be instances when it is important to specify a minimum compressive strength of the brick. Most brick have compressive strengths considerably higher than the minimum compressive strengths required for durability and abrasion resistance.[1] This is a crushing test where half brick specimens, laid flat, are capped on the top and bottom with a gypsum or sulfur filler to remove any high spots on the surfaces. The specimen size is to be 1/2 the true brick's length so that the brick strength will not exceed the testing machine's loading capacity. Five (5) specimens are tested. The capped bricks are placed in a compression machine which loads the brick unit until it crushes. The crushing load is recorded, and the compressive strength is calculated by dividing the crushing load by the gross area of the capped specimen.

This article continues on http://go.hw.net/AR12221. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. Which of the following is a reason to specify face brick?

A. Aesthetics
B. Energy efficiency
C. Value
D. All of the above

2. The effect of weathering on brick is related to the weathering index, which for any locality is the product of the average annual number of _____ and the average annual _____ in inches.

A. Freezing cycle days
B. Winter snowfall
C. Winter rainfall
D. Cooling days
E. Both A and C

3. Which of the following is the Standard Specification for Facing Brick (Solid Masonry Units Made from Clay or Shale)?

A. ASTM C216
B. ASTM C67
C. ASTM C76
D. ASTM C612

4. Which classification identifies the brick's strength and freeze/thaw durability characteristics?

A. Compression
B. Type
C. Grade
D. Absorption

5. Which classification identifies tolerances on physical and visual characteristics of brick affecting appearance and usability?

A. Strength
B. Type
C. Grade
D. Absorption

6. Which test simulates the amount of water absorbed by the brick during extended rain events?

A. 5-hour boiling water absorption
B. 24-hour cold water absorption
C. Saturation coefficient
D. 5-hour cold water absorption

7. In the freezing and thawing test, how many freeze-thaw cycles must brick go through before they are examined for any new cracking, breakage, and weight loss?

A. 20
B. 30
C. 40
D. 50

8. Which brick Type has the most liberal tolerances?

A. FBX
B. FBS
C. FBA
D. FBC

9. Which brick type has the most stringent tolerances?

A. FBX
B. FBS
C. FBA
D. FBC

10. Imperfections in the face of the brick are allowed in ASTM C216, as long as one cannot see them; for Types FBS and FBA, the viewing distance is _____ feet away from the sample.

A. 10
B. 15
C. 20
D. 25

SPONSOR INFORMATION

BELDEN
THE BELDEN BRICK COMPANY

Since 1888, architects, homeowners, universities, commercial and government clients have turned to Ludowici for uniquely beautiful architectural terra cotta products that stand the test of time. Ludowici clay tiles are the highest quality available, are infinitely customizable, and carry a 75-year material warranty.

Designing with Fire: An Elemental Approach

LEARNING OBJECTIVES

1. Examine the element of fire and how it's been fundamental to human civilization for millennia.
2. Explore the evolution of hearth design and how fireplaces have been an integral part of both vernacular and high-style architecture.
3. Discover how to use fire as a design element indoors, outdoors, and as art.
4. Show two case studies where fire features were incorporated into luxury residences.

CONTINUING EDUCATION

This course is approved for AIA and IDCEC Learning Unit Credits.

AIA Continuing Education Provider

IDCEC APPROVED

Use the learning objectives to focus your study as you read this article. For details on the learning units or credit information, and to earn credit and obtain a certificate of completion, visit **http://go.hw.net/AR12223** 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.

THE ELEMENT OF FIRE

Fire is one of the four classical elements, along with Earth, Water, and Air, according to ancient Greek philosophy, science, and medicine. Other ancient civilizations such as the Persians, Japanese, Chinese, and Indians had similar beliefs, affording the elements great importance and symbolism. They believed that everything was comprised of these four natural elements and that it was important to maintain a balance between them to ensure physical and mental health.[1] Plato, Aristotle, and Hippocrates later supported this theory and "the idea that these four elements made up all matter was the cornerstone of philosophy, science, and medicine for two thousand years."[2] This concept of the classical elements persisted throughout Europe and Asia through the Middle Ages and into the modern era.

While we now know this theory to be oversimplified, it's not entirely unfounded, as the four elements do "align with the four states of matter that modern science has agreed on: solid (earth), liquid (water), gas (air), and plasma (fire)."[3] In a plasma substance like fire, there is more space between atoms than there is in a solid or liquid so they can move freely, but plasma contains so much energy that the atoms split into smaller pieces. "Plasma are able to carry an electrical current and [some] generate magnetic fields."[4] Examples of plasmas, beyond fire, include lightning, solar wind, the sun, fluorescent lights, and neon signs.

HISTORY OF FIRE

Scientists argue that without fire humans would not have evolved into the civilized beings we are today, which was highly dependent on the growth of the brain.[5]

Fire as a tool had been widely discovered by approximately 400,000 years ago, as evidenced by archaeological records across Africa, Europe, the Middle East, and Asia. But earlier evidence has been found at Wonderwerk Cave in South Africa, where "they found remnants of burned bone and plants and what appear to be hearths" dating back approximately 1 million years.[6] Fire was probably used even earlier, based on human remains with larger brains and smaller guts (a growing brain requires more energy from food). Most concur that fire had a significant impact on our evolution, as it allowed humans to live longer, improved cognition, increased sociability, and allowed us to live in colder climates.

From the onset of civilization fire has been used for cooking, warmth, and light. The method of delivery has changed and become more technologically advanced, but it's the

From the onset of civilization fire has been used for cooking, warmth, and light. The method of delivery has changed and become more technologically advanced, but it's the pure element of fire that remains the same.

pure element of fire that remains the same. Fire needs three things to exist: oxygen, heat, and fuel. Wood was always the material of choice for fuel until recently. "Throughout the majority of human history, fuels derived from plants or animal fat were the only ones available for human use. Charcoal, a wood derivative, has been used since at least 6000 BC for smelting metals. It was only supplanted by coke, derived from coal, as the forests started to become depleted around the eighteenth century."[7]

Coal, a natural mineral that forms over millions of years, was first used as a fuel around 1000 BC in China and became more commonly used as a power source with the advent of the steam engine in 1769. According to the World Coal Association, "By the nineteenth century, gas extracted from coal was being used for street lighting in London. In the twentieth century, the primary use of coal was for the generation of electricity."[8] Today, wood, natural gas, and electricity are the primary means of fueling fireplaces.

FIRE AS A NECESSITY

As we've noted, fire was necessary to move civilization forward, as it was used for cooking, heating, and light. In her research *The Use of Fire and Human Distribution* author Katherine MacDonald notes, "This technology can be used for many purposes, from keeping warm, to cooking food, managing the landscape, making tools, and extending daylight hours, many of which are particularly useful in temperate environments."[9]

Cooking

For early humans, fire increased the caloric yield and edibility of the foods available to them, particularly in the winter.[10] Later, hearths that were incorporated into residences and kitchens housed multiple fires for cooking and baking.

Heat

MacDonald posits, "Fire has long been seen as an important factor in human evolution and range expansion, particularly into temperate latitudes."[11] As noted, fire allowed people to migrate out of Africa to colder regions in Europe and Asia, but this was also dependent on their ability to hunt and make clothes and shelter. Until the advent of modern heating systems, fire was the primary method of heat delivery, whether it was around an outdoor fire or indoor fireplace.

Light

As carbon atoms heat up, they emit light (incandescence), and cause a visible flame. At some point humans learned that it wasn't only campfires that could provide light. Tools such as a candle could be used to meter out the fuel and control a fire by slowly vaporizing and burning wax – and it was portable. Candles led to lanterns, which led to gas lamps and eventually electricity.[12]

Tools

Fire also allowed humans to forge metal tools, form pottery, and harden bricks, among many other tools, vessels, and building materials that helped to develop modern civilization.

GLOSSARY

Coal: A combustible black or brownish-black sedimentary rock with a high amount of carbon and hydrocarbons that contains the energy stored by plants that lived hundreds of millions of years ago in swampy forests; coal is considered a non-renewable resource[13]

Direct-Vent Technology: A sealed combustion system that protects indoor air quality by drawing outside air for the fire and expelling 100 percent of combustion exhaust and byproducts outside the home

Electric Fireplaces: Hearth products that deliver flames utilizing advanced and energy-efficient LED lighting to create realistic fire effects without fire or combustion

Firebrick: A refractory brick capable of sustaining high temperatures that is used especially for lining furnaces or fireplaces

Gas fireplace insert: Direct-vent gas fireplace inserts are a retrofit solution that fits inside an existing masonry or manufactured wood-burning fireplace

Hypocaust heating system: A very early precursor to central heating invented by the Romans, which circulated hot air from a fire under the floor and surrounding walls

Indoor/outdoor fireplace: Indoor/outdoor hearth products offer warmth and fireside views from two sides, as they are see-through; they are built with commercial-grade components to withstand the outdoor elements

Overmantel: An ornamental structure over a mantelpiece, typically of plaster or carved wood and sometimes including a mirror

Plasma: A state of matter where there is more space between atoms than there is in a solid or liquid so they can move freely; plasma contains so much energy that the atoms split into smaller pieces; plasma are able to carry an electrical current and [some] generate magnetic fields

Rumford fireplace: A firebox that is taller than it is wide and smaller and shallower than styles that preceded it, with sharply angled covings on either side that throws more radiant heat; another key element is its narrow throat, which exhausts both smoke and air at an increased speed, acting as a check against backdrafts

A burning hearth can serve as the nucleus of family gatherings, as it encouraged people to visit and stay in a place.

Social

A burning hearth also "served as the nucleus of family gatherings," as it encouraged people to visit and stay in a place.

INTRODUCTION

Fire was first used for cooking and warmth, which continues today, but we now have the luxury to use fire as an aesthetic tool as well. The wide variety of hearth products available to home and business owners is dizzying, from traditional wood-burning fireplaces to fire features that double as high art. Let's explore how and why hearth products became ubiquitous, and supremely important, in residences world-wide.

THE EVOLUTION OF FIREPLACE DESIGN

Early American fireplaces (1600's to early 1700's) were very wide and deep — you could almost consider them walk-in fireplaces – and had little decoration other than a very simple mantel. They were not efficient but provided a wide berth for cooking. Colonial homes in colder climates of New England and the Mid Atlantic had central chimneys with multiple flues so "fires could be lit in two or more rooms on each floor."[14] These fireplaces tended to be smaller and more efficient, with the central chimney retaining heat and keeping the home warmer. In the South, fireplaces were usually on outside walls to reduce heat buildup.

By the second quarter of the 18th century, the fireplace had become the centerpiece of the main gathering room. Decorative paneling and other accents in the Georgian style were book-matched on either side of the opening, sometimes for the entire width of the wall. Most fireplaces were set into a paneled wall with cupboards.[15]

In 1795 Sir Benjamin Thompson (more often referred to as Count Rumford) revolutionized fireplace design when he invented a firebox that is the basis for all of today's open fireplaces. Rumford studied heat and its transmission and came up with a design that ensured smoke was pulled by the chimney more efficiently while minimizing heat loss. According to Old House, "Taller than it is wide and smaller and shallower than older styles, the Rumford fireplace has sharply angled covings on either side. The ingenious design throws more radiant heat into a room than its predecessors. Another key element is its narrow throat, which exhausts both smoke and air at an increased speed, acting as a check against backdrafts."[16] A historic firebox was typically constructed of brick, which was often plastered to protect the brick from flame exposure and so the plaster could be cleaned and whitewashed, then replaced if it cracked or broke off.[17]

After the Revolutionary War, full-relief fireplaces with decorative mantels and surrounds emerged. Decorative motifs of the Federal and Greek Revival styles such as swags, reeding, shells, and stars accented mantels. During the Industrial Revolution, more urban households began burning coal rather than wood and horseshoe-shaped cast iron grates and doors became the norm. During this era mantels and surrounds became even more heavily ornamented, with overmantels, columns, and glazed tiles in a host of colors.

Fire was first used for cooking and warmth, which continues today, but we now have the luxury to use fire as an aesthetic tool as well.

In the early 20th century, fireplaces and mantels reverted to a simpler style again, a backlash against the heavy ornamentation. Surrounds were often simply finished with brick and stone. Today the shape and make of fireplaces has evolved exponentially. Fireboxes themselves can be made of stone, metal, ceramic, or a material called Firebrick that withstands high temperatures and insulates against heat transfer.[18] Innovative technologies such as power venting, remote operation, intelligent ignition and heat management have made the category ultra-versatile.

FAMOUS FIREPLACES

Throughout history, as building design became more complex, fireplaces became an integral part of residences for both utilitarian purposes and to showcase a homeowner's wealth and style. Let's explore some iconic buildings and architects that made fireplaces the focal point of their designs.

Medieval Fireplaces

Wealthy Roman homes and baths used a hypocaust heating system, a very early precursor to central heating, which circulated hot air from a fire under the floor and surrounding walls. "The floor was raised above the ground by pillars called pilae so that hot air could circulate under it. The floor consisted of a layer of tiles, followed by a layer of concrete, then another layer of tiles. There were also tile or clay flues under the walls, which circulated the hot air to the rooms' floor and walls above. The hot air would at last escape from the roof. The walls had ceramic tiles in them to maintain the heat. The Romans also made sure that the hot air and smoke did not leak from the floor and walls, which was quite a feat of engineering considering the materials used at the time."[19]

Romans also used tubes that ran inside walls to draw smoke out of bakeries, but true chimneys did not appear in Northern Europe until the 12th century, with the earliest

This article continues on http://go.hw.net/AR12223. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. Fire as a tool had been widely discovered by approximately _____ years ago, as evidenced by archaeological records across Africa, Europe, the Middle East, and Asia.

A. 100,000
B. 200,000
C. 300,000
D. 400,000

2. According to modern science, fire is considered what state of matter?

A. Solid
B. Liquid
C. Gas
D. Plasma

3. Today, what is the primary means of fueling fireplaces?

A. Wood
B. Natural gas
C. Electricity
D. All of the above

4. What portable tool is used to meter out fuel and control a fire?

A. Lightbulb
B. Candle
C. Fire pit
D. Wood-burning stove

5. In what region of colonial America were chimneys typically centrally located within the home?

A. New England
B. Midwest
C. South
D. Mid Atlantic
E. Both A and D

6. During which period did horseshoe-shaped cast iron grates and doors become popular?

A. Colonial
B. Federal
C. Industrial revolution
D. Mid-century

7. Wright incorporated _____ fireplaces in his three personal homes alone, with a massive fireplace and chimney always placed at the center of his plans.

A. 35
B. 44
C. 65
D. 1200

8. Which of the following tactics were used to emphasize horizontality in Frank Lloyd Wright's fireplace designs?

A. Vertical grout lines tinted to match masonry
B. Vertical grout filled to level of bricks
C. Deeply raked horizontal grout lines
D. Roman brick
E. All of the above

9. One of the most iconic mid-century modern fireplace designs was the _____, which is a freestanding, colorful model that does not necessitate demolishing a wall to create a space for a built-in fireplace.

A. Calla
B. Malm
C. Preway
D. Majestic

10. _____ fireplaces are perfect for clients seeking a hearth feature where a gas line or venting is impossible, or for spaces with minimal square footage or very narrow walls.

A. Direct-vent
B. Indoor-outdoor
C. Wood-burning
D. Electric

SPONSOR INFORMATION

HEAT & GLO

Heat & Glo has been the fireplace industry leader in timeless design and innovative technology since its inception by brothers Ron and Dan Shimek in 1975. The brand pioneered direct-vent gas technology in 1987 and revolutionized the way fireplaces operate in the years that followed. Today, Heat & Glo continues to develop unmatched technologies, materials and designs in a full line of fireplaces, inserts and accessories. It has won more U.S. fireplace awards and been granted more patents than any hearth manufacturer. Heat & Glo is headquartered in Lakeville, Minnesota, and is a brand of Hearth and Home Technologies, Inc. For more information, please visit **www.HeatnGlo.com**.

Stellar Redefines Fire.

From America's fireplace innovator comes the next big advance—now in the luxury custom realm. Introducing Stellar by Heat & Glo. With limitless customization, Stellar takes fire where no one else has ever gone. Browse our full lineup at **stellar.heatnglo.com**, with pro resources that make specifying easy. **For your next project, specify a Stellar custom luxury gas fireplace from Heat & Glo.**

STELLAR
by Heat & Glo

The Evolution of Universal Design: Accessibility to Empowerment

Presented By:

propane
ENERGY FOR EVERYONE

Photo courtesy of LifeStage Home Designs.

LEARNING OBJECTIVES

1. Examine the history of inclusive and universal design in the built environment and how these concepts expand access for all in both residential and commercial design.
2. Discover why accessible, inclusive, and universal design is more important than ever and reasons for its growth.
3. Identify how to design residential homes for all individuals, regardless of age or ability.
4. Explore a residential case study where propane appliances were used to improve universal design.

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/AR12222** 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 INCLUSIVE AND UNIVERSAL DESIGN

The Americans with Disabilities Act was signed into law on July 26, 1990, by President George H.W. Bush.[1] Accessibility standards for buildings only apply to public and private commercial facilities that provide goods or services to the public (aka public accommodations), not private homes. But we live in an era of changing cultural norms and over the past three decades society has had the chance to rethink discrimination, with growing social awareness of gender identity, differently abled individuals, and sensory sensitivity. This has led to a movement to make *all* spaces barrier-free, accessible, and inclusively designed so that they are safe, comfortable, and easy for all occupants to use. Providing these options is an excellent way for homeowners and facilities to get ahead of the changing times. Designing accessible and inclusive spaces not only empowers users with special needs, but many other people as well such as pregnant women, children, those of shorter stature, and the elderly. Accessible and inclusive design also successfully bridges the gap between practicality and physical, mental, and emotional well-being.

UNIVERSAL DESIGN

An early example of inclusive design is universal design, which is a philosophy that emerged in the 1960's to champion the design of inclusive products and environments for all. Founded in 1993 by architect, product designer, and educator Ronald Mace, The Center for Universal Design at North Carolina State University's College of Design created a framework for the theory and practice of universal design. The Center is a national research, information, and technical assistance center that evaluates, develops, and promotes accessible and universal design in housing, buildings, outdoor and urban environments,

While they look like traditional cabinets on the outside, these open fully and have no exposed piping underneath so that wheelchair users can easily access the sink; this is a perfect example of the Size and Space for Approach and Use principle. Photo courtesy of Paragon Building Group.

and related products. The Center's work manifests the belief that all new environments and products, to the greatest extent possible, should be usable by everyone regardless of their age, ability, or circumstance. Planning for spaces with all users in mind, regardless of ability, gender, or age, makes for a safer and more comfortable built environment that is easy for all occupants to use.

7 Principles of Universal Design[2]

The Center for Universal Design outlines 7 Principles of Universal Design that designers should try to achieve. Universal design principles call for structures and spaces to accommodate a variety of abilities; be easy and intuitive to use; communicate necessary information, regardless of sensory abilities; minimize opportunity for error; and be able to accommodate different body sizes, postures and mobility.

The 7 Principles are as follows:

1. **Equitable Use.** The design is useful and marketable to people with diverse abilities.
2. **Flexibility in Use.** The design accommodates a wide range of individual preferences and abilities.
3. **Simple and Intuitive Use.** Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
4. **Perceptible Information.** The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.
5. **Tolerance for Error.** The design minimizes hazards and the adverse consequences of accidental or unintended actions.
6. **Low Physical Effort.** The design can be used efficiently and comfortably and with a minimum of fatigue.
7. **Size and Space for Approach and Use.** Appropriate size and space are provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility.

> *As we begin to imagine what a post-pandemic world needs, we believe that now, more than ever, we have an opportunity to remake the places where we live, work, and play more accessible and more inclusive.*
>
> **— Gensler**

GLOSSARY

7 Principles of Universal Design: Principles that call for structures and spaces to accommodate a variety of abilities; be easy and intuitive to use; communicate necessary information, regardless of sensory abilities; minimize opportunity for error; and be able to accommodate different body sizes, postures and mobility.

8 Goals of Universal Design: Goals supported by an interdisciplinary knowledge base (e.g., anthropometrics, biomechanics, perception, cognition, safety, health promotion, and social interaction) so more realistic applications can be developed for all design disciplines.

American with Disabilities Act (ADA): A civil rights law that prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.

Certified Aging-in-Place Specialist (CAPS): A program that teaches the technical, business management, and customer service skills essential to competing in the fastest growing segment of the residential remodeling industry: home modifications for the aging-in-place.

Inclusive Design: A design process in which a product, service, or environment is designed to be usable for as many people as possible, particularly groups who are traditionally excluded from being able to navigate an environment.

Multigenerational Household: Defined as including two or more adult generations (with adults mainly ages 25 or older) or a "skipped generation," which consists of grandparents and their grandchildren younger than 25.

Propane Standby Generator: A key part of resilient design, propane-powered standby generators keep homes and businesses safe and secure, providing light, heat, and crucial power in the event of an outage.

Tankless Water Heater: Compact water heater that does not have a storage tank, allowing unit placement close to points of use, improving hot water delivery time and reducing waste; because the water is heated when it's needed, tankless units provide a nearly endless supply of hot water.

Universal Design: The design and composition of an environment so that it can be accessed, understood, and used to the greatest extent possible by all people regardless of their age, size, ability, or disability.

WELL Building Standard: A performance-based system that rates the built environment's impact on occupant health and wellbeing.

The COVID-19 pandemic brought universal design to the forefront, as people noticed how their homes could be improved to make their lives easier and safer; it also shifted the makeup of households and laid bare the vulnerabilities of an aging population. Photo courtesy of LifeStage Home Designs.

8 Goals of Universal Design[3]

The IDEA Center at the University of Buffalo's School of Architecture and Planning found the need to expand the conceptual framework of universal design beyond usability to include social participation and health. They expanded the idea by establishing the 8 Goals of Universal Design, which are each "supported by an interdisciplinary knowledge base (e.g., anthropometrics, biomechanics, perception, cognition, safety, health promotion, and social interaction)" so more realistic applications can be developed for all design disciplines.

1. **Body Fit.** Accommodating a wide a range of body sizes and abilities.
2. **Comfort.** Keeping demands within desirable limits of body function.
3. **Awareness.** Ensuring that critical information for use is easily perceived.
4. **Understanding.** Making methods of operation and use intuitive, clear, and unambiguous.
5. **Wellness.** Contributing to health promotion, avoidance of disease, and prevention of injury.
6. **Social Integration.** Treating all groups with dignity and respect.
7. **Personalization.** Incorporating opportunities for choice and the expression of individual preferences.
8. **Cultural Appropriateness.** Respecting and reinforcing cultural values and the social, economic, and environmental context of any design project.

EXPANSION OF INCLUSIVE AND UNIVERSAL DESIGN

The COVID-19 pandemic is another drastic societal shift that brought inclusive and universal design to the forefront again. People were home more and noticing the plethora of little things that could be improved to make their lives easier and safer. The makeup of households also shifted, with different generations moving in together, a continuation of a growing trend. It also laid bare the vulnerabilities of an aging population and other at-risk groups. It's become clear that many vulnerable populations were hardest hit by the pandemic, and there is "vast room for improvement when it comes to not only designing and operating equitable spaces, but also for ensuring these efforts are reaching those who need it most."[4]

The WELL Building Standard, a performance-based system that rates the built environment's impact on occupant health and wellbeing, believes that universal design can be used as an innovative, collaborative tool to create equitable spaces in the buildings and communities of tomorrow. WELL says, "With this challenge comes the opportunity to reframe expectations for how design can better support equitable and inclusive environments, and universal design can serve as a critical tool to further those efforts as we rebuild in a post pandemic world." In fact, WELL's Feature C13: Accessibility and Universal Design outlines the ways a project can incorporate strategies that promote flexible, usable, and intuitive spaces. WELL standards posit that designing spaces in such a way promotes safety and results in healthier and more equitable built environments.[5] As well, equity initiatives have emerged in LEED's Inclusive Design Pilot Credit and Social Equity Pilot Credit, which recognize that "a building cannot be truly sustainable if it's not also accessible."[6]

RISE OF MULTIGENERATIONAL HOMES

The rise of multigenerational homes is another societal shift in the United States that will have a lasting impact on home design. Multigenerational households are defined as including two or more adult generations (with adults mainly ages 25 or older) or a "skipped generation," which consists of grandparents and their grandchildren younger than 25. Most consist of at least two adult generations, such as young adults living with their parents, parents residing in their adult children's

homes, or a grandparent, adult child, and adult grandchild under one roof.[7] According to Pew Research, "After declining in earlier decades, multigenerational living has grown steadily in the U.S. since the 1970s. The share of the U.S. population in multigenerational homes has more than doubled, from 7% in 1971 to 18% in 2021."[8]

The rise in multigenerational households is linked to the changing makeup of the U.S. population, as foreign born, Asian, Black, and Hispanic Americans are more likely to live with multiple generations in one house and they account for the most recent overall population growth. However, Pew Research notes that "multigenerational living also is rising among non-Hispanic White Americans, who accounted for a higher share of the multigenerational household population growth from 2000 to 2021 (28%) than of total population growth (9%)."

The Great Recession led the National Association of Realtors to begin tracking the share of multigenerational home buyers, as many families moved in together out of financial necessity at that time. They still track these numbers and according to their 2020 Profile of Home Buyers and Sellers report, "Buyers purchasing multigenerational homes during the pandemic rose to a series high of 15%," which has been tracked since 2012." The top reason to purchase a multigenerational home is for aging parents to move into the home, with the second most common reason being cost savings, as family members can pool incomes to purchase a larger home. The third most common reason is adult children boomeranging back home or never leaving. In addition, young adults are staying in school longer and marrying later than previous generations, so they may be more inclined to live with parents and younger siblings for longer.[9]

This article continues on http://go.hw.net/AR12222. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. In what year was the Americans with Disabilities Act signed into law by President George H.W. Bush?

A. 1973
B. 1988
C. 1990
D. 2010

2. Which of the 7 universal design principles encourages design that accommodates a wide range of individual preferences and abilities?

A. Equitable Use
B. Flexibility in Use
C. Perceptible Information
D. Low Physical Effort

3. Under the 8 goals of universal design, which ensures that all groups are treated with dignity and respect?

A. Body Fit
B. Awareness
C. Social Integration
D. Cultural Appropriateness

4. Most multigenerational homes consist of at least ____ adult generations.

A. 2
B. 3
C. 4
D. 5

5. The share of the U.S. population in multigenerational homes has _____ from 1971 to 2021.

A. Stayed the same
B. Doubled
C. Tripled
D. Quadrupled

6. What is the top reason to purchase a multigenerational home?

A. Aging parents moving into home
B. Cost savings
C. Adult children moving back into home
D. Young adults marrying later

7. When designing a barrier-free entry from the garage to interior, provide a maximum tolerance of ____ inch from the top of the garage slab to the interior finished floor with a low-profile seal to allow safe navigation.

A. 1/2
B. 3/4
C. 1
D. 2

8. What room is typically most dangerous in residences?

A. Garage
B. Kitchen
C. Bathroom
D. Basement

9. To meet universal design principles, showers should have a _____ inch opening and turning radius.

A. 24
B. 30
C. 36
D. 48

10. Which of the following is not a recommended universal design tactic in the kitchen?

A. Pullout drawers
B. 2' space between the island and cooktop
C. Side-hinged wall oven
D. 3' doors

SPONSOR INFORMATION


propane
ENERGY FOR EVERYONE
Propane Education & Research Council

With a propane standby generator, there's nothing you can't power through

When it comes to your next construction or renovation project, give your homeowner something they'll appreciate as much as the quality of your work: peace of mind. Including a standby propane generator in the build will ensure your customers will have reliable power at home, no matter what happens to the grid. And it will protect your work — and their investment — in the face of summer storms and beyond.

Learn more at **propane.com/propane-products/generators**

Extruded Aluminum Trim: Innovative Solutions for Interior Applications

Presented By:

TAMLYN®
FAMILY. VALUE. SERVICE.

LEARNING OBJECTIVES

1. Explain how interior extruded aluminum trim products can be utilized to enhance drywall surfaces.
2. Explain the aluminum extrusion process and characteristics of extruded aluminum that maximize fire resistance, durability, and sustainability.
3. Discuss the finish and profile options available for interior extruded aluminum trim products, as well as installation considerations.
4. Explore emerging technologies and trends available for interior extruded aluminum trim.

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/AR12224** 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 EXTRUDED ALUMINUM TRIM

When building professionals talk about details, they are referring to the way the parts and pieces of an interior space come together - how they're joined and how they intersect. Since the interior of a building has many intersecting materials, there are numerous details to consider in the design process. Ideally, they all support a single design language—an aesthetic. And, with today's focus on green materials, detailing needs to not only meet an architectural design aesthetic but also durability and sustainability requirements. In contemporary architecture, these details can range from the sublimely simple to the ornate, with equally wide-ranging costs.

Trim is one example of a widely used architectural detail that is employed for a variety of reasons. Trim's most basic function is to separate wall materials and provide protection and a finished edge for vertical drywall or panel corners. But it can also be used to create a modern aesthetic and create a clean intersection of drywall. It also can also sculpt interior walls, as it creates horizontal and vertical lines on the wall plane.

INTERIOR EXTRUDED ALUMINUM TRIM ENHANCES DRYWALL CONSTRUCTION

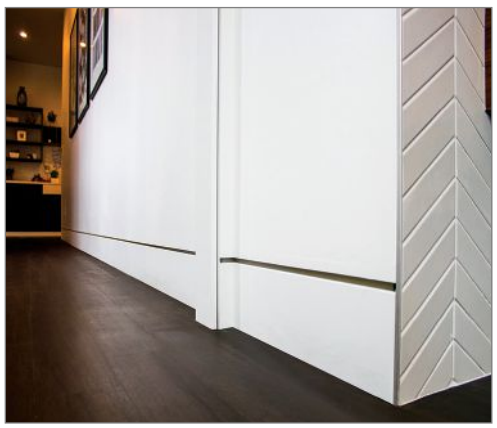
Specifying extruded aluminum interior trim products is one instance where a knowledge of detailing can help meet design prerequisites for durability, sustainability, and beauty. Extruded aluminum trim was initially developed for use on building exteriors, typically in conjunction with fiber cement panels. The trim integrates with panel siding systems and creates modern architectural lines. Galvanized steel trim can also serve this purpose and is sometimes specified because its upfront costs are lower, but it does not perform as well as extruded aluminum in the long run.

Now, manufacturers are offering interior extruded aluminum trim for use in both residential and demanding commercial applications. Typically, extruded aluminum trim is installed in conjunction with drywall, although it can also be used with metal or wood panels and wrapped surface finishes such as fabric or vinyl wall coverings. In

Manufacturers are now offering interior extruded aluminum trim for use in both residential and demanding commercial applications.

the design and construction of commercial interiors, 5/8-inch-thick drywall on metal studs is still the high-value, low-cost workhorse for defining the perimeter of spaces, creating separation, and providing a very flexible substrate for limitless embellishments. It doesn't get much credit for this because it is seen as so simple, so common, and so disposable.

With the cost of construction continuously rising, schedules shrinking, and field skill sets diminishing, designers and architects are constantly looking for ways to create unique spaces that leverage budgets, schedules, and craftsmanship availability. In short, they want to design and build spaces that produce the most "bang for the buck." To that end, a new line of aluminum trim products was designed and manufactured to enhance the practical aspects of drywall construction and transform it into a design medium that can make it the feature, the focus, and the most impactful element of a well-designed space. These modern interior trim products are sustainable, durable, lightweight, and easy to use.



Alternative trim materials cannot achieve the same level of detail and design as aluminum, which is more aesthetically pleasing and provides the designer the ability to match a finish with doors, windows, and frames, among other elements.

ADVANTAGES OF EXTRUDED ALUMINUM TRIM

Depending on the application, interior trim products may be made of a variety of materials including extruded aluminum, polyvinyl chloride (PVC), rubber (used for corner guards), and wood (used for baseboards). Aluminum trim can withstand greater daily abuse than most materials as it is stronger, maintains its shape better, and is less vulnerable to damage than non-metal alternatives. Aluminum adds durability and longevity to construction, whereas PVC and rubber deteriorate over time and wood

GLOSSARY

Acoustical Perimeter Trim: Extruded aluminum trim used for "ceiling clouds" and suspended drywall or panel ceilings.

Aluminum: The most abundant metallic element in Earth's crust and the most widely used nonferrous metal; it is derived from bauxite deposits mined from the earth.

Anodizing: A controlled electrochemical process that deposits an oxide film on aluminum that provides a durable surface that is corrosion resistant.

Baseboard: Serves to cover the joint between the finished wall and floor.

Billet: A solid length (often in a square or circle profile) of material that has been extruded into shape, either by continuous casting or hot rolling.

Extrusion: The process of shaping material, such as aluminum, by forcing it to flow through a shaped opening in a die; extruded material emerges as an elongated piece with the same profile as the die opening.

Fire-Rated Extruded Aluminum Trim: Trim with a factory applied intumescent strip along the back wall of the profile that enables drywall designs to achieve 1-hour and 2-hour fire ratings without the requirement of an extra layer of drywall.

LED Extrusions: Commonly known as LED profiles or channels, they integrate linear LED light strips into a protected and concealed rigid aluminum housing.

Powder Coating: A dry finishing process based on polymer resin systems that are blended with curatives, pigments, leveling agents, flow modifiers, and other additives then ground into a powder; this powder is applied to aluminum substrate via electrostatic spray deposition (ESD).

Type 6063-T5 Aluminum: Commonly referred to as the architectural alloy, it has a very smooth surface and is the best alloy suited for anodizing applications.

damages easily and must be refinished on a regular basis. Additionally, other trim materials cannot achieve the same level of detail and design. Aluminum (when anodized or with a polished finish) is more aesthetically pleasing and provides the designer the ability to match a finish with doors, windows, and frames, among other elements. Extruded aluminum trim also installs straight and true for a very clean look.

Aluminum is the sustainable material of choice in many markets because of its significant environmental and economic benefits.

WHAT IS ALUMINUM EXTRUSION?

Aluminum, the most abundant mineral in the earth's crust, is derived from bauxite deposits mined from the earth. After initial processing, a form called alumina undergoes smelting and alloying, producing solid billets of cast metal from which extruded aluminum shapes or profiles are made. These billets are 8" to 12" diameter "logs" of aluminum. These billets are then heated and pressed through a die, which creates the intended extrusion shape. "Extrusion dies are essentially thick, circular steel disks containing one or more openings to create the desired profile. They are normally constructed from H-13 die steel and heat-treated to withstand the pressure and heat of hot aluminum as it is pushed through the die."[1] This is important because it takes an enormous amount of pressure to push an aluminum billet through a thin, multi-holed die to create the desired shape (e.g., 100,000-125,000 psi of force to push a billet through an 8" inch press). After passing through the die, the extrusion goes through a backer and bolster which maintains the shape while adding space. The backer plate supports the tongue of the die to prevent collapse or distortion while the bolster supports the extrusion load transmitted from the die and backer.[2]

Aluminum extrusions can become a part of the surface, or they can become the feature itself, and complex shapes can be realized in one-piece extruded aluminum sections.

Aluminum extrusion is a highly versatile metal-forming process that provides a wide array of desirable physical characteristics. Aluminum is easily machined due to its malleability, yet it is one-third the density and stiffness of steel. Following the extrusion process, a variety of options (e.g., anodizing and painting) are available to modify the color, texture, and brightness of the aluminum's finish.

TYPE 6063-T5 ALUMINUM

Most extruded shapes for architectural use are fabricated from 6063, an aluminum alloy with magnesium and silicon as the alloying elements. Type 6063-T5 aluminum — commonly referred to as the architectural alloy — has a very smooth surface and is the best alloy suited for anodizing applications. The T5 designation indicates it has been artificially aged and moderately heat-treated. Aluminum trim products are precisely manufactured under extreme tolerances. Extrusions can become a part of the surface, or they can become the feature itself, and complex shapes can be realized in one-piece extruded aluminum sections. Profiles are typically found in 0.050" thicknesses.

CHARACTERISTICS OF EXTRUDED ALUMINUM

Extruded aluminum is frequently referred to as a "miracle metal" due to its long list of favorable properties. It is fire resistant, non-combustible, and does not produce toxic fumes, even at extremely high temperatures. Because it is protected by its own naturally occurring oxide film, aluminum does not rust. Extruded aluminum is also very resilient and can spring back from the shock of impact depending on the temper applied. Aluminum trim products are defined as "articles" by the Occupational Safety and Health

Administration (OSHA) and are therefore exempt from the requirement of publishing material safety data sheets, as it poses no health or physical hazards. Aluminum is relatively inexpensive, may not require long lead times, and even short-run prototypes can typically be produced at moderate cost. It can add a design aesthetic to a wide range of interior applications and can be easily manufactured to accepted standard dimensional tolerances.

SUSTAINABILITY

Aluminum is the sustainable material of choice in many markets because of its significant environmental and economic benefits. The material is constructed from 75 to 100 percent post-industrial and post-consumer scrap. Aluminum is a strong, highly durable material that offers a long service life and prevents the need for frequent replacement and additional raw material use. In fact, the strength of aluminum prevents swelling and buckling so that trim profiles can be made as strong as needed for most applications.

Aluminum is also lightweight, weighing about one-third of most other metals, which makes it easier to handle and less expensive to transport. And, it is the only material in the consumer disposal stream that more than pays for the cost of its own collection. Aluminum produced in North America is more sustainable today than ever before due to technological advancements in recycling and voluntary environmental efforts by manufacturers. Indeed, the energy required to make new aluminum is down more than a quarter since 1995 and the industry's carbon footprint has been reduced nearly 40 percent.

Aluminum can also help projects earn LEED® v4 certification under the following credits:

- Materials and Resources Credit: Building Product Disclosure and Optimization — Environmental Product Declaration (EPD)

This article continues on http://go.hw.net/AR12224. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. Extruded aluminum trim is typically installed in conjunction with what wall material, although it can also be used with these other materials?

A. Drywall
B. Metal panels
C. Wood panels
D. Wrapped surface finishes

2. Interior trim products are typically made of which of the following materials?

A. Extruded aluminum
B. Polyvinyl chloride
C. Rubber
D. Wood
E. All of the above

3. What is the most abundant mineral in the earth's crust?

A. Iron
B. Silicon
C. Calcium
D. Aluminum

4. Aluminum is easily machined due to its malleability, yet it is _____ the density and stiffness of steel.

A. 1/3
B. 1/4
C. 1/2
D. 2/3

5. Which type of aluminum is referred to as the architectural alloy and used in extruded aluminum trim?

A. 1100
B. 3003
C. 6061
D. 6063

6. Which of the following is a characteristic of extruded aluminum?

A. Fire resistant
B. Does not rust
C. Impact resistant
D. Lightweight
E. All of the above

7. Aluminum is constructed from _____ percent post-industrial and post-consumer scrap.

A. 1 to 25
B. 25 to 50
C. 50 to 75
D. 75 to 100

8. Aluminum can help projects earn LEED® v4 certification under which of the following credits?

A. Materials and Resources
B. Indoor Environmental Quality Credit
C. Energy and Atmosphere Credit
D. All of the above

9. Which of the following describes a controlled electrochemical process that deposits an oxide film on aluminum trim?

A. Painting
B. Powder coating
C. Galvanizing
D. Anodizing

10. Compared to liquid paints, _____ provides a more durable finish that offers greater resistance to diminished coating quality resulting from impact, moisture, chemicals, ultraviolet light, and harsh weather conditions.

A. Anodizing
B. Powder coating
C. Electroplating
D. Galvanizing

SPONSOR INFORMATION

TAMLYN®
FAMILY. VALUE. SERVICE.

Tamlyn was started in 1971 by Ron Tamlyn, Sr., and his wife Jean with $800 in borrowed money, and we continue to this day to be family-owned. We strive to bring high-quality products to the building industry, which includes our XtremeTrim® line of extruded aluminum for a variety of siding materials and XtremeInterior™ line of extruded aluminum for drywall and interior.

Beauty and Strength

AN EXAMINATION OF WESTERN RED CEDAR FINISHES AS A COMPLEMENT TO MASS TIMBER SYSTEMS MADE OF DOUGLAS FIR, SPRUCE-PINE-FIR, AND SOUTHERN YELLOW PINE

Sponsored By:

REAL CEDAR

THE WOOD INSTITUTE

Photo courtesy of Brad Nicol Photography.

LEARNING OBJECTIVES

1. Discover the different types of mass timber products, applications for mass timber construction, and the softwood lumber species that are used to manufacture mass timber products, including Douglas fir, spruce-pine-fir, and Southern pine.
2. Examine the benefits of mass timber, from carbon sequestration to construction efficiencies.
3. Review how Western red cedar products can be used on both exteriors and interiors to complement mass timber construction.
4. Explore several projects where Western red cedar was used to complement mass timber structures.

CONTINUING EDUCATION

This course is approved for AIA, IDCEC, and GBCI Learning Unit Credits.

AIA Continuing Education Provider

IDCEC APPROVED

GBCI

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/AR12225** 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.

WHAT IS MASS TIMBER?

Due to revised building codes and a growing awareness of the environmental benefits of building with wood over more energy-intensive materials such as steel and concrete, the number of mass timber buildings being constructed is rising nationwide.[1] These buildings are not only environmentally superior and just as structurally sound, but they are beautiful.[2] Mass timber is a new category of wood products comprised of smaller solid softwood lumber components bonded together with adhesives, nails, or dowels that produce large-format panel, beam, and column elements. These products are used as load-bearing materials, as they provide exceptional strength and stability while being lightweight, making a new generation of high-performance buildings possible.[3] When left exposed, mass timber products also provide exceptional beauty to interior spaces and they can be "designed to curve and cantilever, achieving expressive long-spanning designs."[4]

TYPES OF MASS TIMBER

There are several types of mass timber products that you should be aware of, as they each have different structural and aesthetic merits: cross-laminated timber, dowel-laminated timber, nail-laminated timber, and glued-laminated timber.

Cross-Laminated Timber (CLT)

Cross-laminated timber has been widely adopted in Europe but is gaining popularity in the U.S. The product is typically made from solid sawn laminations and is manufactured in accordance with ANSI/APA PRG 320, a standard that ensures manufacturing, qualification, and quality assurance is the same across North America. CLT consists of layered lumber boards (usually three, five, or seven) stacked and glued crosswise at 90-degree angles. These alternating grains improve CLT panels' dimensional stability and deliver excellent structural rigidity in both directions. Finger joints and structural adhesive connect the boards. The thickness of

CLT consists of layered lumber boards (usually three, five, or seven) stacked and glued crosswise at 90-degree angles; these alternating grains improve CLT panels' dimensional stability and deliver excellent structural rigidity in both directions. Photo courtesy of Structurlam.

CLT laminations typically ranges from 5/8 inch to 2 inches, with widths from 2.5 to 5.5 inches. CLT panels can be manufactured to custom sizes, but each manufacturer has specific product dimensions and transportation restrictions may ultimately limit their size.[5] CLT is manufactured to specific structural performance requirements with lay-ups made with MSR (Machine Stress Rated) lumber or visually graded lumber. There are three major softwood lumber species used:

- Doulas fir-larch, or simply Douglas fir, is plentiful and dimensionally stable. While all lumber benefits from some degree of "seasoning" to adjust to the humidity conditions of its surrounding atmosphere before it's installed, Douglas fir seasons well in position and can be cut, nailed, and fastened in "green" then allowed to air dry during construction.
- Spruce-pine-fir (SPF) is a grouping that includes species such as balsam fir, red pine, red spruce, black spruce, Engelmann spruce, and lodgepole pine. Lumber manufactured from these species is commonly found in building supply stores throughout the U.S., identified on the grade stamp as either "S-P-F" or "SPFs."
- Southern pine lumber features excellent fastener-holding ability, providing framing components with strong connections. Its inherent strength contributes to long, clear spans that reduce the need for intermediate columns and load-bearing walls. Using today's design technology, creative roof and ceiling styles are possible using southern pine.

CLT panels have many applications including roofs, walls, and floors; cantilevered floors and balconies; and load-bearing elevator shafts and stairs. According to the 2022 Mass Timber Design Manual, "The panels' ability to resist high racking and compressive forces makes them especially cost-effective for multistory and long-span diaphragm applications. In structural systems, such as walls, floors, and roofs, CLT panels serve as load-bearing elements and are well suited to taller timber construction. CLT can be left exposed in building interiors — up to 8 or 9 stories in Type IV-C buildings under the 2021 IBC (depending on occupancy), offering additional aesthetic attributes."[6] CLT can also be manufactured to different appearance classifications.

Dowel-Laminated Timber (DLT)

Dowel-laminated timber panels are a newer mass timber product that are made from dimensional softwood lumber boards (2x4, 2x6, 2x8, etc.) that are friction-fit together with dowels made from hardwood lumber. The softwood lumber species used is typically Douglas fir, SPF, or Southern pine. Because it is constructed entirely of wood with no metal connectors, DLT is easily processed and cut using computerized numerical control (CNC) machinery. The Design Manual notes several aesthetic benefits of dowel-laminated timber: "Alternating patterns of lumber can be used to create various aesthetic appearances, and it can be bent and assembled to create curved structures. DLT panels can also accommodate mechanical services and sound absorbing insulation [that is] tucked away as part of its cut and design." DLT panels can even be mechanically bonded to a cast-in-place concrete topping to form

GLOSSARY

Biophilic Design: The practice of connecting people and nature within the built environment

Carbon Sequestration: The process of capturing and storing atmospheric carbon dioxide with the goal of reducing global climate change

Closed-Loop System: Production processes that reuse material waste created during product manufacturing to create new products, thereby preserving natural resources and diverting waste from the landfill

Cross-Laminated Timber (CLT): A mass timber product typically made from solid sawn laminations, of Douglas fir, spruce-pine-fir, or Southern pine species CLT consists of layered lumber boards (usually three, five, or seven) stacked and glued with structural adhesive crosswise at 90-degree angles

Life Cycle Assessment (LCA): A method of assessing the environmental impacts of a commercial product, process, or service at all stages of its life cycle, from raw material extraction through final disposal

Mass Timber Construction: Buildings constructed using a category of engineered wood products typically made of large, solid wood panels, columns, or beams often manufactured off-site for load-bearing wall, floor, and roof construction

Mass Timber Product: Thick, compressed layers of wood, creating strong, structural load-bearing elements that can be constructed into panelized components; they are typically formed through lamination, fasteners, or adhesives

Soffit: The horizontal underside of an exterior or interior construction element, such as a roof overhang

Timber Concrete Composite (TCC): A hybrid panelized system that creates a composite action between timber and concrete that enables designers to increase spans, reduce deflections, improve vibration performance, and streamline structures; electrical, mechanical, and acoustic systems can be integrated into the structural panels

Western Red Cedar: Scientific name Thuja plicata, it is an evergreen coniferous tree that is native to western North America

timber concrete composite (TCC) panels, a hybrid system used to reduce cross sections, increase spans, and lessen noise transfer and vibrations.

Nail-Laminated Timber (NLT)

Nail-laminated timber, which used to be known as heavy timber or mill decking, is a century-plus-old construction method that was used to construct 19th and early-20th century industrial buildings such as factories and warehouses.[7] NLT panels spanned between solid timber posts and beams to create incredibly sturdy flooring systems and can still be seen today in historic buildings that have been repurposed for commercial or residential space. The mass timber product fell out of favor for concrete and steel construction after several major urban fires but is now a practical option again due to improved sprinkler systems, more stringent fire code, the domestic availability of wood, and knowledge about the sustainability of renewable wood building products. An added bonus is that the product does not require a dedicated manufacturing facility and it can be fabricated with readily available dimensional lumber.

NLT is made from dimension lumber stacked on edge and fastened together with nails (or less commonly screws) to form a solid structural element. The typical softwood lumber species used in the manufacture of DLT are Douglas fir, SPF, or Southern pine. The resulting panels have a nominal thickness ranging between 4 and 12 inches.[8] NLT gets its strength and durability from the nails or screws fastening the individual pieces of lumber together. Adding plywood or oriented strand board sheathing on one face of the panel helps with dimensional stability and creates a diagram to transfer lateral forces, allowing NLT to be used as a shear wall or structural diaphragm. WoodWorks notes, "NLT offers a consistent appearance for decorative or exposed-to-view applications and can include curves and cantilevers."

Glued-Laminated Timber

Glued-laminated timber, often referred to as glulam, is one of the oldest and most widely used mass timber products because it can be used in many applications and in almost all

NLT is made from dimension lumber stacked on edge and fastened together with nails (or less commonly screws) to form a solid structural element. Photo courtesy of Think Wood.

construction types from buildings to major load-bearing structures such as bridges, canopies, and pavilions. The product is manufactured in conformance with the ANSI A190.1-2022 standard, and composed of individual dimension lumber laminations, typically Douglas fir, SPF, or Southern pine, that are bonded together with durable, moisture-resistant adhesives. The wood laminations are selected and positioned based on their performance characteristics, but the grain always runs parallel with the length of the member.

Glulam can be customized to create straight, tapered, arched, or curved elements such as columns and beams, or it can be affixed side-by-side to form panels. Per the Mass Timber Design Manual, "While typically used as beams and columns, designers can use glulam in the plank orientation for floor or roof decking similar to NLT. It is particularly well suited to long-spanning structures and custom curvilinear shapes and combines well with hybrid assemblies and building systems."

APPLICATIONS FOR MASS TIMBER[9]

As large solid wood elements or panels, mass timber products can be used for load-bearing wall, floor, and roof construction, as well as in load-bearing elevator shafts and stairs. They can be designed to curve and cantilever, achieving expressive long-spanning designs, or can be bonded with concrete to form timber concrete composite (TCC) floors. As mentioned earlier, this hybrid system creates a composite action between the two materials, which "enables designers to increase spans, reduce deflections, improve vibration performance, and streamline structures in pursuit of sustainable architecture and cost efficiency." Electrical, mechanical, and acoustic systems can be integrated into the structural panels. Because the timber carries a portion of the load, these panels reduce the proportion of carbon-intensive concrete components.[10]

Additionally, mass timber can be used as a complement to other building systems in conjunction with light-frame wood construction or in other types of hybrid structures. This variety of products gives design teams flexibility and versatility, especially since they can be combined to form customized structural assemblies. Designers are using mass timber products to construct multifamily housing, healthcare facilities, public buildings, tall-wood structures, and mixed-used commercial offices, a key use for mass timber construction. While steel and concrete have been used in more recent history to construct office buildings, "mass timber is rising in popularity and is equally capable of accommodating the needs of a modern workplace."[11] This is because mass timber construction is ideal for today's open office layouts and offers aesthetic warmth and biophilic benefits of natural wood when it's left exposed.

WoodWorks tracks mass timber projects

across the U.S. and reports that "As of June 2022, 1,502 mass timber projects had been constructed or were in design in all 50 states, in the multi-family, commercial, or institutional categories."[12]

SUSTAINABILITY BENEFITS

Mass timber construction is a boon to sustainable design because of its many environmental benefits and contributions to biophilic design. From carbon sequestration to preventing deforestation, building with mass timber products reduces a building's carbon footprint[13] and can improve occupant well-being.[14]

Carbon Sequestration

Wood as a building material offers two main advantages when compared to alternative materials and methods such as concrete and steel construction:[15]

1) Harvesting wood is less carbon intensive than extracting energy intensive materials from the ground, and

2) Timber buildings store carbon that would otherwise be emitted back into the atmosphere.

Growing forests absorb and store carbon, and release oxygen, over extended periods of time. Harvesting and replanting increases forests' carbon sink potential as the rate of sequestration is greater during a tree's young, robust growth. Active forest management, or forest thinning, mitigates wildfires, cuts carbon emissions, replenishes area waterways, expands wildlife habitat, and creates jobs in rural areas. This is considered a closed-loop cycle because of the natural processes of growth, decay, and disturbances, but it is also a closed-loop cycle when forests are harvested for use in products or energy. WoodWorks notes, "The biogenic carbon cycle fundamentally differs from the open/one-way flow of fossil carbon to the atmosphere." In addition, wood products are

This article continues on http://go.hw.net/AR12225. Go online to read the rest of the CEU course, complete the corresponding quiz for credit, and receive your certificate of completion.

QUIZ

1. **Which of the following mass timber products consists of layered lumber boards (usually three, five, or seven) stacked and glued crosswise at 90-degree angles?**
   A. CLT C. NLT
   B. DLT D. Glulam
2. **Which of the following softwood lumber species can be used to manufacture CLT in conformance with the ANSI/APA PRG 320 standard?**
   A. Douglas Fir-Larch C. Southern Pine
   B. Spruce-Pine-Fir D. All of the above
3. **CLT can be left exposed in building interiors up to _____ stories in Type IV-C buildings under the 2021 IBC (depending on occupancy).**
   A. 5 or 6 C. 7 or 8
   B. 6 or 7 D. 8 or 9
4. **Which mass timber product is made from dimension lumber stacked on edge and fastened together with nails or screws to form a solid structural element?**
   A. CLT C. NLT
   B. DLT D. Glulam
5. **Which type of mass timber product can be used in both buildings and major load-bearing structures such as bridges, canopies, and pavilions?**
   A. CLT C. NLT
   B. DLT D. Glulam
6. **As of June 2022, how many mass timber projects had been constructed or were in design in all 50 states, in the multi-family, commercial, or institutional categories?**
   A. 205 C. 1502
   B. 500 D. 1205
7. **Wood products are approximately _____ percent carbon by dry weight, meaning mass timber buildings can store carbon that would otherwise be emitted back into the atmosphere well into the future, reducing their global warming potential.**
   A. 15 C. 50
   B. 25 D. 75
8. **CLT components weigh about _____ percent less than concrete equivalents, which can result in additional savings via lower transportation costs, smaller building foundations, reduced crane and heavy equipment rentals, lower interior finishing costs, and less material waste.**
   A. 20 C. 40
   B. 30 D. 50
9. **The ____ IBC was the first to incorporate CLT as a structural building product when it was recognized for use in Type IV (heavy timber, HT) construction.**
   A. 2012 C. 2018
   B. 2015 D. 2021
10. **The 2021 IBC includes provisions for up to _____ stories of Type IV-A construction for Business and Residential Occupancies.**
    A. 8 C. 12
    B. 9 D. 18

SPONSOR INFORMATION

Register Today for KBIS 2023

Visit kbis.com/attend to learn more

NKBA | KBIS

JAN. 31–FEB. 2

LAS VEGAS 2023

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

Editorial: Los Angeles' Promising Housing

TEXT BY PAUL MAKOVSKY

The Ranchito Toy Box, designed by architect Linda Taalman—founder of IT House and Taalman Architecture—is an IT Box, a 360-square-foot ADU that converts an existing carport to a Junior Accessory Dwelling Unit. It is one of six IT House Standard Plan options preapproved for the city of Los Angeles.

JESSE GILLAN

America is in the midst of a housing emergency, and the city of Los Angeles is no exception. Rents increased as much as 22% this year, many lower-income Angelenos are being forced out of the city, and tent encampments are rising throughout the area. Legalizing denser building and expediting approvals in transit-oriented areas will no doubt help alleviate the situation. One promising solution is the city's experiments with Accessory Dwelling Units or ADUs—sometimes called granny flats or in-law suites. According to *The Atlantic*, from 2016 to 2021, the number of ADU permits issued in LA rose dramatically from 80 to 5,064—an increase of 6,230%. Further, the magazine reported that 25% of all homes built in LA last year were ADUs.

Since 2021, the Los Angeles Accessory Dwelling Unit Standard Plan Program spearheaded by the LA Department of Building and Safety has been working with a group of emerging architects from LA and beyond to develop plans that are preapproved, and they've streamlined and expedited the process of getting planning and building approval. The initiative currently has 51 preapproved designs for ADUs, designed by Jennifer Bonner, SO-IL, and Design,Bitches, just to name a few. ADU startups—like Abodu, United Dwelling, and Cottage—are also active in the ADU market and handle the entire process of building one for their customers.

Architect Linda Taalman, founder of IT House and Taalman Architecture and a participant in the city's initiative, recently told me that when she first started thinking about designing an ADU, she realized there was no one-size-fits-all solution, so her team proposed six models. Taalman is also an entrepreneur-in-residence under LA mayor Eric Garcetti's office for the city of Los Angeles, where she and design associate Camille Walkinshaw will spend the next year studying how to increase awareness and improve the implementation of housing in the city through public engagement on the topic of small-scale, low-rise densification following recent legislative changes for ADUs, JADUs (Junior Accessory Dwelling Units), duplexes, and lot-split housing. They are organizing self-guided tours of ADUs throughout the city including their own, collecting data, and getting feedback from the local community. They hope they can change some of the interface with the city, improve the workflow between different city departments, and facilitate new policies. The pair will also be making formal recommendations to the city on how LA can expand its low-rise housing. Plus, there are plans in the near future for a website, lowrise.lacity.org, a symposium on low-cost packaged solutions, and an exhibition on LA densification projects.

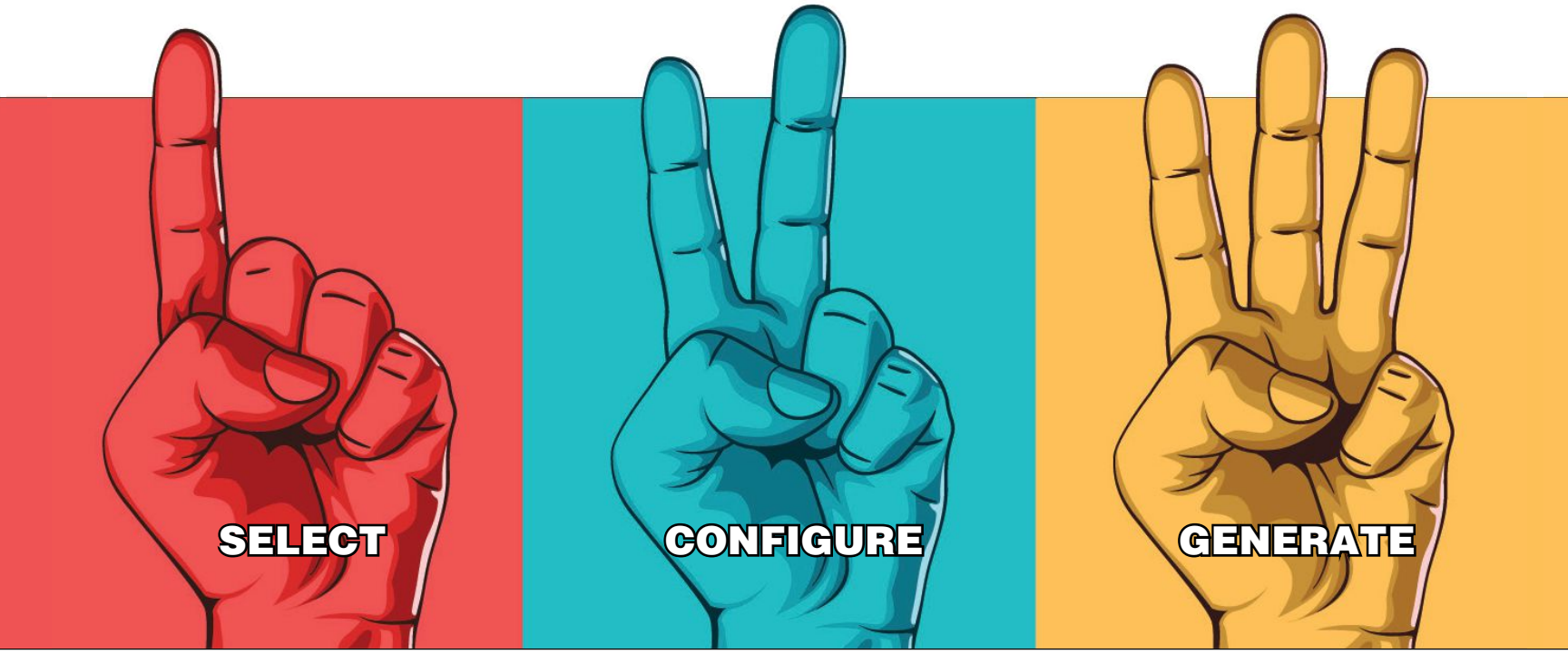
"The Case Study program from 60 years ago was about single-family houses and prefabrication," Taalman says. "Our study is about multi-housing, and our approach is kind of like an open-source case study."

Stay tuned for more.

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

3 EASY STEPS!

and registration isn't one of them.



Select and configure a product fast and accurately, then automatically generate a complete CSI 3-Part Formatted spec.

1. **SELECT** the necessary product(s) for the project.

2. **CONFIGURE** those product(s) around the specific requirements of the project using drop-down menus and option boxes. (The built-in intelligence of SpecWizard prevents incompatible choices)

3. **GENERATE** the completed specification by choosing either USA or Canadian versions. The SpecWizard then edits the manufacturer's proprietary specification based on your selections, and within seconds, produces a finished CSI 3-Part Formatted specification in Word format.

---

that's it. that's SpecWizard®. only@arcat.com

SPECWIZARD

NUCOR®

MINDS OF STEEL

Today's most innovative architects depend on steel more than ever to turn vision into reality.

JAYSHREE SHAH
AIA, NCARB,
LEED AP BD+C

TERRI MEYER BOAKE
LEED AP, PROFESSOR,
UNIVERSITY OF WATERLOO
SCHOOL OF ARCHITECTURE

JASON SMITH
AIA,
DESIGN PRINCIPAL AT SMITHGROUP

DISCOVER MORE
nucor.com/design