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The Journal of The American Institute of Architects

Richard Rogers

2019 AIA Gold Medalist

PROJECT: 8500 Melrose
LOCATION: West Hollywood, CA
ARCHITECT: Tighe Architecture

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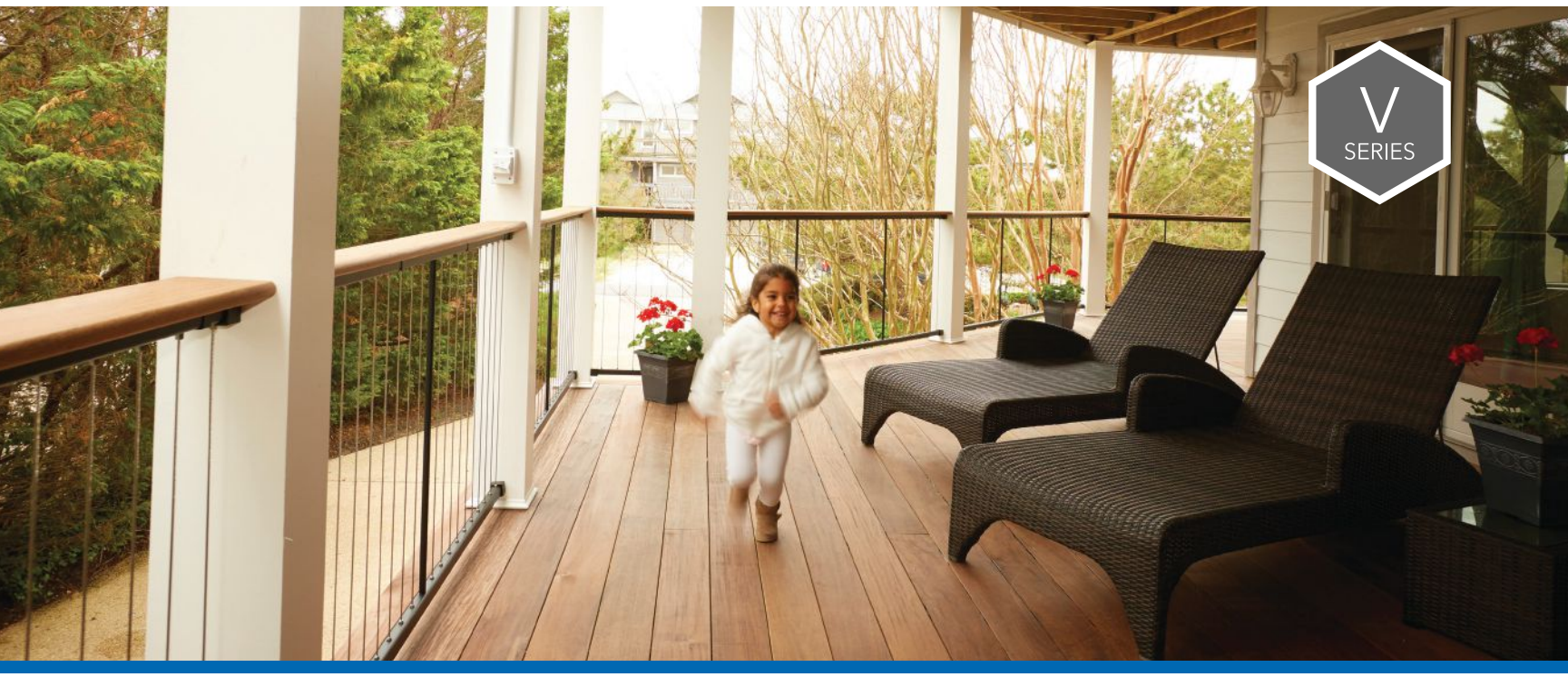

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CONTINUING EDUCATION AIA

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Volume 108, number 5. May 2019.
On the cover: 2019 AIA Gold Medalist Richard Rogers. Photo by Phil Fisk.
This page: Payette designers working on "Pearl." Photo by Rashad Baniabbasi, courtesy Payette.

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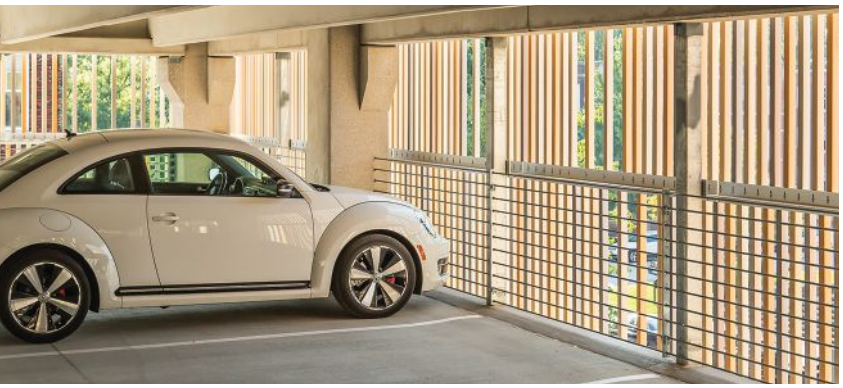

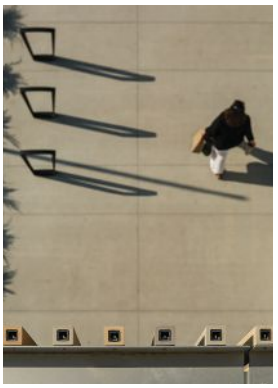

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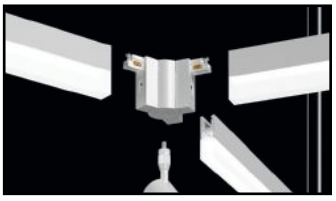
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-Clarice Jones, Project Architect, Catania Engineering Associates

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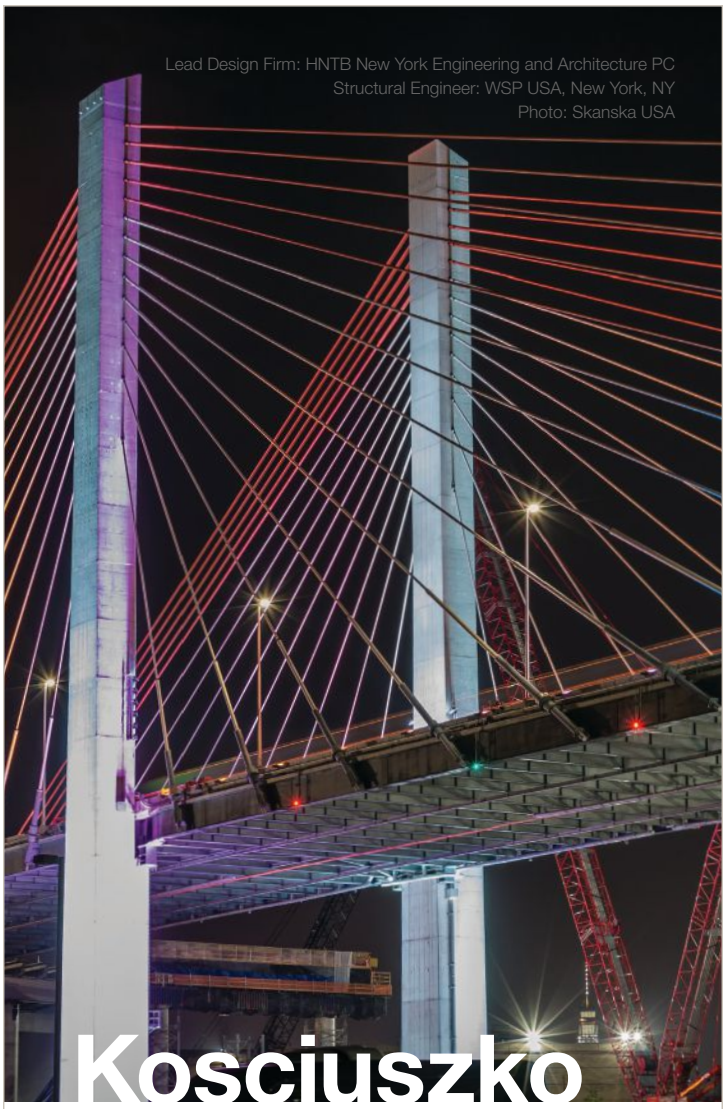

Lead Design Firm: HNTB New York Engineering and Architecture PC
Structural Engineer: WSP USA, New York, NY
Photo: Skanska USA

Kosciuszko à Gogo

The design of urban infrastructure affects city life as much as the design of its buildings. That's why replacing the **Kosciuszko Bridge**—a notorious pinch point in traffic between Brooklyn and Queens—was a high priority for Governor Cuomo. With heavy lifting from **HNTB**, **WSP USA**, and **Skanska**, a striking cable-stayed span has risen where the outdated bridge once stood, ensuring New Yorkers may still have trouble saying its name, but they never have trouble getting home. Read more about it in **Metals in Construction** online.

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LEFT McDonald's Chicago-based flagship restaurant glows like a jewel box illuminating the warmth of its exposed timber structure. TOP RIGHT Upon entry, patrons to McDonald's flagship location are greeted with a dramatic CLT structure and floating glass garden of ferns and white birch trees.

IS WOOD WORTH IT?

For centuries we have been drawn to wood as a building material for its natural strength and beauty. With its many distinct properties and advantages, wood's versatility is vast. And upcoming code changes are creating new opportunities for wood. While wood is cost-competitive when compared to alternative materials, it's not always the cheapest price-for-price. So, all things considered, is wood worth it?

Value Beyond the Price Tag

Multifamily, mixed-use and commercial clients come with a unique set of needs and constraints. Developers are looking for cost-effective, replicable structures that can go up fast and efficiently, without compromising on quality. In a sea of what can sometimes seem like cookie-cutter options, timber is an inherently natural, distinctive building material that is proving it can be a design differentiator.

Given its innate environmental benefits, warm aesthetic, durability and performance, architects are increasingly turning to timber as a primary building material. Coast-to-coast, design teams throughout North America are discovering wood's distinct value, above and beyond its price tag.

Adding Mass Timber to the Menu

In the American Midwest's largest city, one of the most recognizable brands—McDonald's—is showcasing how wood can bring value and help express its growing commitment to environmentally-conscious choices. For its latest Chicago-based flagship restaurant, the three-quarters-of-a-century-old fast-food chain is shaking off its once plastic-clad brightly-colored interiors for an exposed cross-laminated timber (CLT) design, along with more sustainable, naturally hued materials.

The choice to use timber came early in the process with the goal: "design authenticity." As Carol Ross Barney of Ross Barney Architects explains, some durable materials aren't always authentic and eco-friendly. Mass timber offers durability, resilience and sustainability. And because you can use CLT like any panelized material, such as precast concrete or steel, it's a robust, cost-effective and green alternative.

Wood's Curve Appeal

Thirty miles east of Vancouver, British Columbia, a six-story hybrid (mass timber and wood-frame) 72-unit condo building, Legacy on Park Avenue its moniker, is making unique use of CLT, combined with dimensional lumber, to create a signature curvaceous design, not otherwise possible with conventional construction.

"The speed, fit, and finish of the CLT panels cannot be matched in conventional framing,"

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TOP LEFT A seven-story mass timber design has become integral to 77 Wade's marketing plan promoting its benefits to prospective tenants. TOP RIGHT Legacy on Park Avenue condo makes creative use of CLT in this curvaceous hybrid wood-frame mass timber design under construction. BOTTOM RIGHT A concrete podium wood-frame configuration offered significant value for money for architect Togawa Smith Martin's innovative double-podium design, supporting five levels of wood-framed structure and boosting density for the WREN Residences in Los Angeles.

explains Steve Rempel, a partner in MDM Construction, the firm constructing the project. "The materials' ability to span in two directions at the same time have opened up new structural framing possibilities."

Generation Wood

A thirty-year veteran developer, Cary Soloman, President & CEO of Next Property Group, has had great success attracting start-ups and tech-oriented tenants through the conversion and adaptive re-use of century-old timber-brick-and-beam buildings. What he discovered is there is an emerging generation of budding office workers drawn to their historic character.

This led him to ask his design team at BNC Inc. Architecture + Urban Design, "what if we took a 1920's timber brick-and-beam building and put it in a time machine, taking it out in 2020? What would that building look like? How can we achieve its same warmth and character, while incorporating the best and latest technologies?"

The result is 77 Wade, a thoroughly modern Toronto-based office complex to be constructed of mass timber, with nail-laminated timber ceilings and glulam columns, reminiscent of timber structures of the past. The seven-story building, with its generous exposed wood, will attract what Soloman calls "a new kind of urban professional" that is looking for a vibrant, natural, warm and sustainable workplace.

With the upcoming changes in building codes in both the United States and Canada, wood's value will be reaching new heights. Innovative design teams across North America are choosing wood for the great value it offers and proving there are a wide range of reasons why its worth it.

Why Wood is Worth It

The business case for wood is growing:

- *A natural, renewable and sustainable material*
- *Market differentiation and cachet*
- *Anecdotally, some owners of timber buildings report higher lease-rates and lower vacancy rates*
- *Podium-wood-hybrid configurations can save money and boost density*
- *Well-suited to prefabrication, wood buildings can go up quicker, year-round*
- *Studies show a correlation between appearance of wood and lower levels of stress*
- *Can offer cleaner, safer and more efficient job sites*
- *Light but strong, wood can reduce transportation, foundation and other costs*
- *Its versatility creates new design possibilities*

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Calling All Adrenaline Junkies

Chicago will soon be home to a new architectural ride for adrenaline junkies. In March, local firm SCB (Solomon Cordwell Buenz) released plans for a glass-walled elevator that will be fixed to the outside of the Edward Durell Stone–designed Aon Center at the edge of Millennium Park, transporting visitors 1,000 vertical feet in 60 seconds, or at speeds of 16.6 feet per second. Visitors can then take in a 360-degree panoramic view of the city and look out over Lake Michigan from the top of the 83-story tower's new Aon Center Observatory. Construction will begin this year with expected completion in 2021. —KATHARINE KEANE

> *To learn more about the project, check out SCB's site at scb.com.*


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ANTHONY LINDSEY

Well Read

On April 4, The American Institute of Architects and the American Library Association announced the winners of the 2019 AIA/ALA Library Building Awards. The program honors projects anywhere in the world as long as they permit public access and are completed by an architect licensed in the United States. This year, a six-person jury recognized six projects, all located in the U.S. and Canada—from MSR Design and JRA Architects; Perkins+Will; Pfeiffer; Skidmore, Owings & Merrill; Snøhetta and Dialog; and Noll & Tam Architects (whose Half Moon Bay Library, in Half Moon Bay, Calif., is shown). —MIABELLE SALZANO

> *Read more about each winner, and see a lot more images, at bit.ly/2019AIALibraryAwards.*

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On a Mission from God

Mario Botta, HON. FAIA, designs with a disposition toward solid masonry construction and simple geometric volumes. Is it the essentialist nature of the work that has won him so many commissions with a spiritual program? "Church architecture describes visually the idea of the sacred, which is a fundamental need of man," Botta has said. "Sacral Spaces," at the Ringturm Exhibition Centre in Vienna, examines 22 religious projects that the Swiss architect has completed during his five-decade career. (A 2004 church dedicated to Pope John XXIII in Seriate, Italy, is shown.) The exhibition is on display through May 31. —M.S.

> *Learn more about Mario Botta's installation at the Ringturm Exhibition Centre at bit.ly/BottaReligiousRingturm.*

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Long Beach Residence by Lucid Architecture

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The Circle of Life

Amsterdam-based UNStudio is working on the world's smartest neighborhood. The Brainport Smart District in Helmond, Netherlands, will have 1,500 residences and almost 30 acres of commercial space, much of which will be centered around a "living lab" of mixed-use buildings and a central park. A circular economy of shared energy, food, and water for all residents "aims to develop a new relationship between buildings and landscape, whereby both strengthen each other qualitatively," the firm says. "The landscape is used as a productive environment for food, energy, water, waste processing, and biodiversity." —K.K.

> *Learn more about the Brainport Smart District at unstudio.com.*

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Back to the Beginning

To celebrate the Bauhaus' centennial, Berlin-based Heike Hanada Laboratory of Art and Architecture's Bauhaus Museum Weimar opened on April 6 in Weimar, Germany. What began in 1925 as 168 pieces owned by founder Walter Gropius has grown into a 13,000-piece collection, which makes up the core of the museum's new "The Bauhaus Comes From Weimar" permanent exhibition. The installation includes pieces by legendary Bauhäusler such as Marianne Brandt, Marcel Breuer, Carl Jakob Jucker, Paul Klee, Ludwig Mies van der Rohe, and László Moholy-Nagy. —M.S.

> *Learn more about the new Bauhaus Museum Weimar and its permanent collection at bit.ly/BauhausMuseumWeimar.*

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The Shed represents one of the biggest and most extreme examples of a "move"—as in the first architecture lesson I ever learned: "get in, make your move, get out fast"—that I have seen in recent years. And it is spectacular. The combination of the lacy steel structure and the translucent panels summon the image of a Gothic cathedral that has become abstracted and stretched into a thin membrane. The diagonal panes and struts, not to mention those supersized wheels, have a kinetic beauty even when they are fully stationary. In the end, the Shed's move produces not frozen music, but frozen spectacle. —AARON BETSKY

> *Read Aaron Betsky's entire analysis of Diller Scofidio + Renfro and Rockwell Group's Shed at bit.ly/BetskyShed.*


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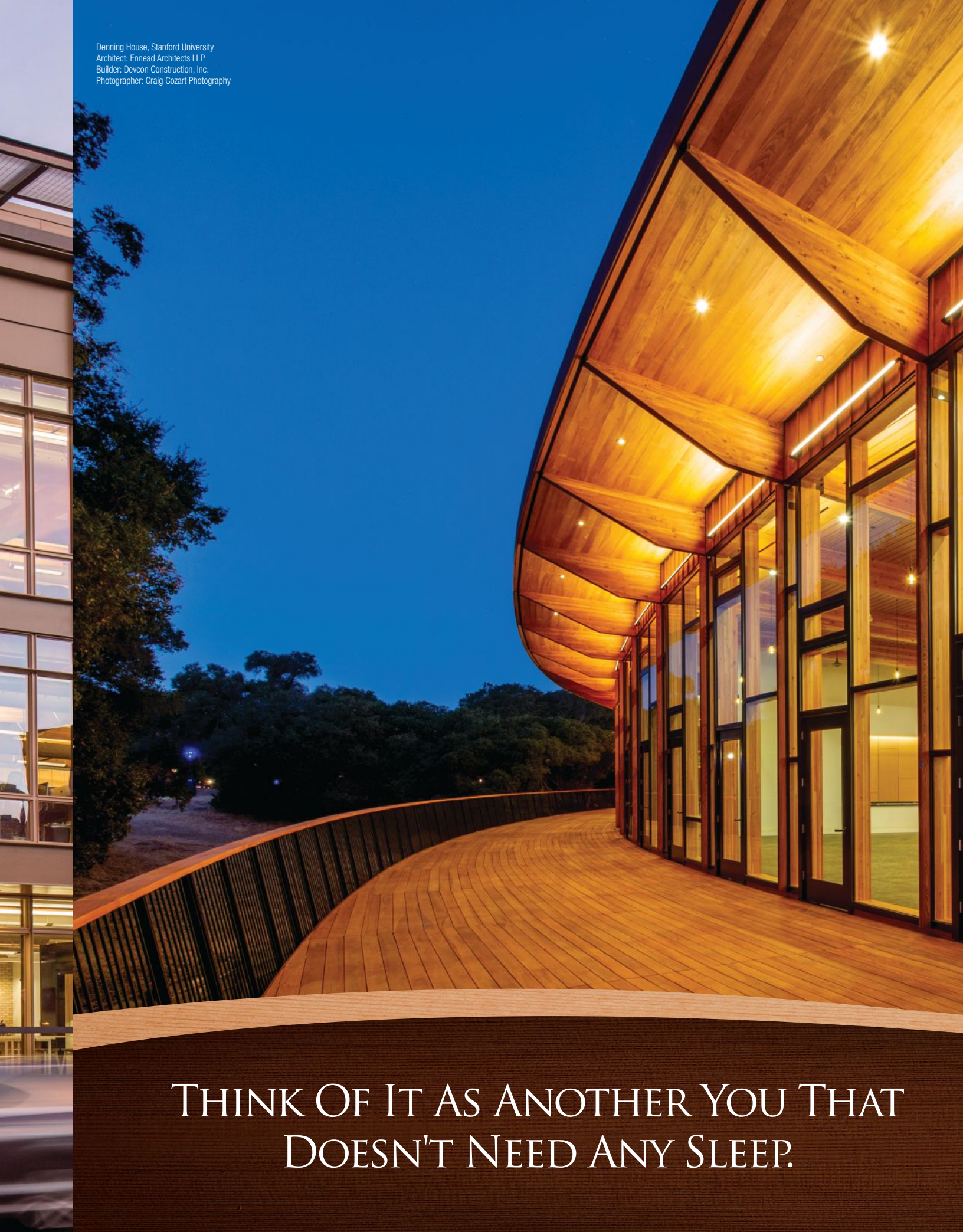

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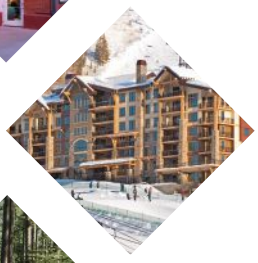

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RECOGNITION

Winners will be featured in the February 2020 print issue of ARCHITECT with expanded coverage online at *architectmagazine.com*.

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ARCHITECT

Best Practices: How to Expand into New Markets

TEXT BY JEFF LINK

It is easy to be pigeonholed into one type of market in architecture, particularly if you're an emerging or small firm with limited resources. Here, architects and designers share their advice for expanding your range of work.

Collaborate with a Larger Partner

One way for a niche practice to gain a foothold in new markets is by partnering with a larger firm on a project that plays to the strengths of each. For a joint retainer from the Public Building Commission of Chicago that included a 42,000-square-foot annex to Nathan Hale Elementary School—a late 1940s-era Art Moderne Chicago Public Schools building—local 10-person firm Searl Lamaster Howe Architects (SLHA) teamed with Eckenhoff Saunders, another local but larger practice, with nearly 50 architects and interior designers. "During the recession, we were looking for opportunities," says SLHA principal Greg Howe, AIA. "Partnering was one thing we identified as a way to reach into new work."

Combining Eckenhoff Saunders' larger staff size and familiarity with public building regulations with SLHA's hands-on, personalized approach helped secure the deal and move the project forward, Howe says.

Connect with the Community

For Edward Ogosta, AIA, founder of his eponymous Culver City, Calif., practice, civic engagement has been key to growing his emerging three-person practice. As acting chair of the Culver City Planning Commission, Ogosta reviews major design proposals for the city; recent projects include a Gensler-designed expansion of Culver Studios, where Amazon plans to house its production arm, and a four-story building that will be a home for Apple's Worldwide Video group. Through his back-end review of pending projects and public presentations, he has earned a reputation as "something of an expert on approvals of commercial development in the city," Ogosta says. "It's volunteer time, but it's time well spent. As a result of this, I've been approached by a commercial developer for a project renovation in the city."

While the three-story office and workshop in question is still undergoing feasibility studies and has yet to be publicly announced, Ogosta says the potential to apply his knowledge of zoning laws to "bring the [1980s concrete-block building] into the 21st century" exemplifies the kind of opportunity that can grow from community involvement.

Prepare for Growing Pains

Almost without exception, expansion into new markets comes with its challenges. When the six-person Houston-based firm Schaum/Shieh began to attract the attention of the cultural beau monde following the firm's completion of White Oak Music Hall and ongoing preservation work for the Judd Foundation in Marfa, Texas, developers like Houston-based Radom Capital took notice. Ultimately, the two companies teamed up for several projects.

But with design-to-construction schedules of seven to eight months (as compared to several years for some of the firm's other projects), the retail spaces have stretched the firm to capacity. "The flip side of developer work, for good and bad, is that it happens very quickly," says Troy Schaum, who co-founded the firm with Rosalyne Shieh, AIA. "When things happen, you and your staff are overworked. We're also not big enough to make new hires. But the more we can understand and communicate the framework for the deliverables, the easier it is to predict deadlines and manage expectations."

> "Partnering was one thing we identified as a way to reach into new work."
>
> —Greg Howe, AIA, principal, Searl Lamaster Howe Architects

And with the newly broadened portfolio of built work comes the opportunity for more growth. "One of the big transitions is moving from a mode of mostly referral or reputational connections to work where we actually go after RFPs and RFQs and are actively competing in open calls," Schaum says. "We're able to use just a few projects as a basis for qualifications … because we've taken [them] seriously enough to stand in as qualifications for the work we want to do."

> *For more tips on expanding into new markets, visit bit.ly/ARExpand.*

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QUANTIFYING SUSTAINABILITY FOR CONCRETE CONSTRUCTION, AIA 1 LU/HSW
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FLOOR SURFACE TREATMENTS, AIA 1 LU
This course will describe why concrete floors need proper curing, the different types of surface treatments available and discuss their benefits. The course will also describe proper installation of flooring treatments, including both proper surface preparation and how to correctly specify.

ENHANCING CONCRETE DURABILITY WITH INTEGRAL WATERPROOFING ADMIXTURES, AIA 1 LU
This course is intended to help identify different options available to waterproof concrete, differentiate between the materials available for integral waterproofing of concrete, and understand the tests used to qualify waterproofing admixtures.

INTRODUCTION TO CAULKS AND SEALANTS, AIA 1 LU/HSW
By the end of this course you will be able to identify and discuss proper and safe joint sealant application procedures, recognize and understand the different causes for common sealant problems, and compare and contrast different sealant types.

REDUCING JOINT MAINTENANCE COSTS BY EXTENDING JOINT SPACING IN CONCRETE SLABS-ON-GROUND, AIA 1 LU
This course will address the need for joints in concrete, while reviewing and explaining the current joint spacing recommendations. It will highlight the different options for extending joint spacing by showing some example projects. This course will also discuss the theory for using extended joint spacing in concrete slabs today.

SIMPLIFYING AIR AND WATER RESISTIVE BARRIERS, AIA 1 LU/HSW
Choosing an air barrier system that is simple to specify, easy to install and has been independently validated to comply with code requirements resolves challenges related to AWRB installation. This program will cover the various barrier systems, important aspects of the building and energy codes and review the characteristics of a high-performance barrier system.

WATERPROOFING AND PROTECTION OF VEHICULAR AND PEDESTRIAN TRAFFIC SURFACES, AIA 1 LU
This course explores the various means and methods of waterproofing vehicular and pedestrian decks through the use of liquid membranes.

MINIMIZING AND CONTROLLING CONCRETE CRACKING DUE TO SHRINKAGE, AIA 1 LU
Concrete cracks because it fails in tension; and a common cause is shrinkage. This presentation will describe typical influencing factors that lead to concrete shrinkage, plus options and construction practices that can mitigate shrinkage to control cracking.

PRINCIPLES OF GROUT, AIA 1 LU
This course will introduce the basics of grouting, such as the needs and successful applications. It will cover why we do it, what we use, and how it is done. The content includes an industry overview as well as discussion on grout technologies, installation procedures and tools of the trade.

WATERPROOF COATINGS FOR HIGH RISE CONSTRUCTION, AIA 1 LU
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DIV 079500 Expansion joints
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Next Progressives: After Architecture

CURATED BY SARAH RAFSON

Location:
Blacksburg, Va.

Year founded:
2012

Firm leadership:

Kyle Schumann and Katie MacDonald, ASSOC. AIA

Education:
MacDonald: B.Arch., Cornell University; M.Arch., Harvard Graduate School of Design; *Schumann:* B.Arch., Cornell University; M.Arch., Princeton University

Firm size:
Two-plus

Origin of firm name:
While we love the process of designing architecture, we are not convinced that it has to be limited to the discipline. "After" alludes to our desire to root our work in history and our ambition to pursue a post-disciplinary scope of work.

Mission:
We seek to elevate the everyday and call attention to the ordinary—unseen histories, cultural identities, construction conventions, building typologies—by tweaking, revealing, rearranging, subverting, and reframing to create appreciation for what would otherwise go unnoticed.

Favorite project:
Our most recent project, the Camp Barker Memorial, has been a breakthrough piece because it confronts a powerful historical moment currently hidden from view. Composed of a series of entry portals to a modern-day elementary school in Washington, D.C., the project calls attention to the site's past as a Civil War–era refugee camp for those escaping slavery. The portals take form as a folding plane that incorporates a central gateway as well as smaller shelters that engage the scale of the child, inviting young students to grapple with America's fraught history.

Second favorite project:
Hearth was originally designed for a cabin competition and was more recently adapted for a client in Vermont. The design plays with the tropes of the archetypal backwoods log cabin—the log façade, the chimney, the porch, and the stack of firewood out front—integrating each discrete element into a seamless wrapper. This project was pivotal in shaping our thinking about typology and reinterpreting architectural tropes.

Design hero:
We recently conducted a research fellowship to study the work of Edoardo Gellner, an Italian architect who studied with Carlo Scarpa and practiced in the Italian Dolomites. We came to know of him because he built a company vacation town, Villaggio Eni, on the mountainside above Kyle's ancestral village of Borca di Cadore. Gellner's work fuses the "anonymous" vernacular of alpine barns and ski chalets with modernist concerns around concrete, structure, color, and organic design. We appreciate the work's simultaneous sensitivity to context and rigor in advancing architectural expression.

Favorite destination for architecture:
Los Angeles—Katie's hometown—where the weird thrives and insulation is less critical.

Design trend to leave behind:
Gradients. We see gradients as a manifestation of pop culture imagery surrounding media consumption today, where aesthetics are often valued over substance. They are pretty, but they have become a kind of window dressing. We are more interested in the windows.

Best criticism you've ever received:
Schumann: Late professor Arthur Ovaska of Cornell University diagnosed me with "corneritis" in a second-year studio. Symptoms of corneritis include an obsessive over-defining of space through articulation of closed corners. I am thankful to have received such an early diagnosis, and my plans have never been the same.

COURTESY AFTER ARCHITECTURE

> *To learn more about After Architecture's work and inspiration, visit bit.ly/ARAfterArch.*


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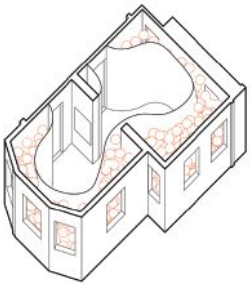
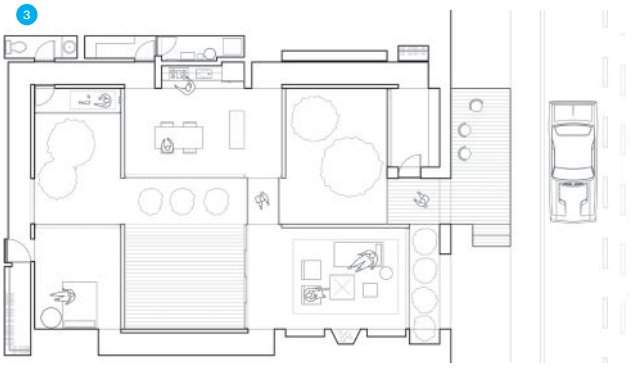
Next Progressives:
After Architecture





1, 6: COURTESY AFTER ARCHITECTURE AND MAKE THINK DESIGN; 2, 3, 4, 5: COURTESY AFTER ARCHITECTURE

1. The Fossa Olfactoria installation features balloons filled with scented oil placed behind a "fleshy fabric membrane" to highlight the connection between the olfactory system (responsible for our sense of smell) and tactile experiences. **2.** The duo describe this cabin located in Sackville, New Brunswick, as an "occupiable hearth" constructed with timber from the surrounding forest. **3.** This residential proposal reconceives the modern house archetype by reassigning the typical red brick core to an outer black brick shell, which allows for a central courtyard where solar energy is harvested to heat the building at night. **4.** Located outside the San Diego Marriott Marquis and Marina, this installation features a grid of undulating posts evoking "waves and wavelengths," according to the firm. **5.** Located at the Cornell Botanic Gardens, in Ithaca, N.Y., this multicolored sculptural bench comprises a grid of 264 CNC-milled square timbers. **6.** Designed in collaboration with New York practice Make, Think, Design, this whimsical garden concept was named a 2018 finalist for the annual Ragdale Ring Competition, hosted by the Ragdale Foundation in Lake Forest, Ill. The proposal calls for an undulating circular typography that surrounds a theater accented with a faux tree that offers shade, shelter, and an area to install lighting and scenery. **7.** Located outside the Boston Children's Museum, Twofold is designed as a bench for adults and a table for children. **8.** The Camp Barker Memorial at Garrison Elementary School in Washington, D.C., harkens back to the site's original use as a barracks for Civil War soldiers that ultimately housed slaves who had recently escaped the South.

6: COURTESY AFTER ARCHITECTURE AND MAKE THINK DESIGN; 7: COURTESY DESIGN MUSEUM BOSTON

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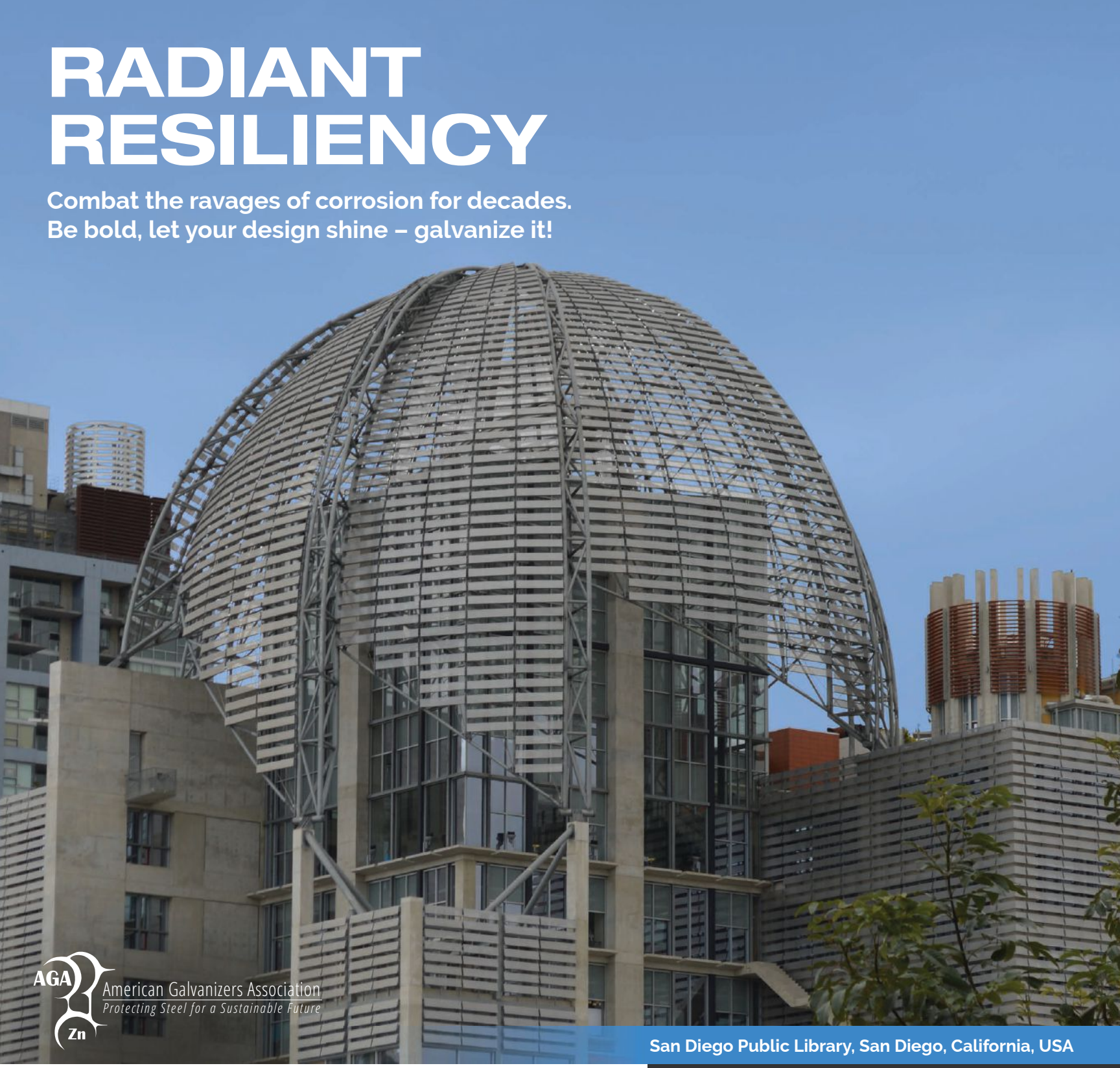

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TEXT BY AYDA AYOUBI

Nirvana Smart Fan, Modern Forms
Suitable for residential and hospitality environments, this fan features aluminum hardware, three ABS blades, a silent direct-current motor, and optional integrated LED lighting that can deliver 1,600 lumens. Measuring 56" in diameter, Nirvana can be controlled using a scalable radio-frequency wall panel or a mobile app. Offered in four finishes (glossy white shown). *modernforms.com*

Quadra Seating System, Forms+Surfaces
This modular collection of outdoor furniture includes seats, tables, and planters, with optional inserts. Each Quadra unit can be used in multiple orientations. Measuring 17" wide and deep and 17.8" tall, the units are finished with a hydrophobic coating for added durability. Insert options include wood, powdercoated aluminum, UHPC, and molded polyethylene planter liner. *forms-surfaces.com*

UH46, NewTechWood
Constructed from a wood plastic composite, the UH46 cladding panels aim to emulate the look and the feel of natural wood. Finished with NewTechWood's proprietary Ultrashield Naturale coating, UH46 resists stains and degradation from ultraviolet light. Measuring 4.8" wide, 16' long, and 1" thick, UH46 is compatible with the company's AW08 aluminum cladding clip, and can be installed vertically and horizontally. Available in an array of gray and brown standard finishes (Peruvian teak shown). *newtechwood.com*

Game Theory, Carnegie
Suitable for commercial applications, Carnegie's new collection of upholstery textiles features four designs with geometric patterns and tactile textures. As part of this collection, Puzzle (shown) features a bold, multicolored pattern that repeats every 23.5" vertically and every 14" horizontally. Puzzle can withstand up to 100,000 double rubs on the Wyzenbeek scale and can be used indoors or out. *carnegiefabrics.com*

> *For more of ARCHITECT's Spring 2019 Product Call, visit bit.ly/ARSpringProd.*

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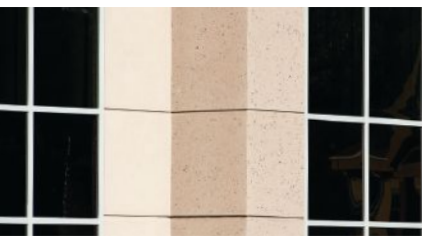

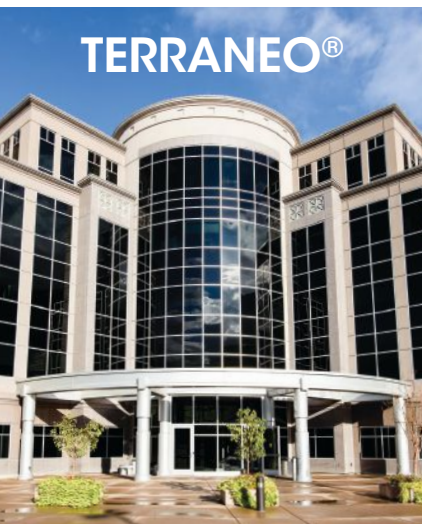

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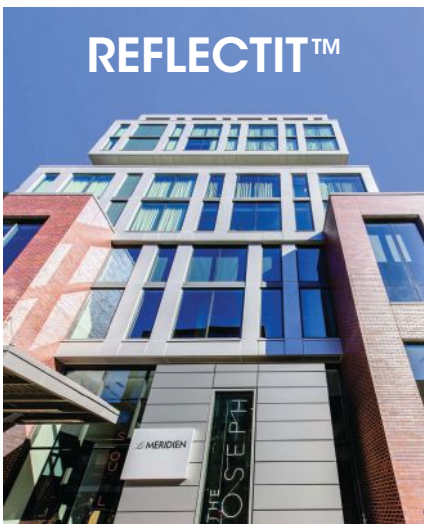

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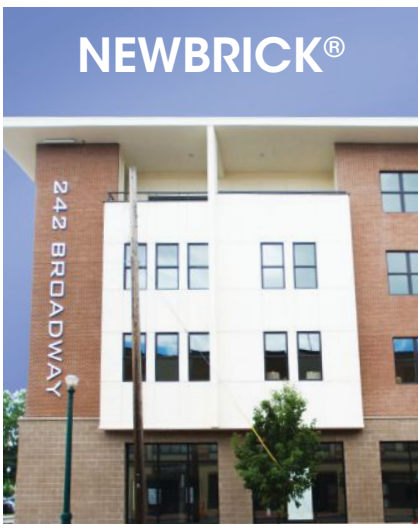

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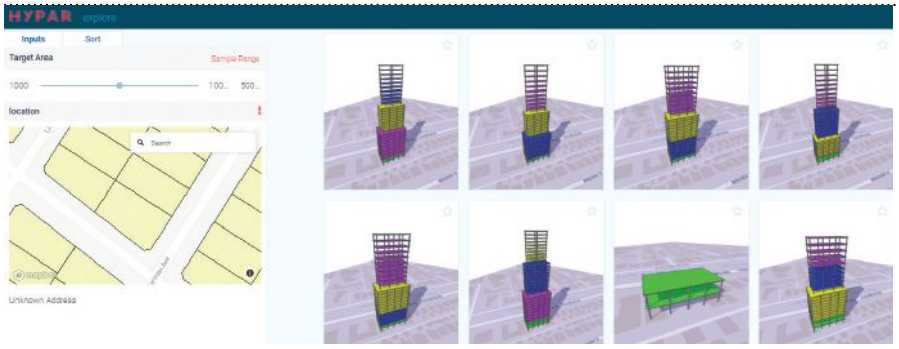
Plenum, Fritz Hansen
A nod to the modern workspace, the Plenum collection of contract furniture was designed by Spanish artist and designer Jaime Hayon for Fritz Hansen. Comprising high-back one-, two-, and three-seater sofas with optional integrated features such as outlets, USB ports, and mounted swivel or free-standing tables, this versatile collection can be upholstered in leather or textile. The legs are powdercoated black steel. *fritzhansen.com*

Sensate with Kohler Konnect, Kohler
Equipped with Kohler Konnect smart home technology and a motion sensor that responds in 20 milliseconds, this voice-controlled, touchless faucet can be programmed to dispense measured amounts of water. Standing 15.5" tall with a 8.43" spout reach, Sensate comes in four finishes and is compatible with Amazon Alexa, Google Assistant, and Apple HomeKit. *kohler.com*

Studio Dekton Slim, Cosentino
Dekton's ultracompact architectural surfaces are now available in 0.15" thickness. These ultrathin slabs, made from a blend of glass, porcelain, and quartz, are suitable for use in furniture, cabinetry, doors, and walls. Each 126"-by-56" slab is available in nine colors (Opera shown). Dekton surfaces also come in 0.3", 0.4", 0.7", and 1.18" thicknesses. *cosentino.com*

StoVentec R, Sto Corp.
Available in glass and render finishes with ultrasmooth to grainy surfaces, this lightweight, ventilated rainscreen cladding system provides a variety of aesthetic and high-performance options. StoVentec also offers ultraviolet protection, weather resistance, and insulating capabilities. Available in flat or curved formats, as well as in custom finishes and sizes. *stocorp.com*



Hypar Explore, Hypar
This generative design platform leverages cloud computing to allow AEC professionals to iterate up to thousands of design and planning options based on their specified criteria—all in five seconds or less. Potential concepts can then be exported for continued use in popular modeling programs. Software developers who publish their tools get assistance in productization. *hypar.io*

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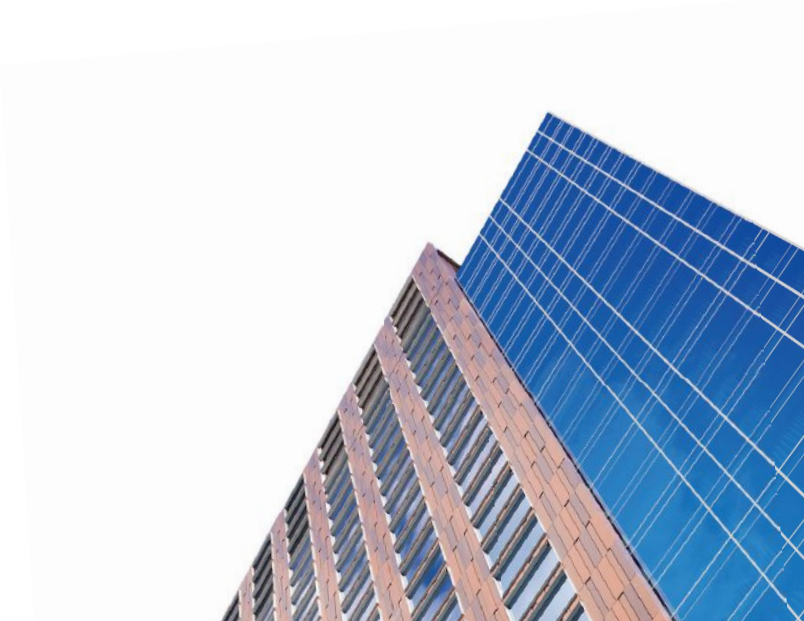

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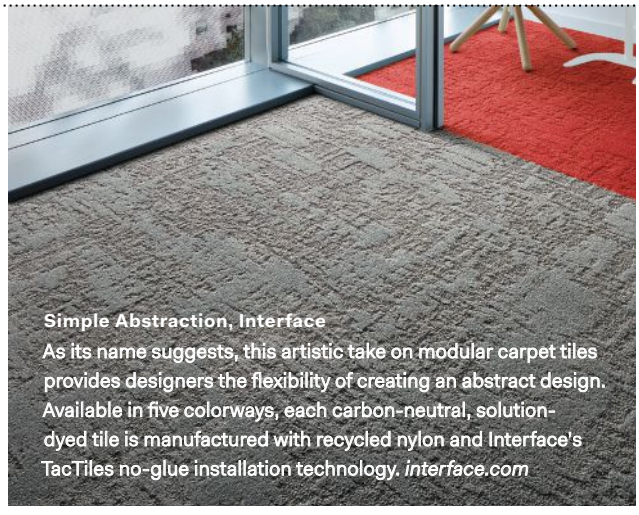
City Multi N-Generation, Mitsubishi Electric Trane HVAC US (METUS)
Suitable for commercial applications, METUS' latest outdoor variable refrigerant flow unit has a smaller footprint than previous generations while offering improved energy efficiency, design flexibility, and a higher heating capacity. The City Multi N-Generation is offered in 6- to 32-ton capacities and can store up to five days of operational data. With an increased vertical piping limit of 295'. *metahvac.com*

Gig, Visa Lighting
Designed for use in behavioral health treatment facilities, Gig is a wall-mounted, anti-ligature tasklight with a high abuse-impact rating of IK10+. Available in 3000K and 3500K color temperatures, Gig offers an optical distribution of 40 or 120 degrees. Measuring 3.75" wide, 6.75" tall, and 3" deep at its base, Gig comes in 16 powdercoated finishes (agate gray shown). *visalighting.com*

Vero Air Toilet, Duravit
This ADA-compliant, wall-mounted, and rimless ceramic toilet offers an angular, rectangular bowl and a lid with a slow-close option. It can be specified with a seat equipped with SensoWash technology, adding bidet-like functionality that includes water, air, and seat temperature control, three wash options, and an LED night light. *duravit.us*

Upfit, Landscape Forms
Designed by Kansas City, Mo.–based firm Kem Studio, this aluminum, modular, and scalable outdoor structural system aims to turn outdoor environments into vibrant social hubs. Upfit's basic unit measures 16' square by 10' tall with options to integrate ceiling louvers, bike racks, tables, power distribution, lighting, and more. *landscapeforms.com*



Simple Abstraction, Interface
As its name suggests, this artistic take on modular carpet tiles provides designers the flexibility of creating an abstract design. Available in five colorways, each carbon-neutral, solution-dyed tile is manufactured with recycled nylon and Interface's TacTiles no-glue installation technology. *interface.com*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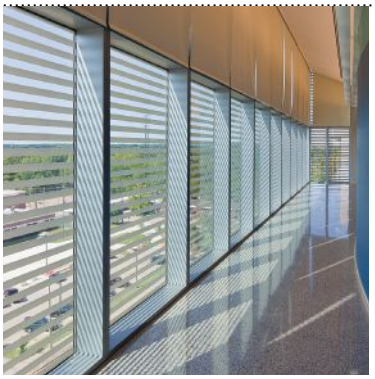

IntelliFlex I/O, Draper
Draper's new control system for its motorized roller shades is designed specifically to cater to small- to mid-sized commercial projects. The scalable and flexible system can be expanded and adapted without replacing hardware or wiring, according to the manufacturer. The system's Network Device Connector can connect up to 120 devices, including intelligent motors and wall switches. *draperinc.com*

Weatherwell Extreme, the Window Outfitters
An extension of the company's Weatherwell line of shutters, this plantation-style shutter is designed to withstand structural, water, and debris impact in extreme weather conditions, including hurricanes. Available in heights ranging from 15.75" to 157.5" and widths upwards of 59", the powdercoated aluminum shutters offer 3.35" or 6" elliptical blades, and fixed, bifold, sliding, or stacked configurations. With six standard colors and the option for customization. *two-usa.com*

Regolo1 by Nulite Lighting
A new addition to Nulite Lighting's Regolo family, this minimalist linear lighting system comprises a variety of pendant, wall, surface, and recessed fixtures. Fitted with a distributed array of LEDs, Regolo1 products are available in 3000K, 3500K, and 4000K color temperatures with a CRI of 80 or 90. *nulite-lighting.com*

Discovery Assistant, PlanIT Impact
In under five minutes, this AI–powered building performance analysis tool can offer site, M/E/P, and transportation design strategies that optimize energy efficiency and the associated payback period. Autodesk Revit and SketchUp plug-ins are available. *planitimpact.com*

System M Friendly Access, FritsJurgens
This ADA-compliant, double-swing pivot door hinge system is designed to be completely mortised into the top and bottom of a pivot door at least 1.56" thick. The closing speed of this self-closing system is adjustable. *fritsjurgens.com*

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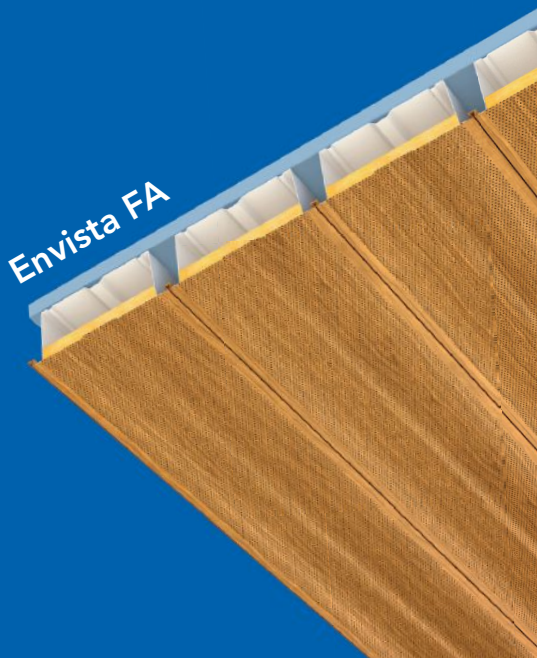

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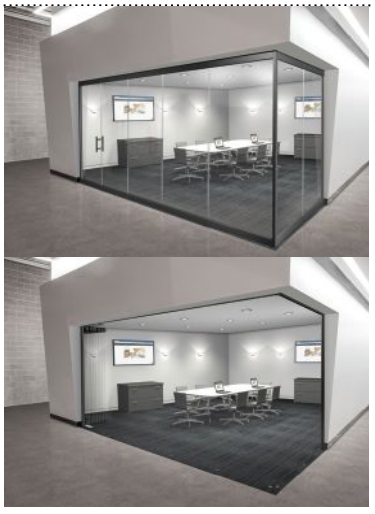
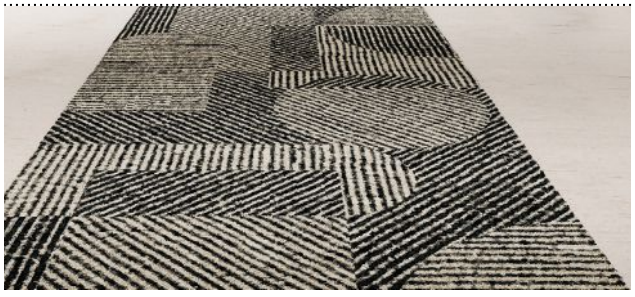
Shaper Sense Acoustic Luminaires, Eaton
Suitable for ambient and tasklighting applications, this line of acoustical pendants can provide uplight or downlight. Made of FilzFelt's 3mm Wool Design Felt and 35mm recycled acoustic substrate, Shaper Sense comes in Box and Trapezoid pendants with noise reduction coefficients of 2.5 and 2.65, respectively. *eaton.com*



Open Corner PrivaSee, NanaWall Systems
Suitable for commercial, office, and educational facilities, this frameless, single-track, moving glass wall system can be used to create an enclosed interior space with acoustic qualities. Featuring 0.5"-thick laminated lites with a sound-enhanced interlayer, PrivaSee's sliding panels come as large as 4.1' by 10.6'. ADA-compliant options available. *nanawall.com*

Harbor Stone System, Tangram Studio (now Studio Other)
This semicircular workstation offers a modern spin on the linear benching system commonly specified for open-plan offices, particularly those with irregular floor plans. Designed by Boston-based Elkus Manfredi Architects, the Harbor Stone System features ergonomic desks—adjustable in height between 27" and 45.5"—with a proprietary cabling system and curvilinear privacy screens that also mitigate acoustics. Available in a variety of finishes. *harborstonesystem.com*

Kiik, Arper
Designed by Japanese industrial designer Ichiro Iwasaki for Arper, this modular lounge seating collection, which includes backed or backless sofas, ottomans, tables, and free-standing consoles, can be arranged in multiple configurations for commercial and educational environments. The versatile collection can be upholstered in Arper's leather and fabric offerings. *arper.com*



Forum, Shaw Contract
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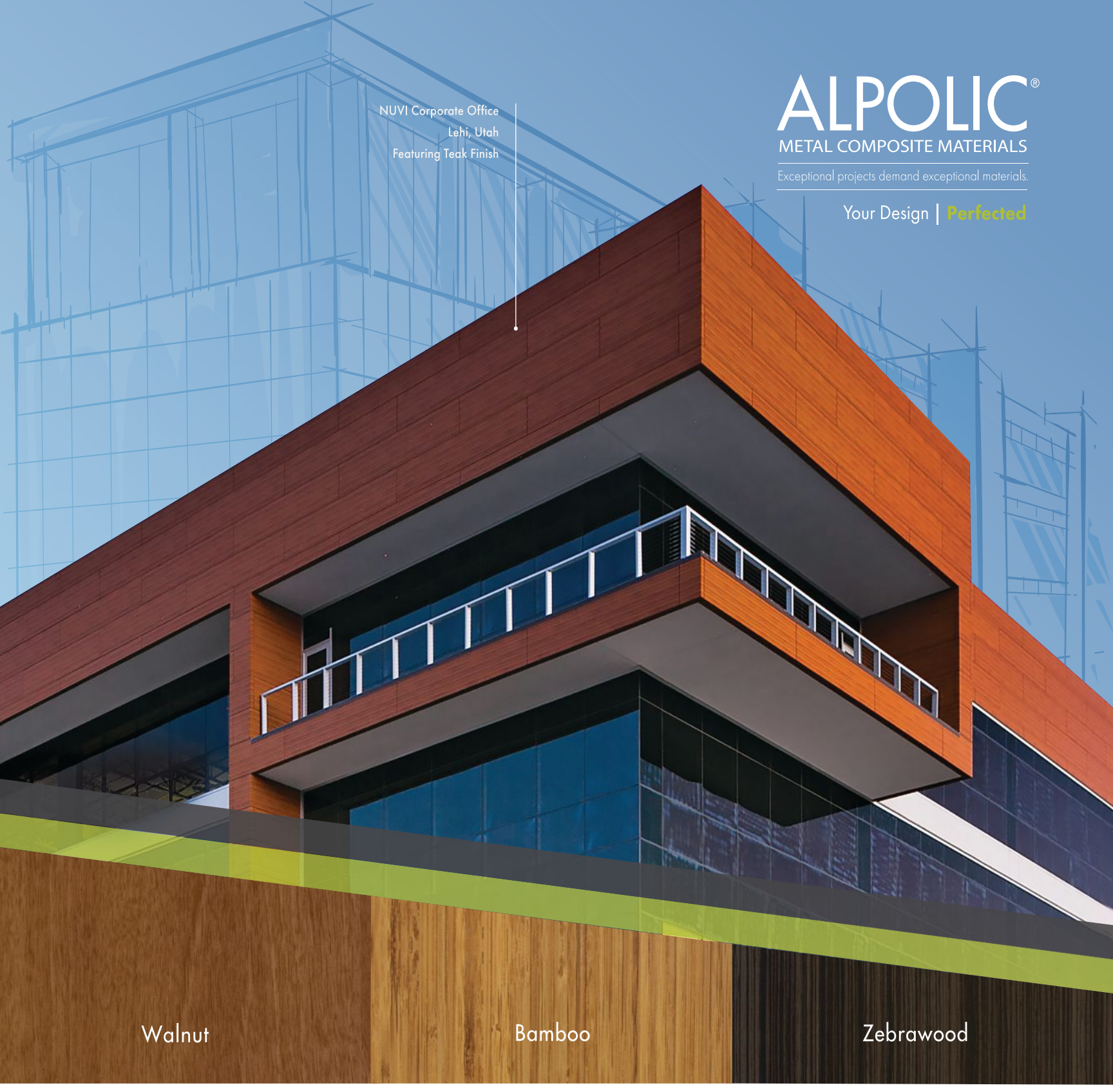

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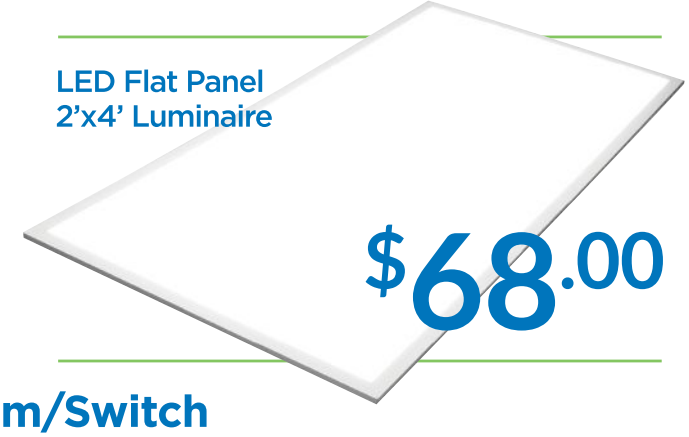

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Opinion: We Must Plan for a Decarceration Nation

TEXT BY DEANNA VAN BUREN

The reimagining of prisons and jails is a task in which the firm I co-founded with Kyle Rawlins is often asked to participate—and one that is a misguided use of our time and energy. In the last decade, books such as Michelle Alexander's *The New Jim Crow* (The New Press, 2010) and social justice movements like Black Lives Matter have helped push us into an age of criminal justice reform. Though our country still has the world's highest incarceration rate, jail and prison admission rates have dropped by 25 percent and 24 percent, respectively, from a decade ago, according to the Vera Institute of Justice.

As such, we need to address a series of pressing issues, including the development of infrastructure, such as housing, in underinvested communities to which citizens are returning; the need to cultivate restorative reinvestments in these communities; and the adaptive reuse of defunct and vacant criminal justice infrastructure in our city centers and rural lands.

My firm is working with local black churches in Oakland, Calif., to transform their assets into re-entry infrastructure for released prisoners. For example, we're turning a charter school building owned by the Center of Hope Community Church into the Hope Re-Entry Campus. There, up to 40 individuals will have access to job training, a place to spend time with families, and therapeutic resources as they find full-time employment and permanent housing to stay out of prison.

The move to decarceration has led accordingly to closures of detention facilities. From 2011 to 2016, 94 state prisons and juvenile facilities were closed or announced imminent closure, according to the Sentencing Project's 2016 report "Repurposing: New Beginnings for Closed Prisons." Strategies for repositioning these facilities are required. For example, the Atlanta City Detention Center, which detains about 100 people—down from a high of 1,314—costs about $33 million annually to operate. Community activist groups, including the Racial Justice Action Center and Women on the Rise, are garnering local support to transform the structure into a center for freedom and wellness while advocating for policy shifts to release the last 100 detainees.

When facilities are not repurposed efficiently, they can lead to safety, public health, and economic concerns, with taxpayers footing the bill to cover their substantial operating costs. Or worse yet, the facilities may reopen as places of incarceration with the opportunity for restorative development lost.

Across the country, communities are rising to engage in justice reinvestment by embracing alternative conflict resolution strategies and proposing ideas to bring in needed resources and infrastructure. In Oakland, our firm is working with a consortium of nonprofits that run Restore Oakland, the country's first center for restorative justice and restorative economics where low-wage restaurant workers train for living-wage jobs in fine dining, and where youths aged 15 to 25 are diverted from court to Restore's dedicated spaces for conflict resolution and peacemaking.

Cities will also need to research the outcomes of current criminal justice policy and the impact of future policies on the built environment. This research will hopefully support communities and governments in their fight to reinvest in restorative infrastructure.

In our most historically under-resourced communities, the investment in infrastructure for our punitive justice system in lieu of educational, economic, and healthcare resources illustrates how the built environment embodies many of our society's gross inequities. Flipping this paradigm will require the attention of our most talented and sensitive architects, designers, and planners. We have a unique way of thinking that helps us manifest complex ideas, concepts, and philosophies into real space and time—all skills that are desperately needed at the edge of social change. Together, we can steward a successful effort to decarcerate our nation and build equitable and just communities.

Deanna Van Buren is the co-founder and design director of Designing Justice + Designing Spaces, in Oakland, Calif.

VANESSA LENZ

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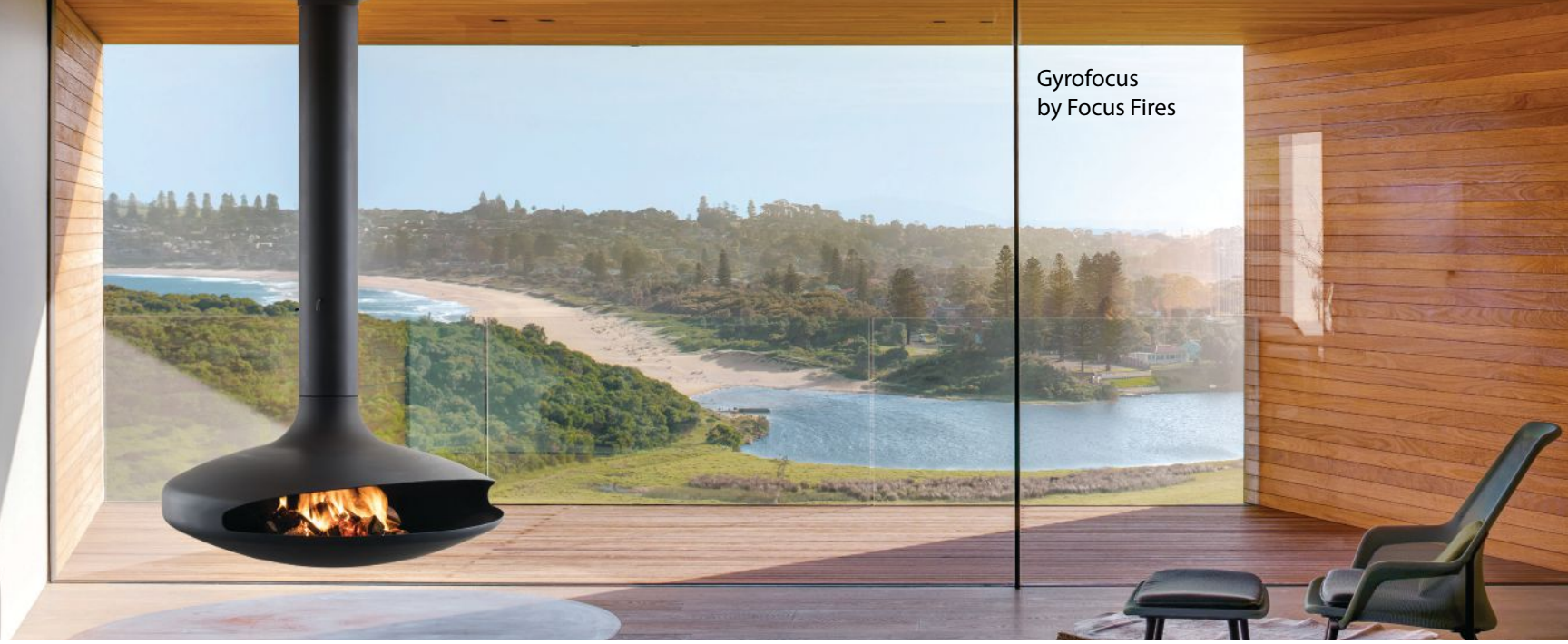

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Detail: Xiqu Centre Finned Façade

TEXT BY TIMOTHY A. SCHULER

Hong Kong's Xiqu Centre, a subtly curving, eight-story structure with a not-so-subtle textural façade, puts the concept of a curtain back into curtainwall. Designed by Revery Architecture (formerly Bing Thom Architects), which has offices in Hong Kong and Vancouver, British Columbia, with local firm Ronald Lu & Partners, the 320,000-square-foot performing arts venue features more than 13,000 extruded aluminum fins on a unitized-panel façade, creating the effect of a rippling, metallic stage curtain drawn strategically to reveal corner entrances and openings that support natural ventilation. Heightening the illusion, portions of the façade appear to overlap, like adjacent curtain panels.

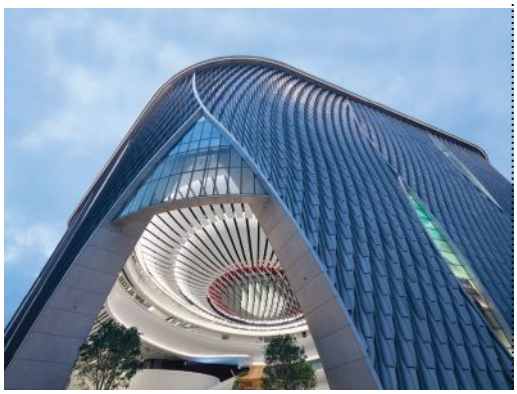
To make the façade cost-effective, Revery used 3D modeling software to optimize the fin geometry. Each fin is CNC-cut from a curved piece of extruded aluminum to produce two identical wave-like blades. Nearly every asymmetrical blade is identical, with the exceptions bordering curtain openings. The fins are arranged end-to-end in an alternating fashion, top to bottom, bottom to top; each vertical array of fins never tilts or changes orientation.

The fins bolt to aluminum panels that make up a unitized curtainwall system anchored to the building's concrete-and-steel structure. Unlike the fins, each aluminum panel is unique.

The connections between the fins and the vertical panels were among the most challenging to develop, says Revery design principal Venelin Kokalov, who took over the firm following the 2016 death of its namesake, the Hong Kong–born Canadian architect Bing Thom. A custom stainless steel bracket slides into a groove cut into the back of each fin blade and attaches to an aluminum transom in three places—the top, bottom, and center of each blade.

The panels were prefabricated in Guangdong, China, and arrived at the building site pre-numbered to streamline installation, which required eight months. Attaching the 13,000-plus fins took another eight months.

For Kokalov, the Xiqu Centre was a deeply personal project, marking his final collaboration with Thom, a friend and mentor. Its completion in January was a reminder of the firm's tireless efforts. "Fight," he says. "Fight every day. To save an idea, you have to work hard. Otherwise, people take the safe route and the easy path. For us, it was important to not give up."



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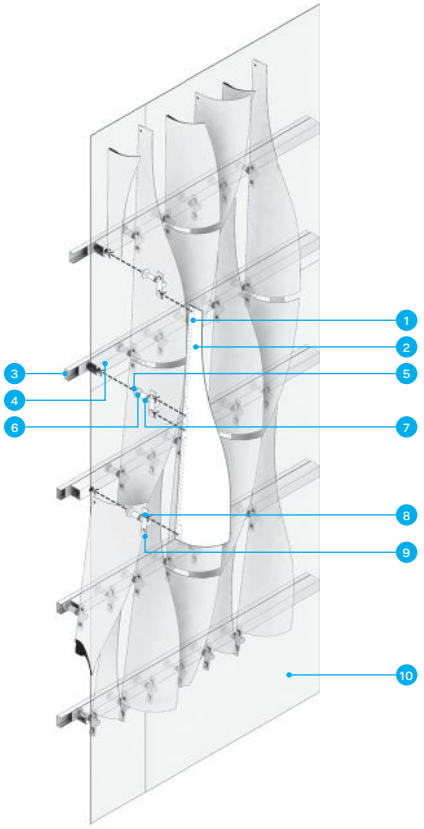

1. Aluminum sleeve fin bracket
2. 7.9' × 1' aluminum fin blade, 6" to 14" deep
3. Aluminum capping with cover clip
4. Aluminum transom
5. Spring washer and stainless steel (SS) bearing plate
6. M30 bolt
7. SS bushing and SS stopper cover
8. M10 male and female cap
9. SS fin knuckle and cover
10. 18' × 7.5' × 1" aluminum panel

> *To read more about the design and construction of the Xiqu Centre, visit bit.ly/ARXiquC.*

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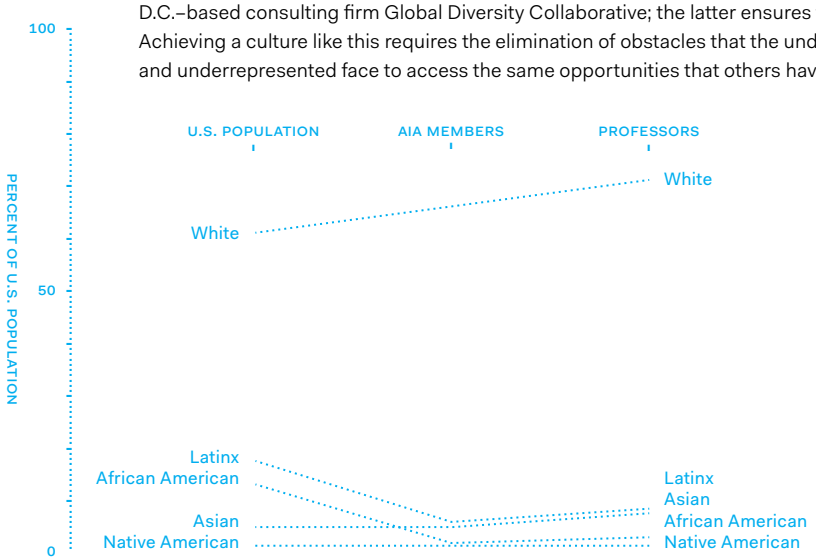
Practice: Increasing Diversity and Inclusion

TEXT BY ALICE LIAO

Architecture remains very much a white profession. Although the demographics have become more diverse in the last decade, says Tania Salgado, FAIA, former chair of the AIA Diversity and Inclusion Council and co-founder and principal of Denver-based Handprint Architecture, "much work remains to be done."

According to the Census Bureau, the U.S. population is 61 percent white, 13 percent African American, 18 percent Hispanic or Latinx, 6 percent Asian, and 1 percent Native American. Meanwhile, the makeup of AIA members is 67 percent white, 2 percent African American, 5 percent Hispanic or Latinx, 6 percent Asian, and less than 1 percent Native American, with 18 percent not reporting. The underrepresentation of many ethnic groups translates not only to inequities within the profession, but also to missed opportunities in business. Time after time, research has shown us that a diverse workforce increases creativity, productivity, debate, and problem-solving among companies. Furthermore, building owners are increasingly mirroring the general population. "[Clients] want to make sure that the design team they hire can understand the needs and perspectives of the users of the building," notes Erin McConahey, a Los Angeles–based principal and regional diversity advocate for the 14,000-person international firm Arup.

Leveraging the benefits of a diverse workforce, however, requires a culture of inclusion and equity. The former encourages everyone "to bring their whole selves to the table," says Sherry Snipes, founder and managing director of Washington, D.C.–based consulting firm Global Diversity Collaborative; the latter ensures fairness. Achieving a culture like this requires the elimination of obstacles that the underserved and underrepresented face to access the same opportunities that others have.



Barriers to Entry

Primary school students with limited or no access to architects—or even to the concept of architecture—will, as expected, take longer to identify design as a potential career path. However, the students most likely to thrive in architecture programs are those who have committed to the discipline early on. Architecture students "have to start [their] programming in the first year of college, so it means you have to know you want to be an architect [by] your junior year of high school," says Bryan Lee Jr., founder and director of design of Colloqate, a New Orleans–based nonprofit multidisciplinary design practice, and the national chair of the National Organization of Minority Architects' (NOMA's) Project Pipeline. As a result, he continues, those "academically rigorous enough to be architects" often opt instead for medicine, law, and other fields where the primary training occurs in graduate school.

Still, early cognizance of architecture isn't enough for some students to seriously consider it as a career. Other obstacles exist.

Tuition is a significant deterrent to entering a design program, says Rachell Morris, ASSOC. AIA, a former ZGF principal now based in New York. According to the Association of Collegiate Schools of Architecture's online resource Study Architecture, the median in-state tuition for a five-year B.Arch. program falls between $11,500

SOURCES: U.S. CENSUS BUREAU, THE AMERICAN INSTITUTE OF ARCHITECTS, NATIONAL ARCHITECTURAL ACCREDITING BOARD 2017 ANNUAL REPORT ON ARCHITECTURE EDUCATION

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and $16,499 annually, not including living costs. For an in-state two- or three-year M.Arch. program, this figure jumps to between $16,500 and $21,499 per year. Tuition at private institutions can be much, much more.

Increasingly, summer architecture programs—themselves with price tags in the thousands of dollars—are becoming a prerequisite for admission to competitive B.Arch. programs, says NOMA president Kimberly Dowdell, AIA, a partner at Detroit-based real estate firm Century Partners. Los Angeles–based Synthesis Design+Architecture (SDA) founder and design principal Alvin Huang, AIA, agrees. Also an associate professor at the University of Southern California (USC), Huang estimates that at least 90 percent of USC applicants have attended at least one such program and submit portfolios demonstrating

Alvin Huang

formal instruction. "The difference is hard to evaluate because one has shown they've been trained to do the work and the other hasn't," he says.

Financial support and scholarships aiming to increase diversity are available from several sources, including major firms such as Gensler and SmithGroup, and nonprofit organizations such as ACE Mentor Program of America and AIA/Architects Foundation—but they come nowhere close to meeting the need.

Post-graduation, even landing a design job offers little reprieve. "Internships paying below market rate prevent talented student access to the prime opportunities," says Andrew Phillips, chief of innovation and design faculty chair for the Charter High School for Architecture and Design (CHAD) in Philadelphia. "Students coming from families of affluence that can support unpaid [or low-paying] work have more opportunity."

Once in a school or work setting, being one of a few members of an underrepresented group can be isolating. "You don't necessarily feel like anyone else in the room can relate to your perspective," says Gabrielle Bullock, FAIA, Los Angeles–based director of global diversity for Perkins+Will. In 1984, Bullock was the second African American woman to graduate from the Rhode Island School of Design's architecture program. "There was a singular approach and language in architecture education that did not resonate with all students of varying cultural backgrounds," she says.

In the 1980s, Kevin Holland, FAIA, was one of three African Americans in a class of 100-plus architecture students at the

Gabrielle Bullock

University of Virginia (UVa). Now the Los Angeles–based director of operations and a senior associate at Perkins+Will, Holland says he often questioned his fit in UVa's program. He considered leaving, but an instructor "convinced me that I would make a pretty good architect. That was the first time an architecture professor had said that to me." It was Holland's last year of school.

To be accredited by the National Architectural Accrediting Board (NAAB), architecture programs must address in its curriculum the profession's role in ensuring "equity of access" to the built environment. "If the faculty who can bring that to the table isn't being hired, it won't exist in the curriculum," says Los Angeles–based ZGF associate Christopher Locke. While studying at the University of Michigan's Taubman College of Architecture and Urban

Kevin Holland

Planning, he was able to travel to Brazil to study the country's Afrocentric culture and roots in the slave trade. A diverse curriculum that "challenges the traditional practices and education of architecture is necessary for the profession to evolve," he says.

Students investigating the minority experience also require faculty members with a level of cultural competency. A 2017 NAAB report finds that design faculty in the U.S. are 71 percent white, 8 percent Latinx, 7 percent Asian, and 3 percent African American. This disconnect in demographics can become clear at crit time when students may "have to work harder to justify [their] ideas," Locke says. He recalls an occasion in which a professor halted the critique of a peer's project when it became clear that the visiting jurors had no understanding of the significance of barbershops in African American culture.

For firm owners of color, competing for projects can be challenging because people prefer to work with those they like and know, says Deryl McKissack, president and CEO of McKissack &

HUANG: ARIEL SINSON; BULLOCK: COURTESY PERKINS+WILL; HOLLAND: NOAH PYLVAINEN

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McKissack, based in Washington, D.C.: "Architecture is such a chemistry-driven business. Sometimes the relationships can span years and are cultivated through personal and professional networks," making them difficult for outsiders to penetrate. (The 2018 AIA Firm Survey report found that 71 percent of billings come from repeat business, 43 percent of which were from clients without a competitive selection.)

To win a commission without these connections requires a proven track

Christopher Locke

record, but "firms can't show a rich portfolio if they have not had the chance to build it," McKissack notes. And if a minority firm is hired, she adds, "there is very little room for error. Small and minority-owned businesses rarely get a second chance if they underperform."

McKissack & McKissack's own portfolio comprises 65 percent public and 35 percent private work. The high proportion of public work is not uncommon among minority-owned firms: Public agencies often mandate participation by a minority business enterprise or women business enterprise to give firms, such as hers, a chance to compete. Such stipulations don't exist in private development. "As progressive as [Washington, D.C.] is, we had only one office building designed by an African American company as recently as about seven years ago," McKissack says. "The big developers aren't using minority firms to do their design work."

Although Asians are proportionately represented in architecture, their numbers dwindle among senior leaders, firm owners, and sole practitioners, says SDA's Huang. "Part of it might be structural," he says, referring to the dearth of Asian leaders to serve as role models and the persistence of the stereotype that Asians are quiet and hard-working, but "not necessarily as visionary … or charismatic—the qualities that define leadership."

Cultural differences are a factor. Huang has noticed a reluctance among his Asian students to ask questions out of fear of seeming unintelligent. Yet in his own career, being inquisitive with colleagues, supervisors, and clients has not only deepened his knowledge, but also helped make his presence known. "They have to talk to you, so you're part of the conversation," Huang says.

Unconscious or implicit bias is another factor. A product of one's life experiences and the culture and environment into which one is socialized, implicit bias refers to assumptions about individuals, groups, and behavior that are steeped in stereotypes based on race, ethnicity, gender, or age. Unlike explicit bias, which is self-reported and measurable, these assumptions are less accessible but more pervasive: Everyone has them.

When unaddressed, implicit bias can muddle hiring practices, compensation, and promotions for minority architects. In conducting bias training with corporate and design firm clients, Global Diversity Collaborative's Snipes has observed that résumés with ethnic-sounding names tend to be judged unfavorably and receive less consideration. Huang has observed an industry tendency to attach cachet to

Designer-Led Solutions and Initiatives

Many organizations and individuals are supporting current and aspiring architects of color in the hopes of creating a more inclusive and representative profession. Below is a sampling.

Discussing hopes and concerns for communities at Small Talks:LA, a Designing in Color spin-off

ACE Mentor Program of America

Across the country, AEC professionals guide local high school students through regular meetings and mock projects. Sessions culminate with student presentations and scholarship opportunities. *acementor.org*

National Organization of Minority Architects

Currently 900 members strong, the association comprises 27 local professional chapters and 40 student chapters that host a variety of events and programs that promote and support designers of color. Its Project Pipeline program enrolls middle- and high-school students into a summer camp that explores social inequities through design. *noma.net*

Designing in Color

This social, online, and workshop platform invites architects, designers, artists, and students to share and discuss their explorations of race, class, and social justice. *designingincolor.com*

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Practice: Increasing Diversity and Inclusion

certain accents—usually European—and stigma to others, which "may affect colleagues who immigrated when they were teenagers."

Intersectionality can multiply the consequences of bias. For example, students of color who have to work two jobs to support themselves or their families—and thus have limited time to spend in studio—may be viewed as

Deryl McKissack

lazy or less dedicated by their professors and peers.

Even "positive" biases can impede advancement, says Mina Chow, AIA, adjunct associate architecture professor at USC and founding principal of Los Angeles–based design and media production studio Mc2 Spaces. "Any type of stereotype," she says, "is always going to undermine who you might actually be as a human being."

Firm Initiatives

Without personal connections and a financial safety net, underserved students can have trouble landing internships. ZGF's Los Angeles office has formalized a summer shadowing program that hosts high school students for three days of activities, such as jobsite visits, model making, and virtual reality exploration. The experience allows students to interact with architects and "get a good feel for what it means to be a part of an architecture firm," says partner Mitra Memari, AIA.

A member of the AIA Large Firm Roundtable (LFRT) task force on diversity, ZGF has committed to hiring summer interns from historically black colleges and universities. One Hampton University student has already completed a three-month internship with the firm. "We heard from the dean of the school how much she grew from experience," Memari says. The firm hopes to turn the internships into long-term mentorships.

Several Arup offices in major cities have also reached out to local commuter colleges through the company's Immersion Days initiative. Students, accepted through an application process, are guaranteed an in-office

Mina Chow

interview for an internship or full-time position. "Even if they don't get a job with us either as intern or a graduate, they'll have better insight on the industry and their own résumés going forward," McConahey says.

Firms striving for more inclusive and equitable work cultures can hire diversity and inclusion experts to evaluate business practices for implicit bias and create training to help eliminate them. Arup's diversity program grew out of long-standing efforts to reduce gender inequity, also a perennial problem in engineering. The firm's group leaders "felt it was too limited to only look at gender diversity in the Americas," McConahey says. "They wanted to be looking at underrepresented minorities

Latinos in Architecture
Originating as an AIA Dallas committee, this organization now has counterparts in San Francisco, San Antonio, Fort Worth, and Austin. The group hosts lectures, exhibitions, and networking opportunities for Latinx/Hispanic architects and other minorities, and acts as a liaison between local communities and design professionals. *Various AIA component websites*

AIA San Francisco Equity by Design
The AIA San Francisco committee explores equitable practice through events and activities that include quarterly workshops, biennial symposiums, a comprehensive biennial survey of design professionals, Twitter chats, and a blog with topics that include disrupting bias, articulating values, charting career paths, and designing workplace culture. *eqxdesign.com*

Hip Hop Architecture Camp
Held in cities across the country, this free weeklong camp uses hip-hop as a catalyst to introduce middle-school students to architecture and design. Students explore design ideas by building models, using Autodesk Tinkercad, and creating their own rap—complete with a music video—about their observations of their neighborhoods and their design solutions. *hiphoparchitecture.com*

400 Forward
Launched in 2017 when the 400th living African American woman achieved licensure, this organization aims to boost the next generation of African American women architects—who currently make up only 0.2 percent of all licensed architects—through exposure to architecture, mentorship, and financial assistance. *tiffanybrowndetroit.com*

Charter High School for Architecture and Design
Offering a robust education in eight design-related majors, this Philadelphia high school has a graduation rate of 93 percent. *chadphila.org*

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Practice: Increasing Diversity and Inclusion

and to make sure that all of our staff get the same opportunity for development toward promotability."

Perkins+Will had also undertaken efforts to promote diversity "intermittently" through the years, Bullock says. But it took an internal position paper she authored in 2013 to crystallize a coherent diversity strategy. Her writing followed a months-long listening tour at each Perkins+Will office that involved "difficult and uncomfortable conversations" with representative groups, which offered feedback that further focused office training programs, developed in conjunction with Snipes' Global Diversity Collaborative, about topics including racial and gender equity.

Since Perkins+Will has evaluated its business for equitable practice, its Leadership Institute, a yearlong development program to which employees apply, is becoming more racially and gender diverse with each class, Bullock says: "We're moving in the right direction."

In 2013, ZGF established its internal Diversity and Inclusion Advocacy Group (DIAG) as a safe space for employees to discuss firm bias and equity and to identify areas for improvement. One of its first projects was a 2014 firm-wide employee engagement survey, which led to the creation of a task force to clarify salary criteria and promotion timelines. "People felt that there wasn't enough transparency about rules and how and when you can move up," notes Memari, a founding DIAG member. Membership to DIAG is voluntary and lasts two years. All on-boarding members undergo diversity and inclusion training.

This year, following a DIAG recommendation to firm partnership, the entire ZGF staff will receive training, Memari says. DIAG will develop initiatives to promote engagement by each office with their respective communities. In Los Angeles, for example, this means continuing its participation with the local NOMA chapter's Project Pipeline camp. Each office is tasked with holding at least two community-related activities per quarter.

At the end of the year, DIAG will evaluate progress based on a new system of metrics that examine ZGF culture, statistical diversity, recruitment, retention, education and training, and community outreach and volunteerism.

Since working with an outside consultant in 2012, Arup has intensified its efforts to create an inclusive workplace by focusing on four key areas—recruitment, pay and promotion equity, development, and engagement—and establishing an equality, diversity, and inclusion (EDI) governance model that "allows us to have the grassroots efforts, which is where the best ideas come from, [as well as] a firm leadership commitment that's very visible to our region," says Dawn Lederer, chief human resources officer for Arup Americas.

Mitra Memari

The new structure consists of an EDI executive committee, which sets strategy for the entire North Americas region; group leaders; and EDI representatives at each office who drive local initiatives and efforts in three areas: awareness and education, community outreach, and visibility or impact for staff. Recent examples include a lunch-and-learn in Arup's San Francisco and Oakland, Calif., offices and a forum in Los Angeles where staff and leadership shared personal takes on the meaning of an inclusive work culture, and the impact of one's background and culture on identity and career choices, respectively.

Last year, Arup relaunched training to mitigate unconscious bias for all 250 leaders and supervisors in North America. The training is designed to support not only a merit-based promotion and appraisal process, but also broader inclusion efforts, Lederer says. During salary reviews, a metrics worksheet provides group leaders with a snapshot of pay equity by level, tenure, ethnicity, and gender. These metrics are shared at regional board meetings semiannually and, moreover, with all staff via a digital report. This year, the firm will add a midyear report.

Prior to college graduation season, employees involved in recruiting receive refreshers on the most prevalent biases, which include favoring candidates with a similar cultural background or college experience; emphasizing academic achievement and extracurricular activities over work or life experience; and not giving adequate consideration to people skills.

Additionally, Arup offers a mentoring circle program that assigns six to eight employees to two senior members and strategically mixes ethnicities, genders, and experience levels.

Final Thoughts

With minorities projected to become the majority in the United States by 2045, firms that have embraced diversity, equity, and change will have an edge. The general population and the client base are diversifying, says 400 Forward founder and SmithGroup project manager Tiffany Brown, ASSOC. AIA: "The way many architects have been doing things the last 40 or 50 years—or even 20 years—is not going to work if you want to continue to practice as an architect."

MEMARI: COURTESY ZGF

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Tech:
Here Come the Venture Capitalists

TEXT BY DANIEL DAVIS

While the music industry was upended by Apple, the taxi industry by Uber, and the entertainment industry by Netflix, the construction industry has largely escaped notice. But the reprieve has ended. A number of tech companies have made their move, flush with the capital to cause significant disruption.

In 2015, Alphabet, the parent company of Google, launched New York–based Sidewalk Labs, an organization that aims to build Quayside, a new neighborhood in Toronto that "combines the best in urban design with the latest in digital technology." In 2016, Tesla announced its entrée into the roofing business with a photovoltaic shingle designed to "complement your home's architecture." And last year, Airbnb unveiled plans to apply its disruptive business model "more broadly to architecture and construction," throwing away conventional wisdom to "prototype new ways that homes can be built."

A plethora of startups have also emerged, each of them promising to reimagine aspects of the building industry. Prefabrication startups FullStack Modular, Kasita, and Blokable are each attempting to create a manufacturing-style production system for buildings. Well-funded, vertically integrated organizations, namely Katerra and WeWork (where I previously worked as director of research), bring design, construction, and operations in-house rather than contracting it out. The list of startups setting up shop at every corner, every market, goes on: Hypar and Higharc are tackling design software, Leko Labs is taking on fabrication systems, and Test Fit, Spacemaker, and ArchiStar are upending estimating software.

Sears Home Model No. 52 (1908)

Rhino Retrospective

Of course, the profession is no stranger to part-ambitious, part-naive upstarts from the outside. For example, Sears, Roebuck & Co. began selling housing kits direct to consumers via mail-order catalogs in 1908. Largely known for its department stores, Sears sold 70,000 houses this way, with production only ceasing due to material shortages during World War II.

In a similar vein, tech entrepreneurs have been pushing the industry forward for decades, although not at the scale we're seeing today. Take the example of 3D modeling and visualization program Rhino, which Seattle-based Robert McNeel & Associates began developing in 1992. Founder and CEO Bob McNeel tells me that though a dozen 3D drafting companies existed at the time, only two would become wildly successful: Bentley Systems, the maker of MicroStation, and Autodesk, the maker of AutoCAD. During these early days of CAD, investors were more interested in companies like Adobe, which already had a large user base. What his company was doing, McNeel says, was "so specialized and narrow that nobody paid any attention."

Instead, McNeel & Associates was initially funded through consulting gigs, developing AutoCAD plug-ins and content for various architecture firms—"bootstrapping" in today's startup parlance. Its main competitor in the 3D modeling space was Alias, which cost tens of thousands of dollars per license. (Alias was acquired by Autodesk in 2005 and still costs an inordinate amount of money.) By introducing a lower-priced product, Rhino disrupted the market and began to take off. Since McNeel & Associates had no outside shareholders, it could decide its fate without the pressure that many of today's investor-backed companies face to grow at any cost.

The company proceeded cautiously, avoiding seemingly obvious markets

> *For more technology columns by Daniel Davis, visit bit.ly/ARDDavis.*

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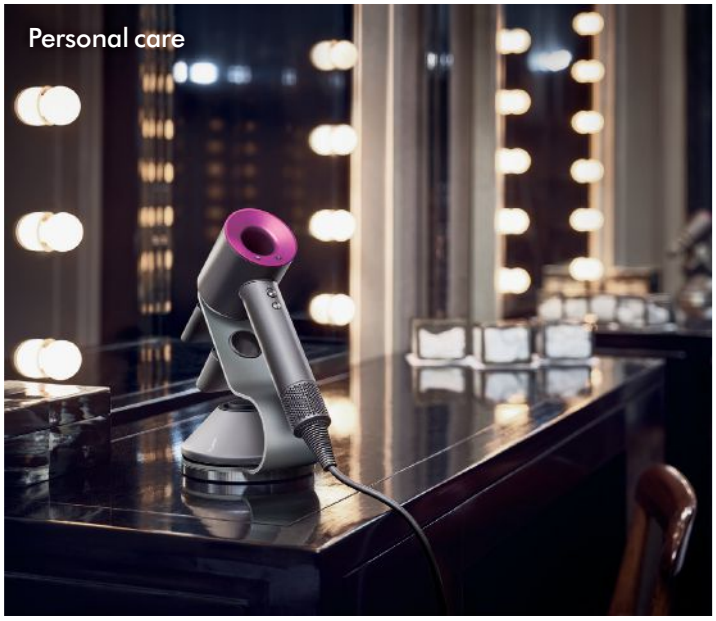

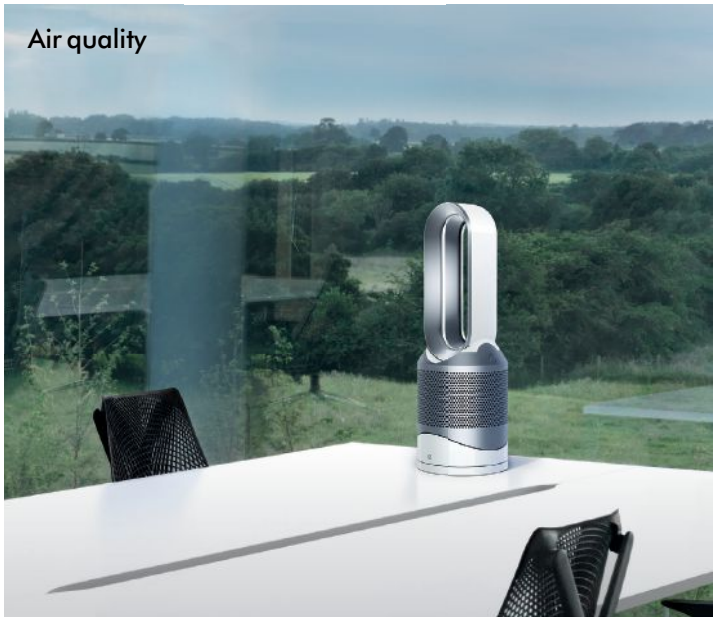

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Tech:
Here Come the Venture Capitalists

to instead develop tools for *other* businesses to pursue said markets. "If they're building something that makes Rhino more useful, we'll do whatever we can to help them all out," McNeel says. "I don't know how else to think about it."

The result was a growing ecosystem of startups and consultancies that are built on Rhino. Responding to requests from these businesses, McNeel & Associates has begun developing Rhino Inside and Rhino Compute, two platforms that make Rhino's geometric engine available in other software, something that may fuel the next generation of disruptive startups.

Today's Dollars

Investment in the building sector today dwarfs everything in the past. It's difficult to calculate exactly how much is being invested, but one estimate by CREtech puts the 2017 figure upward of $12 billion into real estate startups—including construction, co-working, and underwriting—with another $10 billion in 2018. For context, the U.S. architectural services industry *altogether* is worth about $45 billion, according to AIA.

For the most part, investors aren't going after architects, but rather the real prize: the $10 trillion global construction industry. A February 2017 McKinsey Global Institute report advocated for dramatic changes to the design and construction sectors, arguing that a manufacturing-style production system would boost productivity and save $1.6 trillion per year.

As companies battle to capture parts of this enormous industry, architects are finding themselves at the mercy of these larger changes in the economy. Many firms I've spoken with are unfazed, seeing their work as distinct to these new ventures. But others expressed real concern that they are losing work and employees to well-funded newcomers.

Some AEC companies have seized the opportunity to start their own business offshoots. New York–based Thornton Tomasetti launched TTWiiN, a discrete incubator that has partnered with venture capitalists to commercialize the firm's innovations. In Amsterdam, UNStudio started UNSense, a startup aimed at "integrating sensorial adaptive design into architectural output." And

Airbnb's Backyard initiative reimagines design prototyping.

Philadelphia-based KieranTimberlake has tried productizing some internal tools, including Tally, a platform for calculating the environmental impact of building materials; Roast, a survey platform for measuring occupant comfort; and Pointelist, a sensor network for buildings.

Whether these efforts will succeed remains to be seen. Selling products has its own unique challenges when it comes to marketing, product support, and finance. For a firm accustomed to billing services by the hour, it may be difficult to introduce and support a product-based revenue stream.

Meanwhile, some academics sense change is in the air and are preparing their students for the new reality. At Yale University, Phil Bernstein, FAIA, teaches a course that challenges students to devise an architecture firm that creates profit through something other than fixed or hourly fees. MIT's School of Architecture and Planning has started DesignX, an incubator that helps students and faculty launch business ventures related to the built environment. Courses teaching students to write business plans and launch startups can seem dull compared to the conventional Instagram-ready curricula, but the former offers skills that are central to the future of our profession as any aesthetic innovation.

Mission Versus Money

Overall, it's a good time to be an architect—but a precarious time to own an architecture firm. Architects have more opportunities than ever to branch out, start companies with new business models, and join organizations outside the industry with better working conditions. Architecture firms, however, have a lot hanging in the balance. Small boutique firms are likely immune from most of these changes, the same way bespoke tailors survive in a world of mass-produced fashion. Larger firms are more likely to face headwinds, particularly in sectors where they face well-funded competitors that are willing to lose money to gain market share.

The onslaught of outsiders eyeing architecture is significant. In the canon of architecture, the heroic catalyst of change has been designers: Frank Lloyd Wright conjuring the prairie house, Denise Scott Brown, HON. FAIA, and Robert Venturi giving us permission to love Las Vegas and Postmodernism. In the future, the new agents of change may be consigned to nameless venture capitalists and indomitable tech giants.

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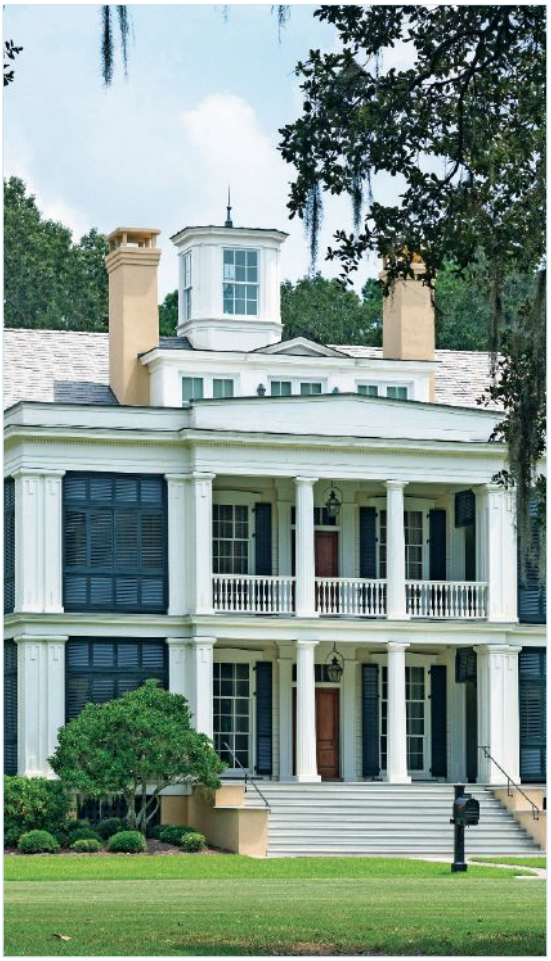

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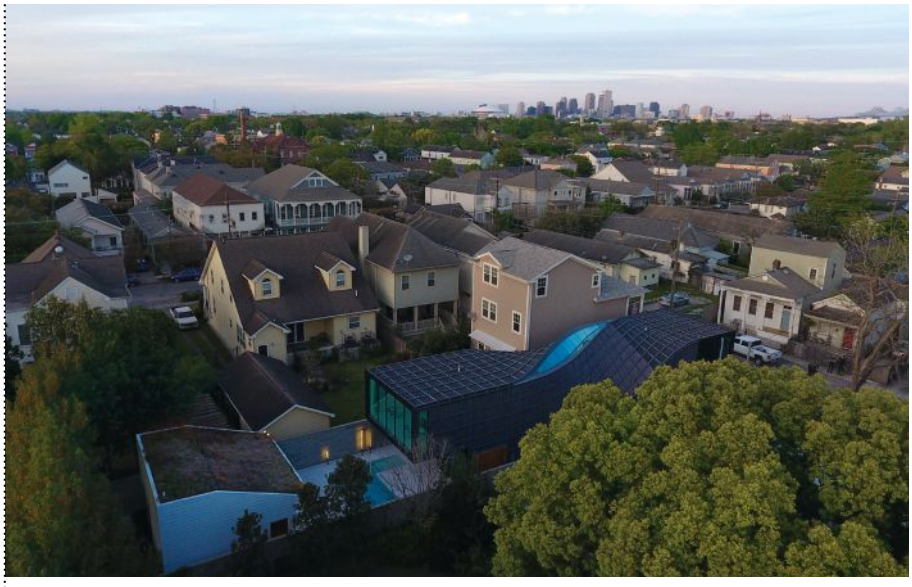
TEXT BY AARON BETSKY

What do you get when you cross a New Orleans shotgun house with a loft and lift the whole thing above the flood plain? If you have a powerful computer, a clever engineer, and happen to be as good an architect as Ammar Eloueini, AIA, the result could be the J-House: an elegantly twisted steel-and-wood structure that rises out of a standard lot to catch the breeze, offer views of its surroundings, and provide refuge from the potential of rising floodwaters.

Eloueini moved his Paris-based practice, AEDS | Ammar Eloueini Digit-all Studio, to New Orleans in 2006—one year after Hurricane Katrina devastated the region—to teach at Tulane University's School of Architecture. He quickly became part of the local effort to rethink how to design houses in a city known equally for its beauty and its vulnerability.

His solution, which he first developed for an exhibition on housing prototypes, liberates the stretched proportions of the ubiquitous shotgun house—a typology that was popularized in the area as a response to the city's standard long and narrow lots—by raising up the bulk of the inhabitable area 10 feet above grade. But instead of placing the volume on stilts or concrete bases, as many post-Katrina houses did, he wanted to make the act of that elevation integral to both the building's structure and interior. This idea developed into a design comprising two 11-foot-wide-by-21-foot-tall tubes—framed with 4-inch-by-8-inch steel members—that twist around each other,



Aerial view of neighborhood from the northeast, showing the J-House at center right.

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Project Credits
Project: J-House, New Orleans
Client: Ammar Eloueini, AIA
Architect: AEDS | Ammar Eloueini Digit-all Studio, New Orleans · Ammar Eloueini, AIA; Jana Masset, AIA, David Merlin, AIA, Dan Kautz, Jamie Lookabaugh, Surawat Hanthawichai (project team)
Mechanical Engineer: Comfort Engineered Systems
Structural Engineer: BuroHappold Engineering
Electrical Engineer: Ducote Electric
Civil Engineer: BuroHappold Engineering
Construction Manager: Ammar Eloueini, AIA; Jana Masset, AIA
General Contractor: Ammar Eloueini, AIA
Lighting Designer: Paul Bakis
Skylight Engineer: Super Sky Products Enterprises
Size: 2,200 square feet (main house); 800 square feet (guest house)
Cost: Withheld

> *For materials and sources information, visit bit.ly/J-House.*

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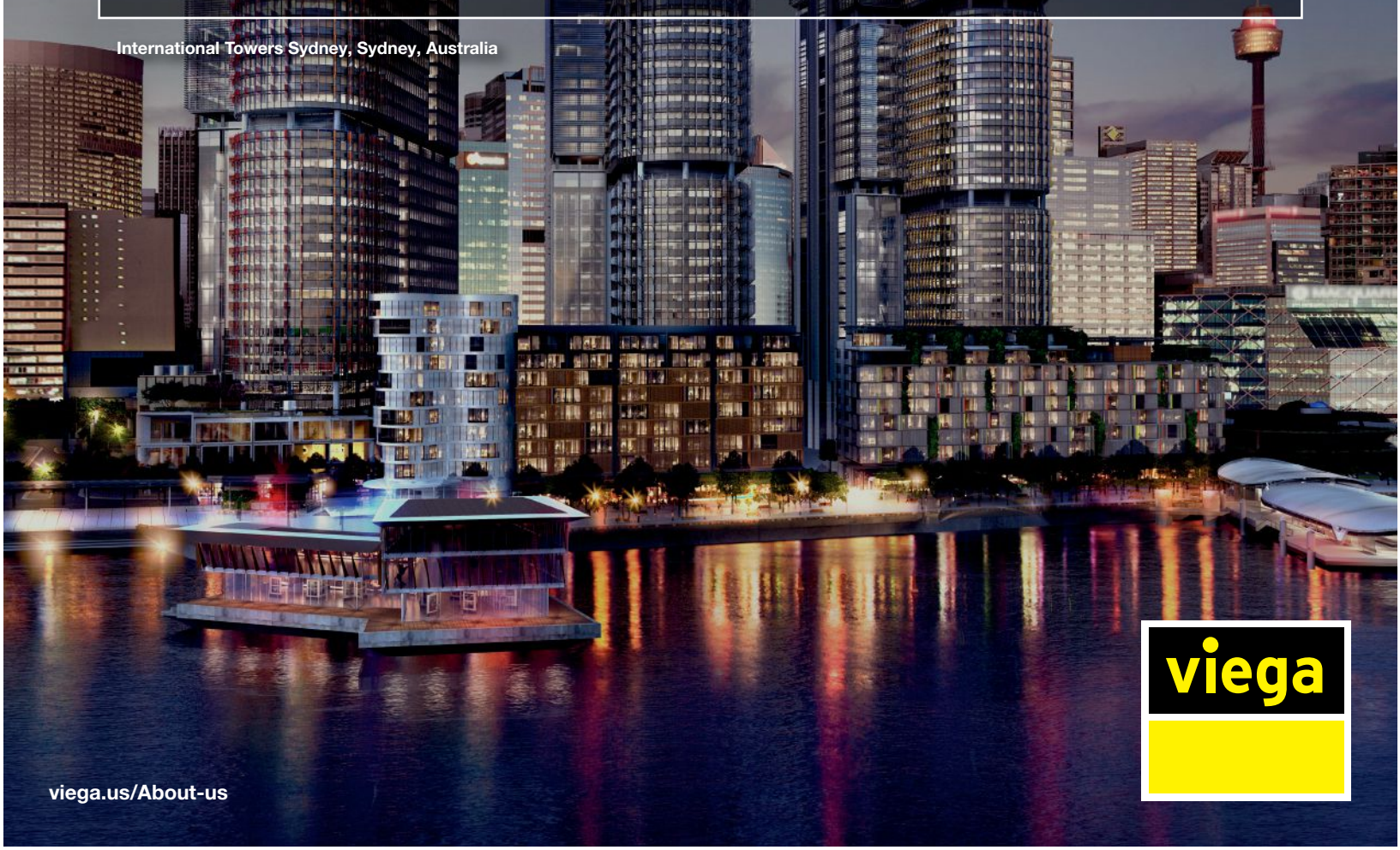

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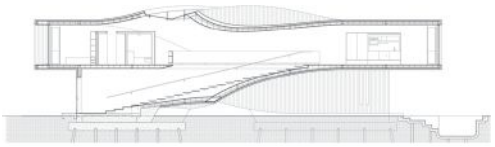
so that only two enclosed staircase volumes touch the ground.

Eloueini decided put his concept to the test and purchased one of those long, narrow lots himself. He even found a willing developer and investment partner—until the Great Recession hit. By 2008, the architect was on his own. He spent the next decade soldiering on with a local contractor, help from his friends at BuroHappold Engineering in New York, and money and time he freed up from his teaching and small practice.

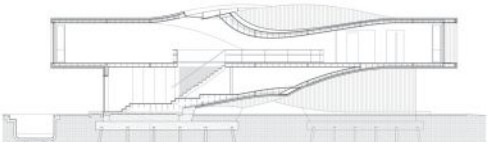
The resulting house looks nothing like its neighbors but slides easily into the rather confused context that makes up the fabric of New Orleans outside of its tourist areas. Eloueini observed all the setback requirements and clad the house in charred wood which, though now a bit of a cliché in some architecture circles, works well here both by offering a sympathetic echo of the neighboring wood-clad houses and by protecting the structure against humidity and pests.

The house also responds to the long tradition of single-family houses as boxes that contain all their functions in abstract forms: “It is my response to [Philip Johnson’s] Glass House,” Eloueini says, “taking the type down to the basic spaces and to fundamental ideas about spatial conditions.” At the J-House, you park directly underneath the living room—perhaps more like at Le Corbusier’s Villa Savoye than Johnson’s house—and enter through one of the two tongues that the house sends down to the ground. A staircase in a compressed

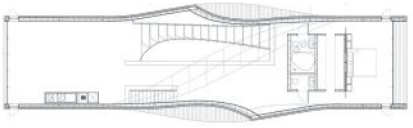
Section A–A₁



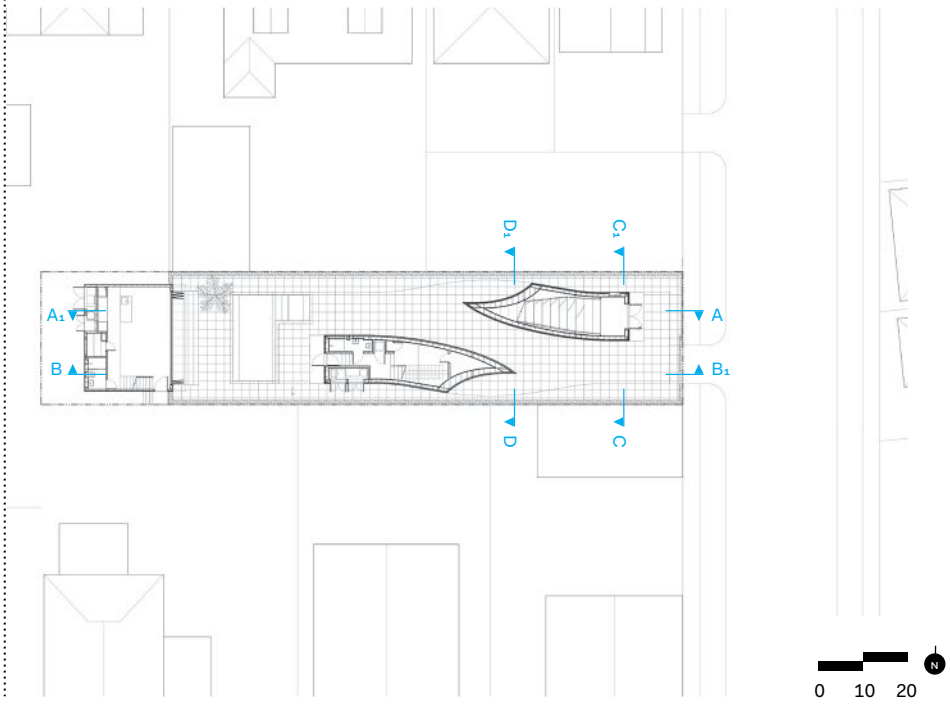
Section B–B₁



Second-Floor Plan



Ground-Floor Plan



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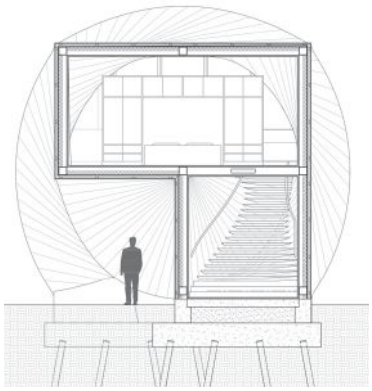
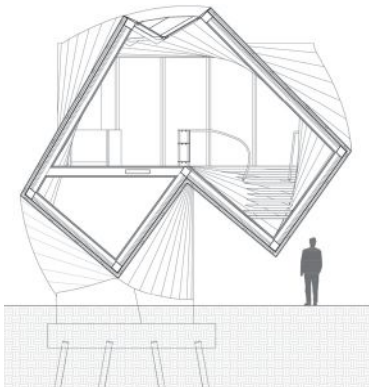
Below: The charred-wood cladding on the J-House (at left) is a reference to, and abstraction of, the materiality of other houses in the neighborhood.

Right: In the second-floor living area, white walls coated in paint from Farrow & Ball arch over a floor made from DuPont Corian in glacier white.

Section C–C₁



Section D–D₁



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RICHARD SCHULMAN

Residential:
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The complex, curving skylight over the living area was fabricated by Chukar Waterjet.

channel of space expands as you ascend to the main living quarters. What you see when you get there is the view—both ends of the J-House are glazed voids.

The living area is barren of anything but a small line of cupboards and kitchen appliances on the south wall and bookcases on the north wall. "I'm pretty reserved and constrained, I guess," Eloueini says. "Not just in details, but in needs; I am a man of little furniture and a lot of books." The living space then flows east past both the entry stair and a set of back stairs that descends toward the rear of the property. It extends further toward the bedroom at the front of the house, where a volume housing a bathroom and powder room creates a modicum of privacy from the living area as you lie in bed and look out the floor-to-ceiling and wall-to-wall picture window. "The main structure is like a Klein bottle," Eloueini says. It's "a continual space of living that lifts itself up and lets you hover there."

The back stair—which is much more mundane than the entry one—descends past mechanical equipment to a small backyard pool that is shaded by the cantilevered living room. On the other side of the pool is an existing structure Eloueini renovated into a guest house.

Now that the house is finished, Eloueini plans to put it on the market. "It served its function," he says. "It was a showcase for me; it helped me get other commissions." (In fact, he is currently building a larger version of the same design in Tasmania for a client who saw the J-House under construction.) "I spent a decade of my life doing this, and I love that space, but I don't want to become fetishistic about it," he says. "It's time to let it go."

What Eloueini will bequeath to whoever buys the J-House is a refined and simple structure whose complexity comes from one idea: a twist. It is a tribute to both his skill and his restraint that he has carried out that notion with such clarity that you can understand it—inside and out, and in all its details—as being a direct and masterful translation of that first move.

The entry stair from the ground floor to the living space ends in a view through a window wall from Hope's Windows.

RICHARD SCHULMAN

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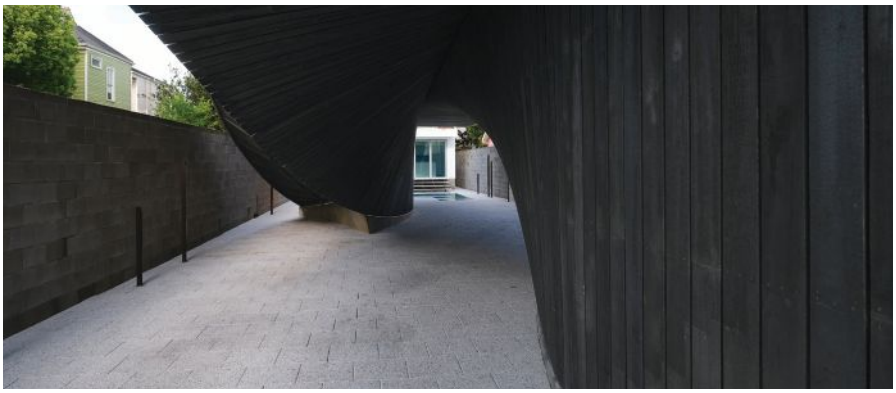

Above: A cavelike carport under the J-House is lined with permeable pavers and gives access to both the main entry stair (at right) and back stair volume (at left); the renovated guest house can been seen past the pool beyond.

Left: Light fixtures from Viabizzuno illuminate both the interior and the site.

RICHARD SCHULMAN

INNOVATIVE MATERIALS HELP ENERGY INNOVATION CENTER EARN LEED PLATINUM CERTIFICATION AND HISTORIC TAX CREDITS

Presented by: covestro

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Explore the history of the Energy Innovation Center—Pittsburgh project and how LEED Platinum Certification and Historic Tax Credits were achieved simultaneously.
2. Review how closed-cell spray polyurethane foam (SPF) insulation met wall assembly challenges.
3. Explore how polyiso board insulation met roofing design challenges at the Energy Innovation Center.
4. Describe how two-component waterborne polyurethane coatings were used on both concrete and wood floorings, as well as for an innovative wall coating.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-1

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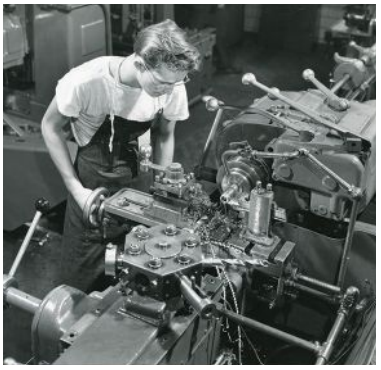
THE CONNELLEY LEGACY CONTINUES

The Clifford B. Connelley Technical Institute opened in 1931 as a Depression-era workforce development facility where students learned essential trades such as plumbing, carpentry, and mechanics. Connelly educated generations of skilled tradespeople and workers from Pittsburgh and the surrounding region but closed in 2005 after years of declining enrollment. Many educators and city leaders continued to advocate for a renewed investment in vocational education, particularly at a time when labor shortages in the construction industry were at an all-time high. In addition, sustainable design is on the rise, so the industry needs skilled laborers familiar with these innovative green materials and technologies. Mayor Bill Peduto called for a "Pittsburgh Connelley for the 21st century," and today their vision has materialized in the new Energy Innovation Center (EIC).[3]

HISTORICAL FACTS ABOUT THE SITE AND ARCHITECTURE[4]

- The school is located in the Hill District neighborhood of Pittsburgh, a historically African-American cultural and business hub
- The school was sited high on a hill so it could remain above the air pollution that plagued Pittsburgh
- The architect, Edward B. Lee, was known for his work on academic buildings
- The original main entrance is flanked by symmetrical academic wings, a characteristic of its Classical Revival architectural style
- The shop building was designed to mimic an actual 1930s factory, and its unique saw-tooth roof was designed to maximize natural interior light
- Students at the Connelley School learned plastering, bricklaying, plumbing, auto mechanics, carpentry, cabinetry, electrical, agriculture, commercial arts, home economics, cosmetology, and nursing, among other skills



The Clifford B. Connelley Technical Institute opened in 1931 as a Depression-era workforce development facility where students learned essential trades such as plumbing, carpentry, and mechanics.

THE ENERGY INNOVATION CENTER

Under the leadership of Pittsburgh Gateways Corporation, and with the help of non-profits, unions, foundations, research universities, the U.S. DOE's National Energy Technology Laboratory, and industry partners, the historic school has been transformed into a 200,000 square foot, LEED Platinum multi-disciplinary campus. The Energy Innovation Center is a not-for-profit organization with a mission to engage corporate and community leaders, align workforce development and education, develop and demonstrate technology, and incubate businesses to support emerging clean and sustainable energy markets.[5]

This 6.6 acre, urban commercial complex is a collaborative hub that promotes energy-sector research and innovation and creates direct and deliberate bridges to job creation, entrepreneurship, and urban economic revitalization to support the Pittsburgh region's emerging clean technologies.[6] EIC is located in the heart of Pittsburgh's Historic Lower Hill District, a neighborhood located between several major research university campuses and the downtown central business district. This building serves as a 'living laboratory' for industry education and training, accommodating hundreds of students in 28 apprentice programs. The EIC also houses diverse tenants, including a national research laboratory, energy sector corporations, political and community leaders, numerous nonprofits and businesses, a co-working space, design lab, and five Pittsburgh universities.[7] The basement alone will house a 9,500-square-foot Community Kitchen facility to engineer new ways to make high volumes of food using fewer chemicals, electricity, paper, and gas.

Energy Innovation Center—Pittsburgh is designed and equipped by corporate partners such as building material manufacturers, lighting manufacturers, and a power company. High-tech building materials can be found throughout the facility, showcasing chemistry as a sustainable solution and helping the EIC maintain its sustainable footprint. Drawing on the Connelley legacy, the new Energy Innovation Center is connecting sustainable careers aligned with the region's changing economy.

RENOVATION CHALLENGES

The Energy Center is an 85-year old education facility, providing three renovation challenges:

- The building had little or no insulation
- The renovation had historical landmark requirements
- The renovation needed to meet LEED platinum standards

The Energy Innovation Center is a leader in green adaptive reuse, as the design of its building and grounds meets the highest standards of sustainability and energy efficiency while preserving the historical character of the building.

SIMULTANEOUS GOALS OF LEED PLATINUM CERTIFICATION AND HISTORIC TAX CREDITS

The energy technology innovation cluster in the Pittsburgh region has a rich history and a promising future. World-class capacity exists here in areas ranging from carbon management to nuclear reactor design, wind turbine manufacturing, materials and sensors, electric power distribution and control, shale gas production, and advanced building systems.[8] The Energy Innovation Center is a leader in green adaptive reuse, as the design of its building and grounds meets the highest standards of sustainability and energy efficiency while preserving the historical character of the building. Through an integrated design-build process, EIC designers and engineers innovated to optimize the performance of vendor components. The EIC has earned LEED Platinum certification and meets the stringent 2013 District energy, water, and transportation emissions reduction targets.[9]

In addition, the building is listed on the National Register of Historic Places and is a Pittsburgh History and Landmarks Foundation Historic Landmark, making it one of the only LEED Platinum designed structures to qualify for Historic Tax Credits in the nation. According to architects DLA+, "The decision to adaptively reuse and renovate the historic Connelley Pittsburgh's Hill District to save

GLOSSARY

Spray polyurethane foam insulation
A spray-applied cellular plastic made by mixing chemicals that react very quickly, expanding on contact to create foam that insulates, air seals, and provides a moisture barrier.[1]

Polyiso board insulation
A closed-cell, rigid foam board insulation consisting of a foam core sandwiched between two facers. The facers are composed of various organic and inorganic materials, usually paper and fiberglass. It is widely used in residential and commercial markets for both roof and side wall applications.[2]

Aromatic hardener
A reactive component of a two component coating system with an amber to brown color. An aromatic hardener reacts with the resin side to produce a coating film that is not light stable and will yellow over time when exposed to sunlight or ambient light sources.

Aliphatic hardener
A reactive component of a two component coating system that is water-clear. An aliphatic hardener reacts with the resin side to produce a coating film that is very light stable and will not yellow over time when exposed to sunlight or ambient light sources.

Solventborne (SB) carrier
Coating where the primary co-solvent is an organic solvent which may or may not be classified as a VOC.

Waterborne (WB) carrier
Coating where the primary co-solvent is water, although it may still contain a small amount of organic solvent which may or may not be a VOC.

Polyurethane dispersion (PUD)
Typically contains a polymer dispersion primarily composed of a polyester, polyether, or polycaprolactone resin pre-reacted with an aliphatic hardener and dispersed in an aqueous carrier. Additional additives may include pigments, flow and leveling additives, and/or defoaming agents.

One-component (1K) coating
Ready to use out of the can, moisture cure (MC) or polyurethane dispersion (PUD).

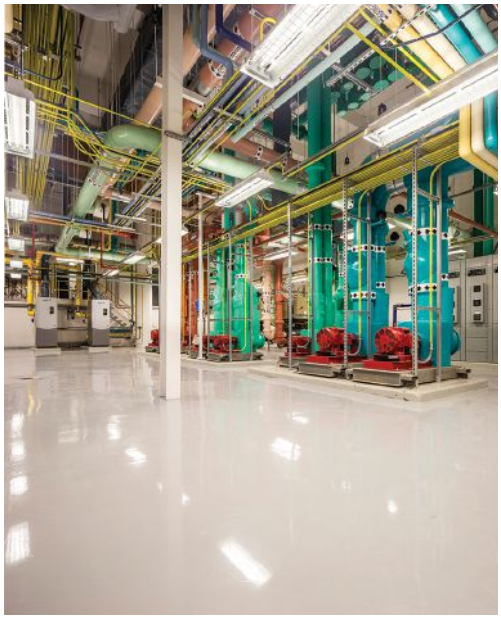
Two-component (2K) coating
Contains a formulated resin component and a hardener component.

Rehabilitation
The process of returning a property to a state of utility, through repair or alteration, which makes possible an efficient contemporary use while preserving those portions and features of the property which are significant to its historic, architectural, and cultural values.

Secretary of the Interior's Standards for Rehabilitation
Used to determine if rehabilitation of a historic property qualifies as a Certified Rehabilitation for Federal tax purposes. The Standards intend to assist the long-term preservation of a property's significance through the preservation of historic materials and features.

a part of Pittsburgh's heritage was no easy vision. Its Trade School in landmark status, the obsolete mechanical systems, and a building that was practically inaccessible according to today's ADA standards were only a few of the hurdles. However, the greatest challenge lay in the simultaneous goals of LEED Platinum certification and historic tax credits. A year-long process of negotiations and design reviews with the Pennsylvania State Historic Preservation Office and the National Park Service (NPS) ensued. Time and again, innovative green design had to be balanced against the directive to preserve character-defining features of the historic school building while also meeting the competing goals of the client."

Many historic structures such as the Connelley School were designed with inherent energy-saving qualities including operable windows, ample natural light sources, clerestory windows and skylights, wide, overhanging eaves, or heavy masonry walls. Due to these features, historic preservation, energy efficiency, and environmental sensitivity are not mutually exclusive, as was proven at EIC.[10] Now, the facility has achieved LEED Platinum rating and has the potential to be one of the highest rated LEED Core and Shell projects ever. The EIC design team met the Secretary of the Interior's Standards for Rehabilitation, and the Owner was awarded a 20% tax credit of $6.5 Million through the Rehabilitation Investment Tax Credit program.[11] This unique combination of historic preservation and highly sustainable architecture has proven very successful.



Through their partnership, the EIC worked with building product manufacturers to educate about the ways buildings can be designed sustainably and operated more efficiently.

EIC AND SUSTAINABILITY PARTNERS

Buildings are responsible for 40 percent of global energy consumption and about one-third of the greenhouse gases emitted to our atmosphere. However, a lot can be done to make buildings more environmentally compatible. Through their partnership, the EIC worked with building product manufacturers to educate about the ways buildings can be designed sustainably and operated more efficiently. Today, buildings must consume less energy and emit lower amounts of greenhouse gases. They must be durable and efficient, and meet the demands for comfort and design. Choosing innovative and appropriate materials and solutions helps improve the performance of buildings and the quality of people's lives.[12]

Efficiency in building is not just a matter of having the right parts; it also depends on how you assemble the whole. At the EIC, the design-build team followed efficiency principles to optimize the performance of the whole system:

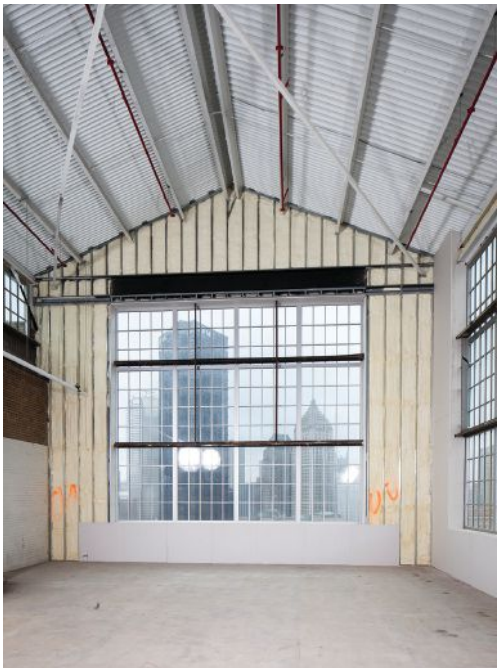
- Data collection and transfer
- Continuous commissioning
- Measurement and verification
- Heating and cooling[13]

There were, of course, myriad building materials used in the renovation of the EIC building, but this course will discuss two uses of polyurethane insulation and two types of architectural coatings that were employed to improve energy efficiency, provide durable surfaces, and meet historic preservation standards.

POLYURETHANE INSULATION—MULTI-PURPOSE INSULATION CHOICE

Highly insulative polyurethane foam was used throughout the roof and walls of the EIC during its renovation to help improve the performance of the facility's building envelope. Closed-cell spray polyurethane foam (SPF) was used in the wall systems, providing continuous insulation to create an airtight seal and eliminate thermal breaks.[14] Polyiso board insulation was used for the EIC roofing system, which allowed for a cost-effective, high-performance roof system. It features environmentally-friendly construction with zero ozone-depleting components and is CFC-free.[15]

"We used a well-thought-out approach to improve the efficiency of the shell and installed state-of-the-art equipment, and got tangible results in that effort," explains Bill Miller, CEO of the EIC.



An application area of 56,000 square feet of closed-cell SPF was installed throughout the EIC to ensure continuous insulation that helps eliminate thermal breaks and seals the building envelope to optimize insulation value.

SPRAY POLYURETHANE FOAM PROVES TO BE AN ECONOMICAL INVESTMENT[16]

It may seem preposterous today, but when the Connelley Technical Institute was built insulation was not incorporated into the construction. When renovations began in 2011, adding high-quality insulation to the building's exterior was mandatory to meet the building's energy efficiency goals (and provide occupant comfort through Pittsburgh's cold winters and hot summers). After examining several types of insulation, the project team chose closed-cell spray polyurethane foam due to its several unique benefits. Closed-cell SPF has nonintrusive versatility, high R-Value, moisture resistance, adds structural strength, and provides a drainage plan when installed as continuous insulation.

"Historic buildings generally have greater potential for air leakage, and traditional insulation methods do not combat this," says Joe Morrone, the EIC project manager with InsulRight, the company that installed the spray foam at the Center. "Buildings perform as a system and insulation plays a big role in that system. Maintaining the air movement throughout a building helps all the mechanicals perform as designed."

While there are multiple choices of spray polyurethane foam insulation available, specifiers often choose closed-cell SPF for exterior applications since it creates a continuous layer of highly water-resistant insulation. An application area of 56,000 square feet of closed-cell SPF was installed throughout the EIC to ensure continuous insulation that helps eliminate thermal breaks and seals the building envelope to optimize insulation value. With closed-cell SPF, the building did not need an additional building wrap as a drainage plane, which cut back on renovation time and resources.

Additionally, closed-cell SPF products can offer a low installation cost and design flexibility, helping to create a durable and efficient thermal envelope. It is installed using a chemical blowing agent that is retained inside the polymer cells to form a rigid, dense foam. This rigidity and density provides an enhanced air barrier, limits moisture ingress, and can add structural integrity to a building's exterior. SPF can be used to insulate much more than just walls, providing insulation, sealing, and strength for ceilings, floors, attics, foundations, and piping.

"The old masonry walls of the building and vapor retarding properties of closed cell spray polyurethane foam were major driving forces behind the decision to use [closed-cell SPF] for this project," Morrone says. "Framing sizes also came into play. The high R-Value per inch of closed cell allowed the contractor to reduce the framing size and still achieve the desired thermal performance in the building envelope."

Spray polyurethane foam provides additional value by helping to minimize heating and cooling bills over time and serves as a moisture and air barrier, which can eliminate the need to install separate air or moisture management systems. In some situations, the use of closed-cell SPF alone can reduce fuel bills. And at the EIC, the installation of this insulation, thermal windows, updated climate systems, and low-energy appliances and lighting have already resulted in significant utility bill savings. "We were able to cut energy usage in half," Miller says. "Our energy model predicted a 57 percent reduction in energy from our baseline and our numbers [actuals] are coming in pretty close to that. The building had no insulation, and everything was from the 1930s, so our baseline model was pretty bad."

This article continues on http://go.hw.net/AR052019-1. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. The Energy Innovation Center received historic tax credits and LEED _____ Certification.
   a. Silver
   b. Gold
   c. Platinum

2. _____ was used in the wall systems at EIC, providing continuous insulation to create an airtight seal and eliminate thermal breaks.
   a. Polyiso board insulation
   b. Spray polyurethane foam
   c. Mineral wool
   d. Fiberglass insulation

3. _____ was used for the EIC roofing system, which allowed for a cost-effective, high-performance roof system.
   a. Polyiso board insulation
   b. Spray polyurethane foam
   c. Mineral wool
   d. Fiberglass insulation

4. Spray polyurethane foam helped the Energy Innovation Center achieve a _____ percent savings in their gas utilities.
   a. 42
   b. 56
   c. 68
   d. 74

5. Polyiso board is a _____ product, which means that it will not change shape or melt when exposed to elevated temperature.
   a. Thermoset
   b. Thermoplastic
   c. Thermoformed

6. _____ hardeners are more color stable, so the polymer does not break down and yellow over time.
   a. Aromatic
   b. Aliphatic
   c. Resin
   d. High-performance

7. _____ is an entanglement and reaction of polymer chains that increases physical strength and chemical resistance.
   a. Hydrogen bonding
   b. Crosslinking
   c. Dispersion

8. Properties of 2K waterborne coatings include which of the following?
   a. Excellent durability
   b. Excellent color
   c. Excellent gloss
   d. All of the above

9. 80 percent or more of coating or sealer failures are due to _____.
   a. Poor surface preparation
   b. Application issues
   c. Wrong coating

10. A _____ was used to coat an original 5/4" maple wood floor that was installed in what used to be a machine shop training room.
    a. 100% solids epoxy basecoat
    b. 2K waterborne polyurethane topcoat
    c. 2K waterborne polyurethane clear coat

SPONSOR INFORMATION

SPACE PLANNING FOR A NEW GENERATION

USING BIM SOFTWARE TO UNDERSTAND AND ACCOMMODATE THE MILLENNIAL MARKET

Presented by:

VECTORWORKS
A NEMETSCHEK COMPANY

Image courtesy of: http://www.hamonic-masson.com.

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Analyze the role that Millennials have to future building project management and technology needs.
2. Rethink space planning methodology based on a new generation and how to make a space functional within a larger urban context.
3. Explore the capabilities of BIM software and how it brings efficiency to communication and space planning when managing project requirements, constraints and opportunities.
4. Examine case studies where building professionals used BIM software to enhance the space, human connectedness, and sustainability of the occupants.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-2

IDCEC CREDIT: 0.1 CEU/HSW
IDCEC COURSE NUMBER: CEU-108824

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INTRODUCTION: PLANNING FOR A NEW GENERATION[1]

The Pew Research Center and Gallup define Millennials as the 73 million people[2] born between 1981 and 1996—the first generation of the new millennium.[3] Identifying key characteristics within generations, such as Millennials, and the ways in which generations interact with one another involves identifying which world events, social shifts, or technological innovations influenced particular age groups. For example, most Millennials were old enough to remember the 9/11 terrorist attacks and witness the way those attacks reshaped the world. The ensuing wars in Iraq and Afghanistan also impacted Millennials and denoted the beginning of extreme political polarization in America. Politically, many Millennials were also of age to vote in 2008, and the election of America's first black president marked social trends of diversity and inclusivity.

Economically, Millennials were impacted by the recession, which lasted roughly from 2007 to 2009. Not only did the recession hurt the nation's and the world's economies, but it caused Millennials to get a slower start in life: it took them longer to find jobs based on their degrees, longer to start saving money, and longer to move out of their parents' homes.

As well as politics, economics, and social considerations, generations are marked by the technology that is being developed as they come of age. For example, Baby Boomers were growing up just as television was becoming commonplace. Similarly, Millennials were growing up as the Internet was expanding and becoming part of everyday life. Millennials adapted to the use of different technological tools and incorporated that technology into their daily lives. Just as Baby Boomers set the tone for the way in which television was used in ensuing generations, Millennials' use of the Internet determined the way Generation Z would utilize it.

Considering the events and advances that helped shape each generation can lead to a deeper understanding of why generational groups hold certain viewpoints. Discovering what drives and influences a generation can, in turn, lead to better business decisions.

Generational Characteristics

Significant research has been done on generational characteristics, attributes, and interactions. The West Midland Family Center (WMFC), a non-profit organization that focuses on generational well-being and quality of life, outlines traits of the Silent Generation, Baby Boomers, Gen X, and Millennials in an effort to serve them better.[4]

The WMFC notes that some core values of the Silent Generation are that they are stable, loyal savers who adhere to rules, work hard, and are willing to make sacrifices. Baby Boomers are team-oriented, willing to "spend now, pay later," optimistic, and express loyalty to their children. Key traits of Gen Xers are that they seek life balance, are cynical, think globally, are technologically literate, and lack organizational loyalty. Both Millennials and Gen Xers are highly educated and value diversity and fun. Millennials are even more technologically savvy than Gen Xers, want things immediately rather than having to wait, are competitive, and are avid consumers.

In terms of generational attributes, the WMFC notes that the Silent Generation will do more with less, have a linear work style and are hard-working, task-oriented, and loyal to organizations and employers. Baby Boomers are also task-oriented, handle crises well, are loyal to their careers and employers, and have good communication skills. Gen Xers are focused on results, have a high degree of brand loyalty, and are willing to put in extra time to finish a job. Millennials, on the other hand, are loyal to peers rather than employers, offer respect for competency rather than for status, are attached to their technology, have not lived without computers, and focus on making changes in the world using technology.

In an article titled, "Selling to All Generations: Cross-generational Differences Can Make or Break Your Sales Success," Diane Thielfoldt, co-founder of consulting firm The Learning Café, details the ways in which knowledge of the generational characteristics mentioned above can help harness sales success. For instance, she notes that those in the Silent Generation appreciate practical services and products, as well as straightforward communications. Relationship-building is not as important as "sticking to the business at hand." They are loyal to the companies they make purchases from and expect loyalty in return, and, while they might be technologically literate, they still prefer face-to-face meetings.[5]

Thielfoldt further comments that like the Silent Generation, Baby Boomers too prefer face-to-face meetings. While comfortable with online communications, they tend to prefer print. They also prefer to establish personal relationships with those they do business with, intertwining business results with close relationships. Linking a product with a vision, mission, or values is a good start at opening dialog and establishing a relationship.

Gen Xers are slightly more skeptical than Boomers and the Silent Generation when it comes to business. After learning about a product from a representative or company, they will do their own research to find out more. They will also consult with peers about products and often rely on word of mouth or networks to provide them with more information. Unlike the generations before them, Gen Xers would rather communicate via email or over the phone. Establishing personal relationships in business does not interest them that much, and they prefer working with those who "get to the point." Being direct from the outset goes over favorably.

Finally, Thielfoldt notes that Millennials are somewhat paradoxical. They often need time to make a decision and will refer to managers or peers for guidance. That being said, they might lack patience, want information quickly, and ultimately end up making decisions with confidence. As opposed to Gen Xers, Millennials appreciate extra attention and time spent explaining the pros and cons of what is being sold. Because Millennials are civic-minded, companies that are socially or environmentally conscious will have the competitive edge. They typically are not brand loyal, and if another company offers a better deal or service, they transfer their business. In terms of communication, Millennials prefer emails or even text messages. They are further willing to communicate with suppliers via blogs and other social forums. Stressing a product's uniqueness, relating to their professional goals, and taking a collaborative approach can all help to win over the Millennial client.

Overall, having generational knowledge of a client, and creating targeted approaches throughout the sales process can help win new business. Thielfoldt recommends that when closing a sale with individuals from the Silent Generation, it is best to summarize their expectations, and then state how those expectations will be met before asking for their business. When finalizing a sale to Baby Boomers, it is important to show the hard work that went in to winning their business. With Gen Xers, it is best to avoid pressure or hard selling. Being "direct, open, and understated," as well as being willing to educate, inform, and answer their questions, will essentially "let Gen Xers close themselves." Finally, Millennials are receptive to companies who provide service in the community, donate to charities, are sustainable, and are socially and environmentally responsible. A company that focuses on those wants, as well as demonstrates the relevance of their product, can reach an agreement with Millennials one step at a time.

GLOSSARY

Baby Boomers—the generation born roughly between 1946 and 1964

Branching—designing for different scenarios

Building Information Modeling (BIM) Software—generates and manages representations of physical and functional characteristics of space; aids collaboration and communication.

Generation X—the generation born roughly between 1965 and 1980

Iterative design—a user need is identified, a prototype is developed and tested, the design is amended, and a new prototype is developed

Millennials—the generation born roughly between 1981 and 2000

Mulit-generational households—a household consisting of at least two adult generations

The Silent Generation—the generation born roughly between 1900 and 1945

Third places—first created and defined by sociologist Ray Oldenburg; places between work and home where people can relax, be entertained, build relationships, and exchange ideas.

First place—home; **Second place**—work

GENERATIONAL SUCCESS: HOW MILLENNIALS LIVE, WORK, AND USE SPACE[6]

According to Gallup, Millennials are not positioned for success in the same way as earlier generations. Millennials strive for well-being in the workplace and for financial security. They want to be emotionally and behaviorally engaged in the workplace, be in jobs that offer at least 30 hours of work per week, earn regular paychecks, and live a life of purpose by being active in the community and having meaningful social ties. For many Millennials, a life well-lived means having money to spend on wants, not just needs.

However, Gallup notes that only 29% of Millennials report feeling engaged in work, only half report feeling satisfied with the amount of money they have to spend, and only 40% are "thriving" by any of Gallup's definitions of well-being.

Each generation's ability to live well ultimately affects the strength of the marketplace. If Millennials continue to struggle to find purpose, financial security, and good jobs, those hardships will eventually be reflected in all aspects of their behavior as citizens, employees, and consumers. Understanding what drives Millennials and the ways in which they are both similar to and different from previous generations can help business owners and other leaders create the kind of engagement that leads to the creation of better workplace environments, better products, and better ways of attracting clients.

Statistically Comparing Generations: Where and How Millennials Live

When the Silent Generation was in their 20s and 30s, 67% lived in a metropolitan area, leaving 33% to live in non-metropolitan areas. Similarly, at the same age, 68% of Baby Boomers lived in metropolitan areas. More recently, however, more than 8 in 10 Gen Xers (84%) lived in metropolitan areas at those ages, and today, approximately 9 out of 10 Millennials, or 88%, live in urban settings.

The ways in which Millennials occupy urban spaces is also changing, and more of them are living in multigenerational households. In this instance, "multigenerational households" can be defined as consisting of two adult generations. In 2016, 33% of 25 to 29 year-olds were living in multigenerational households. Pew Research further notes that in 2014, for the ages between 18 and 34, "living with parents surpassed other living arrangements for the first time in more than 130 years."

Millennials and "Third Places"

Taking these statistics into consideration, the Brookings Institute has recognized a trend in urban planning called "third places." "Third places," first created and defined by sociologist Ray Oldenburg, "refers to places where people spend time between home ('first' place) and work ('second' place)." People can relax, find entertainment, build relationships, and exchange ideas in third places.[9]

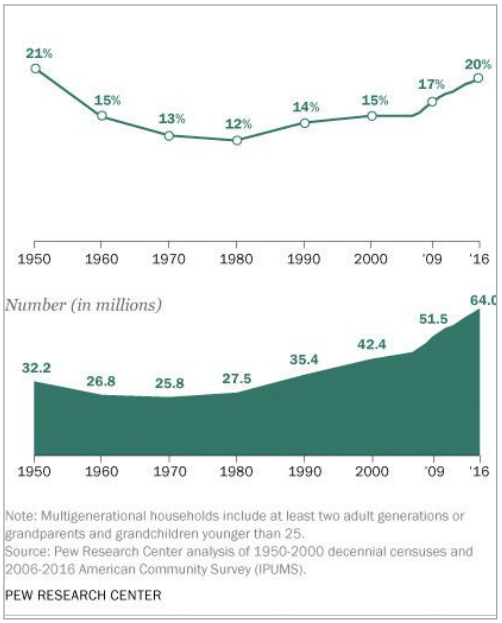
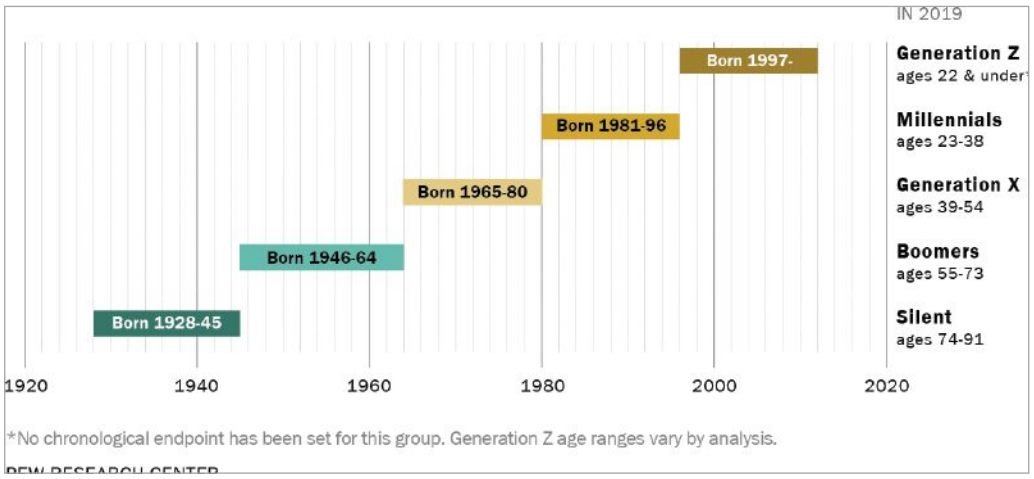


Image courtesy of: http://www.pewresearch.org



CASE STUDY: VILLANOVA ICÔNE[20]

Image courtesy of: http://www.hamonic-masson.com

Construction of 120 housing units + retail
Location: Northwest of Paris, Genevilliers, ZAC Chandon-République, Genevilliers, 92.
Calendar: Under construction.
Client: NEXITY.
Architecture team: Hamonic+Masson & Associés
Surface: 8 000 m2, 7 750 m2 housing + 250 m2 retail.

In 2015, the architecture firm Hamonic+Masson & Associés won a competition to design the Villanova Icône project, an urban apartment building in France, for French property developer Nexity. This award-winning firm was founded in 1997 and is expanding internationally. A leader in the European architecture scene, Hamonic+Masson works with public and private owners to create all types of projects, including housing, public equipment, business real estate, infrastructure, and more.

Their Villanova Icône building is located at the junction of three different urban settings just northwest of Paris in the town of Gennevilliers: the Agnettes sector, the Chandon-République eco-district, and the Calmette sector.

The design team was challenged to create a building with complex morphology. The project has many exterior balconies and terrace spaces, and using BIM software helped them manage the interior and exterior passages in detailed drawings. "The principle of layers allows us to easily change between interior, exterior, and isolated spaces," said Gaëlle Hamonic, founding partner. "[BIM software] facilitates the conception and completion of complex projects. It is efficient and functions well with our architectural style and our concept development."

A landscaped garden at the heart of the building's ground floor blends in with the surroundings and ultimately becomes part of a local park—an important factor in the design, as the building is located within an eco-friendly district. The ground level contains shops, porches, and hallways that add a richness to the pedestrian level, while the apartments are situated in a fanned-out array, giving the 17-story building a distinctive look while adding architectural richness to the façades. The design lends itself to a sense of community, as residents can find third places to relax, socialize, and enjoy the outdoors all within their apartment complex.

The team of engineers, landscape designers, economists, and construction contractors have worked hard to ensure the success of the project. The building is currently under construction and will be finished in early 2020.

Many young Americans have started to use virtual spaces as third places, and brick and mortar establishments are at risk of becoming obsolete. However, Oldenburg notes that brick and mortar third places that people visit regularly can build a sense of community and belonging through conversation and physical interaction, the equivalent of which cannot be achieved online.

Adding to the risk for brick and mortar establishments is zoning that bans commercial establishments in residential areas. Many Americans who live in the suburbs must use cars to get anywhere conveniently and then often head to box stores rather than more intimate independent establishments. Another contributor, according to Brookings, is that some suburbs are experiencing higher levels of poverty than some cities. Brick and mortar third places in both cities and suburbs could help residents establish the connections that lead to social and economic well-being.

Solutions to dwindling physical third places can be to change zoning laws in residential areas and to improve bus routes. Free Wi-Fi in public spaces also attracts people from a variety of generations. Finally, retrofitting public spaces in both suburbs and cities and exploring new architectural options can further lead to revitalization of the physical third place and economic growth.

Cities vs. Suburbs[10]

While statistics show that the majority of Millennials are living in the city, it is not clear whether that trend will continue. Writing for CityLab, Kriston Capps asserts that there are currently two theories regarding where Millennials will ultimately reside. The first theory is that Millennials will remain in urban spaces, taking advantage of the diversions and diversity. The other theory is that Millennials want to live in the suburbs but cannot afford the same lifestyle their parents espoused.

This article continues on http://go.hw.net/AR052019-2. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. According to the course materials, there are approximately how many Millennials?
   a. 23 million
   b. 52 million
   c. 73 million
   d. 86 million

2. When the silent generation was in their 20s and 30s, ___% lived in a metropolitan area.
   a. 57
   b. 67
   c. 25
   d. 45

3. _____ places are spaces between home and work where people can relax, be entertained, build relationships, and exchange ideas.
   a. First
   b. Second
   c. Third
   d. Fourth

4. According to the course materials, which generation currently dominates the housing market?
   a. The Silent Generation
   b. Baby Boomers
   c. Gen Xers
   d. Millennials

5. When asked in a 2015 NAHB survey, homebuilders specified things to do with _____ as four of the top features they would like to include in a new home.
   a. Energy-efficiency
   b. Storage space
   c. Kitchen Equipment
   d. Interior space

6. Which two generations comprise the majority of the AEC industry?
   a. The Silent Generation and Baby Boomers
   b. Baby Boomers and Gen Xers
   c. Baby Boomers and Millennials
   d. Gen Xers and Millennials

7. Which of the following describe features of BIM software?
   a. Users can freely sketch, model, and document designs with precision drafting capabilities and a flexible 3D modeling engine
   b. Information is easy to quantify and analyze
   c. It is possible to automate schedules, calculate costs, and analyze energy efficiency
   d. All of the above

8. According to Cowdy, the ability to convert their work into 3D models early on in the design process is an advantage of what type of software?
   a. BIM
   b. Integrated web-design
   c. User-enhanced technology
   d. None of the above

9. Smart Carpet, an "intelligent street system" that has modular furniture, LED paving, and kinectic energy generation" can be endlessly reconfigured is in which city?
   a. New York
   b. Paris
   c. London
   d. Rome

10. The following characteristics—focus on making changes in the world using technology, loyal to peers rather than employers, socially and environmentally conscious—describe which generation?
    a. The Silent Generation
    b. Baby Boomers
    c. Gen Xers
    d. Millennials

SPONSOR INFORMATION

3D PRINTING AUTOMATES PRECAST CONCRETE FABRICATION PROCESS IN LARGE MIXED-USE DEVELOPMENT

Presented by:
PCI
Precast/Prestressed Concrete Institute

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Demonstrate why prefabrication is an efficient and cost-effective building practice.
2. Examine 3D printing technology and how it can be used in the precast concrete system manufacturing industry to produce prefabricated components.
3. Explain what precast concrete is and how 3D printing is being used to manufacture precast concrete forms.
4. Explore a case study where 3D printing was used to fabricate precast concrete forms that were then used to construct windows for a large mixed-use project in Brooklyn, NY.

CONTINUING EDUCATION

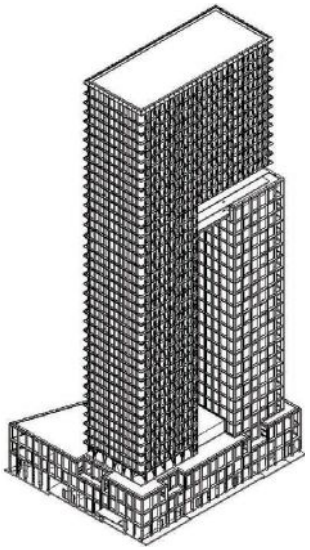
AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-3

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-3 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

A RISE IN PREFABRICATION MEETS SHIFTING INDUSTRY PRIORITIES

Prefabrication is the practice of assembling components of a structure in a factory or other manufacturing site and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located.[1] The design and construction industry did not more fully embrace the prefabrication concept until recently because it had not been well-integrated into their traditional business model, but industry priorities are shifting. Many precast concrete manufacturers are working as design assist firms and are more involved in the project from the planning stage through construction so are able to communicate the benefits of prefabricated components to clients. Also, the ongoing construction labor shortage is driving the construction industry to seek ways to reduce their dependence on traditional onsite labor.

Another significant shift is that the building industry is now embracing digital tools such as computer numerical control (CNC) technology, 3D modeling, and Building Information Modeling (BIM), making prefabrication and communication amongst building professionals easier. Environmental views are also changing regarding construction waste, recycling and re-use of materials, and the product supply chain. Prefabrication is beneficial in each of these regards because building elements are manufactured in factories to very tight tolerances, minimizing waste and simplifying the supply chain. In addition, greater productivity and improved safety measures



The building industry is now embracing digital tools such as computer numerical control (CNC) technology, 3D modeling, and Building Information Modeling (BIM), making prefabrication and communication amongst building professionals easier.

are now high priorities in the industry. Prefabrication increases productivity because factory production is more efficient and makes job sites safer because there are fewer trades people climbing scaffolding and wielding tools, as is the case with onsite construction.

Benefits of Prefabrication

Incorporating prefabricated building components into a design helps project teams meet their budget and provides a higher return on investment (ROI). Fewer trades are needed onsite, resulting in lower labor costs, and buildings can go into service quicker, with far less potential for weather related delay, shifting the cost burden more quickly from the owner to tenants once their leases begin.

Material efficiency is a very important benefit of prefabrication. Component sizes and dimensions are determined in advance and then made or cut to tight specifications. This more efficient use of materials reduces waste both on and off site. This not only further reduces cost, but also contributes to sustainable design, as fewer raw materials are needed in manufacturing.

Prefabrication provides significant time savings. The efficient manufacturing and construction process helps project teams meet aggressive schedules, decreases onsite assembly time, and allows construction processes to be standardized and streamlined because detailed planning is accomplished up front. Prefabrication also aids in the sequencing of trades, as prefabricated components are sorted and loaded onto trucks, minimizing onsite handling, and their delivery is scheduled so the appropriate trades can be onsite only when needed.

Finally, the controlled environment of a factory improves quality and precision of components, increases fabrication productivity, improves the safety of trades, and means weather is not as much a factor, which are all important considerations of the design and construction industry.

3D PRINTING TECHNOLOGY TRANSFORMS THE INDUSTRY

3D printing is an additive manufacturing process that creates a three-dimensional object by incrementally adding material until the object is complete. A subtractive manufacturing process, such as carving or milling, removes parts from raw material to create an object. A 3D printer uses a digital 3D model and transforms it into an object through additive manufacturing.

The printer has three basic parts: a digital file, the printing machine, and the printing material. The digital file divides the object into layers and instructs the printer to create the 3D object by very accurately describing the dimensions of each layer. The finished digital file is upload to a highly calibrated printer, and it begins printing. 3D printers typically have a compartment, box, or vat to work in and employ nozzles and/or lasers that lay down the material and then cures each layer. The printer extrudes the printing material, which forms the printed object. Printing materials can include ABS plastic, nylon, resin, ceramic material, or metals such as steel, gold, or silver, among others.[2]

Precast window wall panels are one example of how the material provides designers with a flexible medium that can be shaped into any form, as the plasticity of concrete lends itself to the manipulation of voids and solids.

GLOSSARY

Prefabrication
The practice of assembling components of a structure in a factory or other manufacturing site, and transporting complete assemblies or sub-assemblies for final assembly and installation at the construction site where the structure is to be located.

Computer numerical control (CNC) technology
A process used in the manufacturing sector that involves the use of computers to control machine tools. Tools that can be controlled in this manner include lathes, mills, routers, and grinders.

Building Information Modeling (BIM)
An intelligent 3D model-based process that gives architecture, engineering, and construction (AEC) professionals the insight and tools to more efficiently plan, design, construct, and manage buildings and infrastructure.

3D Printing
3D printing, or additive manufacturing, is a process of making three-dimensional solid objects from a digital file using additive processes, typically by laying down many thin layers of material in succession until the object is created.

Precast concrete
Precast concrete is concrete cast into specific shapes at a location other than its final in-service position.

Prestressing
A method of reinforcement where the steel strands are pretensioned in the form before the concrete is cast.

Big Area Additive Manufacturing (BAAM) machine
An industrial sized, additive machine that allows 3-D printing to be used for production manufacturing of large-scale products in a matter of hours.

Acrylonitrile butadiene styrene (ABS)
A common thermoplastic polymer typically used for injection molding applications.

Oakridge National Laboratory (ORNL)
Located in Knoxville, TN, ORNL is the largest US Department of Energy science and energy laboratory, conducting basic and applied research to deliver transformative solutions to compelling problems in energy and security.

Design Assist
A project delivery method in which construction material and product suppliers are engaged to collaborate on the project prior to bidding, to inform decision making by the design and construction team during the design phase.

This technology has revolutionized many manufacturing processes, producing components quickly and precisely for industries such as healthcare, aviation, automotive, and the military.[3] 3D printing makes it easier to produce a small, custom quantity and until this point wasn't used to print repeatable, high-volume jobs. Enter the precast concrete industry.

AN INTRODUCTION TO PRECAST CONCRETE

As discussed, offsite building construction or prefabrication has been gaining momentum because it offers a better product and faster installation than onsite construction. Architectural precast insulated wall panels are a popular type of offsite fabricated commercial building construction. Advanced manufacturing is transforming the architectural precast industry by modernizing its manufacturing techniques, and developing materials and processes that can reduce the assembly time of complex molds.[4]

Precast concrete is simply concrete (a mixture of cement, water, aggregate and often admixtures) cast at a location other than its final in-service position. Concrete is placed into a form, or mold, typically made of wood and fiberglass and cured before being stripped from the form, usually the following day. Manufactured concrete components are then transported to the construction site for erection into place. In contrast, standard concrete is poured into site-specific forms and cured onsite.

Quality control differs significantly between plant-manufactured concrete systems and site-constructed systems. The quality of site-cured concrete is sometimes compromised due to the variability of weather conditions versus precast concrete, which is cast and cured under more consistent, more carefully controlled conditions. The prefabricated concrete industry assumes a lot of risk and provides a benefit in terms of cost in those regards.

Precast concrete is reinforced with either conventional reinforcing bars, strands with high-tensile strength, or a combination of both. Prestressing is a method of reinforcement where the steel strands are pulled or pretensioned in the form before the concrete is cast. Once the concrete is cured to a specific strength, the strands are cut (detensioned). As the strands attempt to regain their original untensioned length, they bond to the concrete and apply a compressive force. This compressive force allows precast elements to span greater distances, carry more load, or a combination of both. Prestressing also reduces cracks as the members are in compression. Often it allows precast members to be reduced in size and weight relative to a similar conventional reinforced, cast-in-place concrete member.

"Concrete is one of the world's only truly plastic building materials, and it allows architects to design iconic structures that stand the test of time, with low maintenance over 100-year lifecycles," says Mo Wright, marketing director at Gate Precast, a supplier of precast structural and architectural concrete.[5]

PRECAST COMPONENTS

A variety of components are fabricated from precast concrete, meeting a range of project needs. Listed here are the most common components that precast producers manufacture and that designers incorporate into their projects. Customized pieces, sizes, and shapes are created to meet specific needs.

- Floors and roofs
- Walls
- Window Wall Panels
- Building structural components (beams, columns, etc.)
- Piles
- Transportation components
- Modular components
- Miscellaneous components[6]

The repetitive nature of many fenestration patterns designed for building types such as hospitals, high-rise housing, and office buildings plays to precast concrete's strength in duplicating one pattern many times.

PRECAST WINDOW WALL PANELS

Precast window wall panels are one example of how the material provides designers with a flexible medium that can be shaped into any form, as the plasticity of concrete lends itself to the manipulation of voids and solids. Whether a project is contemporary or traditional, precast concrete is sculpted to fit the style. Window wall panels are often combined with continuous precast wall panels, masonry, or natural stone. Color, shape, and texture of the concrete surface can also be manipulated to achieve the desired aesthetics. For example, precast concrete can be colored, sandblasted, or treated with retarders to provide added surface texture. The aggregates used in the precast concrete can be exposed, providing further variety and interest. Multiple colors in one panel are made possible by combining retarders and sandblasting to expose the aggregate in varying degrees.

Window wall panels can be projected, or recessed to provide texture and a shadow line on the façade. Architectural elements such as bullnoses, reveals, and chamfers can add classical detailing. Also, form liners can be used in the molds to provide texture and variety. Designers may even incorporate shading devices into the window wall panel. The options for architectural expression are limitless.[7]

The repetitive nature of many fenestration patterns designed for building types such as hospitals, high-rise housing, and office buildings plays to precast concrete's strength in duplicating one pattern many times. Repetition of panel design accelerates construction schedules because they are fabricated faster than site-built elements and there is greater control over the rough opening dimensions. The most economical wall unit consists of a panel where the window openings are entirely contained within one precast piece. When precast concrete forms the entire window surround, including the soffit, sill, and jambs, this eliminates potential water infiltration and allows quick installation.[8]

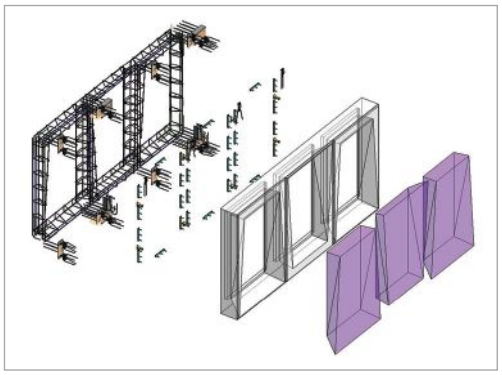
TRADITIONAL WOOD MOLDS

Traditionally, additive manufacturing processes, such as precast concrete construction, use concrete forms/molds constructed out of wood. Concrete is poured into the forms and cured, and then the forms are removed, resulting in a precast concrete element. This process has been used for many years and remains the industry standard, but there are real downsides to using wood as the mold material. Wood molds

take a long time to assemble and can only be used relatively few times. Actual use varies depending on the complexity of the mold and the quality of the desired finish. A very complex component that is only used a couple of times in a building, versus repeated components, increases labor and material waste. The more a mold is used, the less pristine the finish on the precast concrete component, as the wood breaks down and residual concrete remains in the mold. Wood forms are not durable and will start to break down after 15 to 20 castings, which is fine for typical jobs needing only 5 to 10 castings. Larger jobs are the challenge because multiple forms must be built to support many concrete pours.

Other downfalls of wood are that casting tables are sitting idle while molds are constructed, wood pieces have to be nailed, caulked, and resined to ensure joints are watertight and these joints can be visible on the finished product, and round features are more difficult to manufacture. The process is slow, expensive, and the high-skill workforce has shrunk.

A new innovative method using 3D printing to create concrete forms has been employed on a large mixed-use project in Brooklyn and may signal the future of precast concrete.



A precast concrete mold is printed from 3D BIM models programmed into a Big Area Additive Manufacturing (BAAM) machine.

This article continues on http://go.hw.net/AR052019-3. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. _____ is the practice of assembling components of a structure in a factory or other manufacturing site and transporting complete assemblies or sub-assemblies to the construction site where the structure is to be located.
   a) Computer numerical control
   b) Building Information Modeling
   c) 3D printing
   d) Prefabrication

2. Which of the following is a benefit of prefabrication?
   a) Lower labor costs
   b) Material efficiency
   c) Time savings
   d) Improved safety
   e) All of the above

3. _____ is an additive manufacturing process that creates a three-dimensional object by incrementally adding material until the object is complete.
   a) Carving
   b) Milling
   c) 3D printing
   d) Computer numerical control

4. The quality of _____ concrete is sometimes compromised due to the variability of weather conditions versus _____ concrete, which is cast and cured under more consistent, more carefully controlled conditions.
   a) Site-cured, precast
   b) Precast, site-cured
   c) None of the above

5. Traditionally, concrete forms were constructed of _____.
   a) Stone
   b) Wood
   c) Plaster
   d) Plastic

6. Which of the following is a benefit of 3D printed molds?
   a) Durability
   b) Rigidity
   c) Repeatability
   d) Cost
   e) A,B, C only

7. ORNL researched different materials to evaluate their durability for the 3D printing process and ultimately chose which of the following?
   a) Glass-filled ABS
   b) Wood
   c) Polymer
   d) Carbon-reinforced ABS

8. 3D molds were used to produce _____ in 993 architectural precast concrete panels at One South.
   a) Doors
   b) Cornices
   c) Window Wall Panels
   d) Mullions

9. Which of the following is a benefit of the design assist process?
   a) Reduced complexity
   b) Reduced cost
   c) Fewer change orders and scope changes
   d) Reduced timelines
   e) All of the above

10. Each 3D-printed concrete form cost approximately $9,000 and lasted for _____ castings.
    a) 10
    b) 50
    c) 100
    d) 200

SPONSOR INFORMATION

PCI
Precast/Prestressed Concrete Institute

The Precast/Prestressed Concrete Institute develops, maintains and disseminates information to the marketplace to ensure the highest quality and safest design, fabrication, and construction of plant-manufactured precast concrete structures. PCI's members are proud stewards of the built environment, committed to creating beautiful, functional, and resilient building systems.

NFPA 285: A FOCUS ON ASSEMBLIES

Presented by: Kingspan

INTRODUCTION: SAFETY AND THE COMMONALITY OF HIGH-RISE FIRES

The US has some of the most stringent building codes anywhere on the globe; however, building codes outside of the US are lax, and fires in high-rise buildings are becoming common news items. For instance, the Grenfell Tower fire in 2017 in the UK had a catastrophic loss of life and was the worst UK residential fire since World War II.

Another fire that made recent news was Tamweel Towers in Jumeriah Lakes, Dubai. The building was comprised of an ACM exterior with a polyethylene core. PE is extremely flammable, allowing fires to spread and rip up the entire façade of a building. In the Tamweel Towers incident, firefighters could not get ahead of the fire because it was moving so quickly. Firefighters were forced to go into an adjacent building, spraying from the other side to try to contain the fire. It is also worth noting that this same building caught fire on two separate occasions. A number of years later, after it was repaired with the same product, the same incident occurred.

Other residential fire incidents have occurred in Russia at the Grozny City Tower. Grozny City Tower and Tamweel Tower begin to look almost identical. Both are comprised of ACM covered façades with PE cores, which facilitates the spread of fire through the entire building. Both façades look like pieces of tissue paper. The fire eats through the fuel source, which is the PE, and destroys the buildings. It is also important to consider various levels of smoke toxicity and to identify how much smoke, not just flame, is coming up the building.

Part of the problem is that many codes are not being enforced abroad or in the US. Spot-checks are not occurring to see where materials may have been changed. Assemblies that were tested and rated appropriately are not being installed properly: value engineering and substitutions cannot occur in a rated assembly. Even if a product may have similar performance characteristics, if it has not been tested as an assembly, it is not a like-for-like substitution.

LEARNING OBJECTIVES

1. Evaluate the structure of wall assemblies, the building envelope, and how NFPA 285 compliance is achieved to ensure the safety of occupants after the project is complete.
2. Analyze how large scale and small-scale fire testing, clarity of codes, regulations, testing acronyms, and the methodology behind testing enhances the built environment for occupants.
3. Compare and contrast the need for thermal performance that is not sacrificed for fire performance ensuring occupancy comfort and safety throughout the life of the building.
4. Examine real fire case studies where fires have occurred in a building and analyze how those buildings have performed.

CONTINUING EDUCATION

CREDIT: 1 LU/HSW
COURSE NUMBER: AR052019-4

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-4 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

The building envelope has changed significantly over the past fifteen years. The demand for high performance, resilient, healthy, energy-efficient buildings is driving the building sector—both clients and contractors alike. There has been an increasing focus on envelope designs that incorporate increased amounts of combustible material in cladding, insulation, and water-resistive barriers (WRBs).

Fire codes are also continuing to evolve and are becoming more and more stringent. They have become integral with updates to the International Building Code (IBC). Building science has focused on the "envelope" in response to the movement of air, water vapor, and thermal conditions. However, understanding how to deliver high performance, code-compliant buildings can be complex.

Insulated Panels

Architects and owners want beautiful facades, for instance with modern metal cladding or "walls" of glass. However, it is important to understand, from a compliance perspective, how that is delivered. These preferences can be seen in many sectors of modern construction, such as hospitals, multi-story residences, office buildings, and education centers. Using Hudson Yard in New York City as an example, a great juxtaposition can be seen. There are buildings from the 1950s, 60s, and 70s at lower heights made from masonry, brick, and stone. Then, there are modern buildings which look like glass shards jutting into the sky. It is rare to see a new 40-story building built out of brick today.

A typical methodology for new construction is a multicomponent built-up system or a multicomponent built-up façade system. There is also a factory manufactured single component insulated panel system and a pre-engineered façade and rainscreen carrier system. They act as the air and water vapor control barriers.

There are multiple core types for insulated panels: expanded polystyrene (EPS), polyurethane (PUR), polyisocyanurate (PIR), FM approved PIR, and mineral fiber (MF). It is important to note that EPS is typically only used in interior walls and that there are many performance variations between different manufacturers of PIR.

Example of Insulated Panels with Polystryrene Insulated core.

THE RED LIST AND WHY IT MATTERS

By Brent Trenga, LEED AP BD+C, WELL AP

In the current environment of sustainability conscious consumerism, everything from the make-up of products to the building envelope in which they were developed plays into purchasing decisions. While not very well known by general consumers, the Living Building Challenge's Red List is an important set of chemicals included in some products that design teams should avoid.

The Red List is a compilation of the worst materials, from the health and wellbeing standpoint, prevalent in the building industry. U.S. government agencies have designated certain materials on the Red List due to their harmful nature and negative impacts they have on people and the environment.

The International Living Building Institute (ILFI), a sustainable building certification program, has developed the Red List of materials that it advises against being used in building and construction. The list includes the following materials:

- Alkylphenols
- Asbestos
- Bisphenol A (BPA)
- Cadmium
- Chlorinated Polyethylene and Chlorosulfonated Polyethylene
- Chlorobenzenes
- Chlorofluorocarbons (CFCs) and Hydrochlorofluorocarbons (HCFCs)
- Chloroprene (Neoprene)
- Chromium VI
- Formaldehyde (added)
- Halogenated Flame Retardants (HFRs)
- Lead (added)
- Mercury
- Polychlorinated Biphenyls (PCBs)
- Perfluorinated Compounds (PFCs)
- Phthalates
- Polyvinyl Chloride (PVC), Chlorinated Polyvinyl Chloride (CPVC), Polyvinylidene Chloride (PVDC)
- Short Chain Chlorinated Paraffins (SCCPs)
- Volatile Organic Compounds (VOCs) in wet applied products
- Wood treatments containing creosote, arsenic or pentachlorophenol

Why does it matter to project teams?

One of the goals of the Living Building Challenge, the world's most rigorous proven-performance standard for projects, is to eliminate the use of these harmful chemicals and products. While difficult, becoming Red List Free is a significant step toward sustainability and protecting the health of those both in and out of the building. The chemicals on the list are polluting the environment and bio-accumulating up the food chain until they reach toxic concentrations. Some of the chemicals are also human carcinogens.

Based on available market materials at a given time, ILFI does make some exceptions on a case-by-case basis. If teams are granted an exception, they must send a letter to the manufacturer of the Red List material in question to explain that their purchase is not an endorsement and express a preference for the production of sustainable, non-toxic materials. There is also a less than 100ppm clause that allows Red List chemicals to be present in trace amounts. Under most circumstances, however, project teams must seek out alternative products if they want a project to meet Living Building Challenge standards.

In working with clients who are building to the Living Building Challenge requirements, one manufacturer was able to respond by being the first insulated panel manufacturer with polyisocyanurate insulation to eliminate HFRs (halogenated flame retardants). When the technology was reformulated to remove the HFR, the thermal performance was enhanced and the first foam insulation ever to achieve FM 4882 approval for Smoke Sensitive occupancies was delivered. This was the first in many steps in moving toward a Red List Free Declare Label. Becoming Red List Free represents dedication to reducing global warming potential and protecting the future.

When possible, projects should eliminate hazards in chemicals, materials and products by purchasing safer alternatives. Eliminating the threat is a key part in creating healthier buildings, and that is often achieved through substitution. Untested chemicals and materials should not be presumed to be safer. The best way to prevent health issues and increase sustainability is by being proactive and decreasing as many harmful chemicals as possible.

While everyone may not be ready to become Red List Free or take on the Living Building Challenge, eliminating the use of chemicals on the red list is a goal for sustainability. Builders are encouraged to be proactive in their choices of materials and consider the potential impact these materials have on the environment.

Foam Plastic Cores

In terms of beginning to understand code compliance, it is important to understand the materials used as insulation. Foam plastic cores and foam plastic insulation are not the same, and there are two fundamental differences that need to be recognized: whether the material is a thermoplastic or thermoset foam.

Thermoplastic is a solid material and a linear polymer chain structure. When heat is added to that structure, it softens and melts. When a building comprised of this material catches fire, the fire and the material literally drip off of the building. When thermoplastic cools, it returns to a solid state.

Generally, thermoplastic is a highly combustible polymer chain as opposed to thermoset, where the polymers are cross-linked. Thermoset is cured by heat in the manufacturing process, and it cannot be softened or formed. In other words, it cannot be turned back into a liquid in any form or structure. It is technically considered combustible, but it can be highly fire-resistant.

There are a number of different technologies that have evolved from polyurethane (PUR) to polyisocyanurate (PIR), and now there is technology in the market that is hybrid PIR that has even higher resistance to fire and smoke.

GLOSSARY

Flame spread index—describes the surface burning characteristics of building materials; ASTM E84 develops this rating

FM 4882—is a parallel panel test measuring smoke density. It is the approval standard for Class 1 systems for Smoke Sensitive Occupancies, and it is only applicable for next generation insulated panel technology. For this test, two panels are burned against each other. Testers look not necessarily at the flame but at the smoke. Before being able to test for 4882, 4880 and 4881 must be passed. Few companies globally have achieved FM 4882.

FM Global—certifications are recognized internationally by the world's leading testing bodies. FM Global tests systems and products, as well as single performance characteristics, with the goal of providing loss protection. Their tests include fire protection equipment, electrical equipment, building materials, roofing assemblies, hazardous location equipment, fire detection and signaling materials, wall assemblies, and smoke detection materials.

Living Building Challenge—the world's most rigorous proven-performance standard for projects; one of its goals is to eliminate the use of harmful chemicals and products.

Metal composite material (MCM) or aluminum composite panels (ACM or ACP)—aluminum-clad metal and are used in a number of exterior and interior products.

Polyisocyanurate (PIR)—thermoset plastic, typically produced as foam and used as rigid thermal insulation; manufactured from isocyanate and polyol; better fire performance than PUR.

Polyurethane rigid foam (PUR)—rigid closed cell low density insulation; manufactured from isocyanate and polyol.

The Red List—a compilation of the worst materials, from the health and well-being standpoint, prevalent in the building history. Compiled by the International Living Building Institute (ILFI).

Thermoplastic—solid material and a linear polymer chain structure; when heat is added, it softens and melts.

Thermoset—highly combustible polymer chain where polymers are cross-linked; cured by heat in the manufacturing process; cannot be softened or formed.

ALUMINUM COMPOSITE PANELS

ACM, MCM, or aluminum composite panels (ACP) are all aluminum-clad metal and are used in a number of exterior and interior products. While buildings can have aluminum, steel, copper, or high-end finishes, the main focus for specifiers should be on what is combustible: the core.

The core can be made from phenolic resin, non-fire retarded polyethylene (PE), or fire retarded polyethylene (PE). ACM or ACP panels can also have metal cores. For instance, a honeycomb "ribbed" panel is rigid and strong; an aluminum composite panel with a thermoset phenolic resin core has very good fire properties; and an aluminum composite panel with a polyethylene core is standard. These panels typically range anywhere from 3mm to 6 mm thick and consist of two layers of about 0.5mm thick aluminum sandwiching.

Testing Aluminum Composite Panels

When a welder's torch is applied to aluminum composite material with a polyethylene core compared to the same test being conducted on an ACM with a fire-retardant polyethylene core, the flame in the former is significantly greater. The material itself catches fire, spreads, and drips. The polyethylene transforms from a solid to a liquid state as the polymer structure breaks down. The flame then spreads and causes additional damage. In less than a minute with a small flame source, the amount of damage is considerable.

When the same heat source is applied under the same conditions to an ACM with a fire-retardant core, the metal burns off in the same manner; however, the core does not catch fire. When the welding torch is taken away from the ACM with a polyethylene core, it is still on fire. When the torch is taken away from an ACM with a fire-retardant core, the fire burns itself out. While there is smoke, there are no additional flames.

The reaction of the ACM with a polyethylene core in the test closely resembles what occurred in the residential building fires that have made the news across the globe.

KNOWING WHEN NFPA 285 TESTING IS REQUIRED

In general, the IBC requirements for "hazardous materials, fire-resistance-rated construction, interior finish, fire protection systems, means of egress, emergency and stand by power, and temporary structures" directly correlate to the requirements of the International Fire Code (IFC).[1]

In 2012, the IBC Combustible Component Requirements was redeveloped and pertains to air and water barriers, combustible claddings, and foam plastic insulation. Although the IBC was not willing to exempt WRBs fully from NFPA 285, the following exceptions were included in the 2015 IBC:

- If the WRB is the only combustible wall component and the wall has a noncombustible covering.
- Windows and doors, as well as flashing around windows and doors are excluded.
- If the WRB is the only combustible wall component and the following test parameters are met.
  - ASTM E84 Product Test:
    - Flame spread index of 25 or less
    - Smoke-developed index of 450
  - ASTM E1354 (Cone Calorimeter Product Test)
    - Incident radiant heat flux of 50 kW/m^2
    - Effective heat of combustion of less than 18 MJ/kg
    - Peak heat release rate less than 150 kW/m^2
    - Total heat release of less than 20 MJ/m^2

If these requirements can be met in just the WRB, then the assembly does not need to be tested for NFPA 285.

For combustible materials to be used, the assembly must pass NFPA 285. This pertains to Type I through V construction:

- **Type I, II**—Non-combustible materials for structural framework, bearing walls, floor, and roof construction Type I is more stringent than Type II (longer fire resistive ratings)
- **Type III**—Exterior walls must be non-combustible, but interior can be any material allowed by code.
- **Type IV**—Exterior walls must be non-combustible, interior walls are solid or laminated wood without concealed spaces (heavy timber construction).
- **Type V**—Combustible construction, limited to one to two stories.

The common denominator across all of these types of construction is that if there is any combustible material in the assembly, the assembly must pass NFPA 285.

Walls requiring a fire resistance (hourly) rating—for instance if a building is on a property line or has an adjacent building next to it—must complete either ASTM E119, which determines fire resistance ratings for various wall assemblies (1–4 hours) or UL263, which also determines fire resistance ratings for various wall assemblies (1–4 hours). These standards are equivalent and based on the same test.

In addition to NFPA 285 test requirements for combustible exterior claddings, the IBC has several other conditions that must be met by MCM:

- ASTM E84 "Standard Test Method for Surface Burning Characteristics of Building Materials"—flame spread index less than or equal to 25
- ASTM E84—Smoke developed index less than or equal to 450
- Separated from interior by thermal barrier

Again, these are specific to MCM panels.

This article continues on http://go.hw.net/AR052019-4. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. At Grenfell Tower in London, once the cladding ignited, fire spread across four facades and into other apartments in a matter of _____ hours.
   a. 3
   b. 4
   c. 5
   d. 6

2. Which of the following are core types for insulation?
   a. EPS
   b. PUR
   c. PIR
   d. All of the above

3. When a welder's torch is applied, the flame in which of the following is significantly greater?
   a. Aluminum composite material with a fire-retardant core
   b. Aluminum composite material with a polyethylene core
   c. Neither
   d. They are both equal

4. Which of the following tests determines flame spread index?
   a. ASTM E1354
   b. ASTM E119
   c. ASTM E84
   d. UL263

5. Which of the following combustible claddings might require NFPA 285 testing?
   a. Metal composite material (MCM)
   b. High-pressure laminate (HPL)
   c. Fiber-reinforced polymer (FRP)
   d. All of the above

6. Which of the following are components of section 1.3.1 of NFPA 285?
   a. The ability of the wall assembly to resist flame propagation over exterior face of the wall assembly. The ability of the wall assembly to resist vertical flame propagation within the combustible components from one story to the next.
   b. The ability of the wall assembly to resist vertical flame propagation over the interior surface of the wall assembly from one story to the next. The ability of the wall assembly to resist lateral flame propagation from the compartment of the fire origin to the adjacent compartments or spaces.
   c. Both a and b
   d. None of the above

7. This test specifically examines exterior walls.
   a. FM 4880
   b. FM 4881
   c. FM 4882
   d. FM 4471

8. What was the insulation composed of at the Audi dealership in the case study?
   a. MCM
   b. FM-approved PIR
   c. PUR
   d. EPS

9. Some PIR cores have which of the following identifiers in place:
   a. Date and time material was manufactured
   b. The manufacturer
   c. Certification and ratings
   d. All of the above

10. FM 4880-83 focus on_____.
    a. Wall assemblies
    b. Single materials
    c. Floors
    d. Roofs

SPONSOR INFORMATION

Kingspan

Kingspan is a global leader in high performance insulation and building envelope solutions, designed to reduce the carbon footprint of the built environment. Kingspan has five insulated metal panel plants in North America and is one of the largest IMP manufacturers in the world.

QuadCore™ protects against fire, smoke and ordinary design.

Kingspan insulated panels featuring QuadCore™ Technology are designed to make you look good. Inside and out. For starters, the innovative cell formulation inside each panel provides superior fire resistance and unmatched health and wellness certification. Back that up with unrivaled thermal performance, a 30-year thermal warranty and enviable design flexibility, and you'll quickly see how the QuadCore™ portfolio can help bring your design vision to life. Get the full details at **kingspanpanels.com.**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Presented by:

WOLF SUB-ZERO COVE

DESIGNING FOR A LIFETIME

HOW TO SPECIFY TIMELESS AND TRENDY PRODUCTS

LEARNING OBJECTIVES

Upon completion of this course, the student will be able to:

1. Explore modern trends driving design choices for building professionals managing kitchen design projects.
2. Identify technological innovations in kitchen appliances, fixtures, and materials.
3. Explain the importance of kitchen space planning and the use of zoning when creating kitchen design plans.
4. Analyze the impact of technology and connectivity in the kitchen planning and design project phase.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-5

IDCEC CREDIT: 0.1 CEU
IDCEC COURSE NUMBER: CEU-108957

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-5 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

INTRODUCTION

Historically concealed by designers, kitchens were dark, dirty, and poorly ventilated. However, after World War I, gas and electricity became widely available in homes, replacing the use of fireplaces in kitchens. Concurrently, the industrial age made it possible for items to be mass produced and widely available. A recent exhibition at the Museum of Modern Art showcased Viennese architect Margarete Schütte-Lihotzky and her innovative revision of the kitchen in the late 1920s. The kitchen featured a gas stove, built-in storage bins, oak flour containers, and a fold-down ironing board. Her innovations were based around ideas of efficiency and functionality that ultimately freed up time for homemakers and elevated the space of the kitchen.[6]

Today, as Chad Wohlrab, Director of Product Design, notes, "The kitchen has become the hub of the home where people gather with both their families and guests. There is a continued trend of the kitchen being the center of activity in the home."

Kitchens have become increasingly important for functions beyond cooking and eating, and so too have the roles of style and design. Today, the residential kitchen and bath industry is a $147 billion industry comprised of roughly 14,000 companies and tens of thousands of professionals.[7] As kitchen innovations continued to increase throughout the twentieth century, organizations began to form; offering resources to design and construction professionals that help keep pace with the style preferences of the general public and the latest offerings of innovative manufacturers.

IDENTIFYING TRENDS: THE 2018 NKBA DESIGN TRENDS STUDY AND KITCHEN INNOVATION

The National Kitchen + Bath Association (NKBA), initially called the American Institute of Kitchen Dealers (AIKD), was formed in Philadelphia in 1963 by a small group of kitchen dealers with the goal of achieving "Education, Standards and Advertising and Public Relations." In 2014, the NKBA began holding shows in conjunction with the International Builders' Show (IBS) and sponsored by the National Association of Home Builders (NAHB). The new Design & Construction Week shows bring an estimated 80,000 design and construction professionals together over the course of a week.

The NKBA also offers resources for continued learning, including guidelines on codes and

standards. It conducts a yearly survey detailing dominant design preferences across the United States and Canada, including materials, finishes, colors, appliances, and lighting fixtures most in demand. It also discusses the ways in which technology is being incorporated into kitchen and bathroom designs. Importantly, it further identifies emerging design characteristics such as the styles, materials, finishes, colors, appliances, and lighting fixtures that are "not yet dominant preferences but are growing in popularity."[8] These emerging characteristics are expected to be the next trends in kitchen and bath design.

The 2018 NKBA Design Trends Study surveyed 822 professionals who specify, build, or sell kitchen and bath products, including designers, remodelers, architects, dealers, and manufacturers. The summation of the study is that "clean, minimalist, and modern with a touch of luxury" is in demand for newly built or remodeled kitchens.

Current Trends

It is common knowledge that remodeled kitchens have the ability to increase the resale value of a home. In 2018, minor mid-range kitchen remodels costing $21,198 on average were able to recoup 81.1% of their value upon resale.[9] So far, in 2019, a major mid-range kitchen remodel, costing an average of $66,196, resales at a value of $41,133, recouping 62.1% of costs. For 2019, major upscale remodels are performing better than they did in 2018. Currently, an expenditure of $131,510 resales at $78,524 for a 59.7% cost recoup.

However, despite the ability of a kitchen remodel to increase the resale value of a home, many homeowners are choosing to remodel simply because their kitchens are outdated. The NKBA found that in 2017, 64% of kitchen remodels were because homeowners wanted an updated kitchen. Only 2% of survey respondents said they wanted to remodel to increase the value of their home. These numbers indicate that the style preferences of homeowners are becoming increasingly important in kitchen remodels.

Cabinets

Some of the style trends that the 2018 NKBA noted involved a detailed look at cabinets. For any style of kitchen, 86% of participants claimed that paint for cabinet facing was trendy, wood ranked second at 74%, and glass ranked third at 44%. Frameless cabinets were slightly

more popular than framed, and homeowners preferred overlay door types over inset.

Cabinetry has also inspired innovation in the appliance industry. The seamless integration of cabinets into kitchen design has inspired the ways in which appliances are customized to blend into any kitchen design. Cabinetry has further provided the impetus for new kitchen layout theories, which will later be discussed in more detail.

Countertops and Floors

In terms of countertops, quartz was the unquestionable choice, as 94% noted its popularity. Granite and marble ranked a distant second and third. Ceramic backsplashes (85%) were also trendy, followed by glass, natural stone tile, and quartz. Respondents noted consumer preference for hardwood kitchen floors (78%), followed by ceramic and porcelain tile and engineered wood.

Sinks, Wall Colors, and Lighting

Undermount (92%), single-bowl (81%), and farmhouse (81%) stainless steel sinks were chosen by participants as trendy, who further noted that single handle and pull-down spray are the most popular faucets. Stainless steel finishes were popular (79%), with brushed nickel coming in a close second (76%).

In terms of color, white and gray, at 90% and 89% remain popular color schemes, followed by blue (52%), black (41%), and beige/bone (40%). Functional lighting, such as undercabinet lighting (93%) and recessed lights (89%), were the most popular, as well as decorative pendant lights (89%).

Technology

Technology is becoming increasingly common across all areas of life, and the NKBA study notes that 62% of homeowners already have flat screens installed in their kitchens. Flush-mounted lighting controls are being considered by 57% of homeowners, as are keypads to

GLOSSARY

Contemporary—"encompasses a range of styles developed in the latter half of the 20th century. Pieces feature softened and rounded lines as opposed to the stark lines seen in modern design. Interiors contain neutral elements and bold color, and they focus on the basics of line, shape, and form."[1]

Convection steam oven—movement of hot air ensures consistent heating and browning; steam adds moisture; vitamins are retained; eliminates the need for additional basting, oil, etc.

Farmhouse—"contains the sleek lines of contemporary design with the cozy farmhouse aesthetic to create a uniquely fresh take on the country living inspired style. Modern farmhouse style is known for its warmth and simplicity, characterized by natural textures and materials like wood or galvanized steel."[2]

Kitchen Triangle—developed by the University of Illinois School of Architecture; imaginary straight line drawn from the sink to the cooktop to the refrigerator and back to the sink.

Modern—"focuses on minimalism, neutral colors, clean design lines, and environmentally friendly materials."[3]

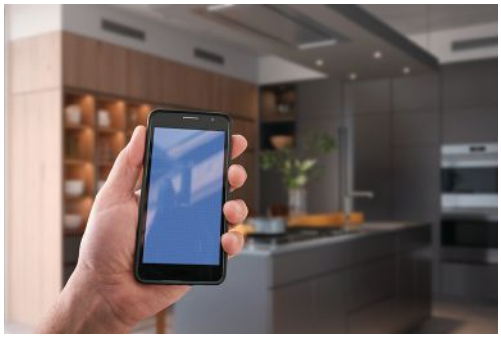
Near Field Communication—allows users to place two gadgets together so that they can communicate.

Sous vide—"relating to or denoting a method of cooking food slowly in a vacuum-sealed pouch at a low temperature so as to retain most of the juice and aroma."[4]

Transitional—"a marriage of traditional and contemporary furniture, finishes, materials, and fabrics equating to a classic, timeless design. Furniture lines are simple yet sophisticated, featuring either straight lines or rounded profiles."[5]

Wireless Surfaces—wireless charging technology is embedded into a surface, such as a countertop.

Zone Design—a spin-off of the kitchen triangle; kitchen can be divided into zones for convenience of the homeowner; examples include prepping, cooking, cleaning, homework, and entertainment zones.



control lighting (50%), motion-sensor task lighting (49%), and voice-enabled automation devices (47%). However, not many people are integrating technology into the kitchen yet, which will be discussed in greater detail shortly.

Appliances: Refrigeration

Despite being slow to install certain technology in the kitchen, homeowners are embracing the latest refrigeration advances. Refrigerator/freezer columns are the trendiest unit (55%), and French-door refrigerators are the trendiest style (85%).

Currently, refrigeration can be designed to either stand out or blend in, depending on the homeowner's preference. Rebecca Seiler, Product Marketing Manager of Innovation, emphasizes that there is a current, "demand in customization and personalization. People want their kitchen and home to reflect their unique style and needs. Many of our products are panel ready so they can easily accommodate an almost endless list of kitchen designs from traditional to transitional to contemporary. Consumers typically desire clean lines, straightforward and easy to use interfaces, and more discrete appliances that do not distract from their kitchen design."

Built-in refrigeration can come with the popular stainless-steel look or be finished in customized panels. Integrated units have the ability to disappear into the décor, with neither hinge nor grille in sight, making refrigeration indistinguishable from other cabinets and drawers around it. Undercounter refrigeration, for instance in the kitchen island, pantry, breakfast room, or exercise room can provide compact, convenient storage both indoors or out. Integrated drawers allow for cold storage for any room in the house and can seamlessly become part of the flow of a kitchen and home. This level of customization allows homeowners to maintain their style preferences and achieve the same amount of personalization in the kitchen as in other rooms in the house.

Appliances: Wine Refrigerators

The NKBA also notes the increasing popularity of wine refrigerators. Better storage for wine ultimately leads to better drinkability and allows it to last for years. Quality wine storage

units can act against heat, humidity, light, and vibrations. One manufacturer also offers integrated wine storage with refrigerator and freezer drawers so that ice, snacks, drinks, and garnishes are readily accessible.

Appliances: Cooktops and Ovens

For cooktops, gas is unquestionably the most popular (85%), followed by induction (67%). Electric models are no longer popular, and only 28% of respondents stated that homeowners preferred them. Microwaves (71%) were more popular than warming drawers (41%), and convection ovens were reported as trendy by 80% of participants, followed by gas ranges at 75%.

Some manufacturers offer dual-stacked gas burners or induction zones that provide precise heat control. Dual fuel ranges offer

Chad Wohlrab, Director of Product Design, and Rebecca Seiler, Product Marketing Manager of Innovation, discuss the ways consumers view technology in the kitchen:

WOHLRAB: I believe we are still in the early stages of connectivity in the kitchen, especially with appliances. The typical kitchen appliances—refrigerator, range, microwave, etc.—aren't ones that consumers can easily see the benefits of a connected device, at least not as easily as things such as phones, televisions, or security cameras. As the manufacturers are able to develop connected features that provide true convenience and value, and are able to educate the consumers on these features, I foresee the adoption rate increasing.

SEILER: We are definitely seeing more activity in the smart living space in general and adoption continues to grow. I don't believe we're at full adoption of these types of technologies quite yet, and the premium kitchen appliance space seems to be in the earlier stages of adoption. There has been some initial exploration, but it doesn't seem as though this space is fully leveraged, and still has significant opportunity to deliver value and convenience to the consumer. From what we've seen, the next generation of kitchen appliance purchasers will place a larger emphasis on smart convenience and will have greater expectations of how their appliances simplify and connect their lives. If there is a clear benefit to the consumer in the form of convenience, customization, and/or simplification, we believe consumers will be willing to pay for connected/smart kitchen appliances.

even cooking, and electric dual convection ovens with fans and heating elements provide consistent heat across all racks. Induction ranges offer speed and power, boiling water faster than gas; temperature control is near-instantaneous and also has the ability to provide ultra-low, steady simmers and melts. This level of efficiency creates consistency whether baking, roasting, broiling, or using the cooktop.

For even greater consistency, there are convection steam ovens. Convection steam ovens are an emerging technology that allows users to combine steam and convection cooking. The oven's technology also senses the size and shape of the food and automatically adjusts all the details of cooking. Importantly, it not only retains flavor and moisture and allows for consistent temperature, it also helps retain more nutrients.

Convection steam ovens also allow users to cook using a method called "sous vide." Translated from the French, "sous vide" literally means "under pressure." For example, if choosing to cook a steak, vacuum-packed meat can be steamed in a convection steam oven for the desired amount of time. When it is removed, each part of the steak is the same temperature. It can then be taken out of its packaging and pan-seared. After searing, the steak is cooked evenly throughout. Overall, convection steam ovens enable chefs and home cooks alike to maintain greater consistency in temperature than regular ovens.

Appliances: Dishwashers

Dishwashers were also a component of the NKBA study, and 85% of respondents stated that homeowners preferred built-in door styles; only 22% stated that homeowners installed more than one dishwasher in a kitchen.

This article continues on http://go.hw.net/AR052019-5. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Kitchen design started to become popular after _____.
   a. The American Civil War
   b. World War I
   c. World War II
   d. The Korean War

2. Today, the residential kitchen and bath industry is a _____ dollar industry.
   a. 147 million
   c. 147 billion
   d. 400 billion

3. The majority of NKBA survey respondents claimed they wanted to remodel their kitchens because _____.
   a. Their kitchens are outdated
   b. They want to increase the resale value of their home
   c. They prefer different color schemes
   d. They want to incorporate more technology

4. The favorite countertop choice of respondents was _____.
   a. Marble
   b. Granite
   c. Vinyl
   d. Quartz

5. Which kind of ovens offer the greatest consistency throughout the cooking process?
   a. Convection steam
   b. Gas
   c. Electric
   d. Induction

6. According to the course, _____ is currently the most popular kitchen style.
   a. Traditional
   b. Contemporary
   c. Modern
   d. Farmhouse

7. According to the course, what is/are the goal/s of the kitchen triangle?
   a. Standardize home construction
   b. Increase the efficiency of kitchens
   c. Have a logical number of steps between each workstation
   d. Mediate the flow of household traffic
   e. All of the above

8. According to the course, which zone of the kitchen do people spend the majority of their time?
   a. Cooking zone
   b. Prepping zone
   c. Cleaning zone
   d. Baking zone

9. What kind of technology is being increasingly used by home cooks?
   a. Web-enabled ice-makers
   b. Web-enabled microwaves
   c. Mobile devices

10. When are the majority of homeowners willing to adopt new technology in the kitchen?
    a. When technology is shown to increase efficiency
    b. When technology is shown to improve quality of life
    c. When technology has been proven trustworthy and reliable
    d. All of the above

SPONSOR INFORMATION

UNDERSTANDING WOOD

HOW NEXT-GENERATION DESIGNERS AND ARTISTS CAN IMPACT THE GLOBAL FOREST ECOSYSTEM

Presented by:
Wilsonart®
ENGINEERED SURFACES

Image courtesy of Chris Hintz of iSee Communications

LEARNING OBJECTIVES

1. Identify the importance of corporate social responsibility and emerging best practices to educate the next generation of architects, designers, and visual artists.
2. Understand the role forests play in the balance of a healthy eco-system and how that relates to specifying durable, eco-friendly products for the built environment.
3. Explore a collaborative project between an engineered surfaces company, Interlochen Arts Academy, and visiting artists to return a pine plantation forest to its native state while studying ecology and creating art.
4. Examine how using alternative design materials can replace endangered wood species while reinforcing on-trend spaces.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/HSW
IDCEC CREDIT: 0.1 CEU/HSW

AIA COURSE NUMBER: AR0520196
IDCEC COURSE NUMBER: CEU-108828

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EDUCATING THE NEXT GENERATION OF ARCHITECTS AND ARTISTS

Social responsibility should be at the forefront of every designer's practice, as their designs impact raw material use, land development, and the health, safety, and welfare of building occupants. It's vitally important to educate the next generation of architects, designers, and visual artists about corporate social responsibility and emerging best practices in their fields. This course will discuss one natural resource that is facing a significant threat from exploitation and development: the global forest ecosystem. We will discuss how building product manufacturers can offer material alternatives that do not further dwindle the world's endangered wood species. We will also dive deep into a collaborative project between an engineered surfaces company, Interlochen Arts Academy, and visiting artists to return a pine plantation forest to its native state while studying ecology, creating art, and educating a future generation of artists.

CORPORATE SOCIAL RESPONSIBILITY (CSR)

There has been a distinct shift from the "every man for himself" mentality to a world where mindful consumers are starting to question where and how products are produced and their own responsibility in enabling socially unjust or environmentally destructive organizations. Because of this increased consumer interest, companies are starting to change their practices to reflect social, cultural, and environmental ethics. Within a business, corporate social responsibility (CSR) is an ethical framework upon which decisions are made. CSR, also called corporate citizenship, aims to

create a balance between economic gain and the general welfare of people and the environment.[1]

The International Organization for Standardization (ISO) notes, "In the wake of increasing globalization, we have become increasingly conscious not only of what we buy, but also how the goods and services we buy have been produced. Environmentally harmful production, child labor, dangerous working environments, and other inhumane conditions are examples of issues now brought into the open. All companies and organizations aiming at long-term profitability and credibility are starting to realize that they must act in accordance with norms of right and wrong."[2]

There are four categories of social responsibility:

- Environmental efforts
- Philanthropy
- Ethical labor practices
- Volunteering

SOCIALLY RESPONSIBLE ARCHITECTURE

Architectural social responsibility means understanding the needs of the community and the surrounding environment. When considering the environmental pillar of corporate social responsibility, the architecture and design industry in particular has a huge ability to impact the use of earth's limited resources. Rising populations, rapid development, global warming, and exploitation of resources are all impacting the architecture community. As the global need for buildings increases, so does the use of building materials and energy to light, cool, and heat those buildings. Every single material specified for the construction of a building impacts the environment either positively or negatively. Designers have the responsibility and power to seek out suppliers with ethical and sustainable manufacturing processes. Refusing to support companies that are unethical or do not incorporate green practices sends a strong message that they must change.

Sustainable architecture and design can significantly reduce the environmental impact on raw materials used for building, and reconnect people with their natural world rather than competing against it.

Architecture should complement natural surroundings in function and appearance, and traditional building techniques that have low impact on the environment should be combined with modern technologies and materials.

HOW FORESTS AFFECT THE BALANCE OF OUR ECOSYSTEM

One significant part of the world's ecosystem is our forests. There are many definitions of a forest and many different types of forests, but in her white paper, *Design for Global Forestry—A New Paradigm for Creative Material Specification*, Grace Jeffers, design historian and materials expert, uses the following definition: "A forest is an ecosystem or assemblage of ecosystems dominated by trees and other woody vegetation. The living parts of a forest include trees, shrubs, vines, grasses, and other herbaceous (non-woody) plants, mosses, algae, fungi, insects, mammals, birds, reptiles, amphibians, and microorganisms living on the plants and animals and in the soil. These interact with one another and with the non-living part of the environment, including the soil, water, and minerals, to make up what we know as a forest." (Styles et al. 2017)

A common misconception is that trees are a renewable resource because they can be replanted, but looking more closely we realize that while trees are renewable, the entire ecosystem of a forest is not renewable. Image courtesy of Chris Hintz of iSee Communications

GLOSSARY

Corporate Social Responsibility
An ethical framework upon which decisions are made within a business to create a balance between economic gain and the general welfare of people and the environment.

Ecosystem
A biological community of interacting organisms and their physical environment.[11]

Old Growth Forest
Virgin forests that have been untouched by human activity.

Plantation Forest
A forest where trees are grown like other agricultural crops.

Deforestation
The clearing or thinning of forests by humans, including removal of the trees for wood products and for croplands and grazing lands.[12]

Forest Stewardship Council (FSC)
An independent, non-governmental, not for profit organization established to promote the responsible management of the world's forests.[13]

Food and Agricultural Organization of the United Nations (FAO)
A specialized agency of the United Nations that leads international efforts to defeat hunger with the goal to achieve food security for all and make sure that people have regular access to enough high-quality food to lead active, healthy lives.[14]

Lacey Act
Protects against the trade of illegally logged timber, which includes both raw lumber and finished products made of wood.

Coop
A European term that suggests a thinning process that mimics what would happen should a large tree fall in the forest.

High Pressure Decorative Laminate (HPDL)
A paper-based product created by bonding melamine-impregnated decorative papers to layers of resin-treated kraft paper under high heat and pressure; commonly used as the decorative surface for residential and commercial countertops and cabinets, work surfaces, laboratory surfaces, backsplashes, partitions, retail fixtures, panel applications, furniture, built-ins, signage/displays, decorative wainscoting, walls, and floors.

The Forest Stewardship Council (FSC) was established in 1993 as a coalition effort between the World Wide Fund for Nature (WWF) and a number of environmental NGOs, timber producers, indigenous groups, and community forestry groups. According to the FSC, forest management needs to be environmentally, socially, and economically sustainable, as well as be in accordance with national and international forestry laws.[3] Many forests worldwide are protected through Forest Stewardship Council certification, but nonetheless trees continue to be harvested from protected forests, which further damages our ecosystem.

In fact, a common misconception is that trees are a renewable resource because they can be replanted, but looking more closely we realize that while trees are renewable, the entire ecosystem of a forest is not renewable. Forests are unique habitats, home to critically endangered or threatened species, including the vibrant, diverse tree species themselves.

According to the Food and Agricultural Organization of the United Nations' (FAO) *2018 The State of the World's Forests Report*, "Forests and trees make vital contributions to both people and the planet, bolstering livelihoods, providing clean air and water, conserving biodiversity, and responding to climate change. Forests act as a source of food, medicine, and fuel for more than a billion people. In addition to helping to respond to climate change and protect soils and water, forests hold more than three-quarters of the world's terrestrial biodiversity, provide many products and services that contribute to socio-economic development, and are particularly important for hundreds of millions of people in rural areas, including many of the world's poorest."[4]

There are many different types of forests worldwide, from old-growth or virgin forests that have been untouched by human activity, to secondary forests that have been logged and left to return to their natural state on their own. A third type of forest, which we will discuss in this course, is referred to as a plantation forest because trees are grown like other agricultural crops.[5] The forest is clear-cut and then replanted to prevent erosion, but with the same or similar tree species. A plantation forest is considered a monoculture, which devastates the ecosystem in the forest, eventually collapsing on itself never to return. The Forest Stewardship Council's position on plantation forests is that they support them, as they are a viable alternative to true deforestation, but they must be properly managed and seek the same FSC certification to ensure their health.[6]

The Lacey Act

In 1900, Theodore Roosevelt introduced the Lacey Act to protect against illegal hunting of animal species for commercial purposes. In 2008, the Lacey Act was broadened to protect plant species and is the first ban on illegally sourced wood products in the world. The Lacey Act protects against the trade of illegally logged timber, which includes both raw lumber and finished products made of wood. The key to understanding and complying with the Lacey Act lies in understanding your supply chain and maintaining a robust document trail. Not only are importers and exporters required to prove the origin of a wood and that it was not illegally logged, but everyone in the supply chain is held responsible.[7]

The Lacey Act makes using responsibly harvested wood not only an ethical choice but a legal responsibility.

ARTIST SPOTLIGHT: LEO GOTTFRIED, ARCHITECTURE STUDENT

Encouraging Personal Vision within a Collaborative Project

Leo Gottfried used some of the culled trees for his thesis show; he built a piece that recreates the sense of sitting under the canopy of a large tree with a circular bench at the base of the tree stump. Image courtesy of Academy Staff Photographer

At 10,000 feet Riley Woods is simply a forest but looking closer, collaborators created an installation that promoted restoration of the forest while simultaneously making space for each student's artistic ambitions. Leo Gottfried was one of these students, who specialized in sculpture while at Interlochen and is now attending the Cooper Union School of Architecture. We spoke about how the Riley Woods project influenced his sculpture and future career as an architect. "I began to think about how scientific knowledge influences my personal vision and how my work might impact the audience's perceptions of our natural environment." He also learned how to work together with a diverse group of extremely talented students spread across all of the art departments at Interlochen. "We had to negotiate how to value and incorporate these unique and varied skill sets in service of the group project."

Gottfried worked collaboratively to create social spaces within the installation that included multiple benches and sitting areas, but the impact the project had on his own work was just as important. "I was fortunate to be able to reuse some of the trees that we had culled for my thesis show. The show focused on what it is that makes one feel at home and my own extensive experience of time spent in the woods. For example, I built a piece that recreates the sense of sitting under the canopy of a large tree. I strung together an umbrella of sticks that hung over a large tree stump. At the base of the tree stump was a circular bench."

Riley Woods continues to influence Leo's studies as an architecture student. "It showed me how much thought and planning a project takes, which relates very directly to architecture. I seem to always find myself in the woodshop when it's time to build models. I am always thinking about the effect art can have on our ecosystem."

Leo loves the idea of different types of people working together and believes more can be achieved when everyone's actions and opinions are encouraged. An individual's own vision within a large project should be open to change because working together often produces outcomes normally beyond the individual's comfort zone. "I think courses like these, guided by the student's vision, reinforce individual self-confidence. A class like this can move forward by thinking about what other universal issues could be addressed and how art can have an influence on these issues."

A&D INDUSTRY CONTRIBUTIONS TO FOREST DECIMATION

There are very few old-growth forests left in the world, and many tree species (and the animals living within them) are in danger of becoming extinct, primarily due to human activity such as loss of habitat due to over-harvesting.[8] The design and construction industry is a significant contributor to this decimation. Wood has been used in construction for thousands of years and is prized for its beautiful grain, rich color, natural look, ability to be manipulated into myriad shapes, as well as its strength relative to its weight, and ready availability. Wood has a multitude of uses throughout a building, including structural framing, siding, trim and molding, flooring, decking, interior finishes, high quality furnishings, and case goods.

Specifying certain species of wood causes global extinction of plants and animals, poor air quality, climate change, and human rights violations. Every time architects intentionally or

unintentionally specify illegally logged wood they are contributing to the further destruction of endangered or threatened forests. Some threatened exotic wood species commonly seen in furnishings and interiors are ebony, teak, rosewood, zebrawood, umber makore, Indonesian redwood, mahogany, koa, and cocobolo. These exotic woods are sought after for their beautiful and exotic grain and coloration, and exceptional durability including water, rot, and insect resistance.

National Survey of Architects and Designers[9]

Architects and designers specify wood to bring warmth and beauty to their work. They tend to care passionately about sustainability, and using responsibly sourced wood is already a priority, but there is a lack of understanding in the industry about which forests are endangered or threatened. An engineered surfaces company conducted a national survey of architects and designers and learned that most respondents have a limited awareness of endangered wood and need more information about the materials they specify, particularly when it comes to natural resources.

This article continues on http://go.hw.net/AR0520196. Go online to read the rest of the article and complete the corresponding quiz for credit.

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QUIZ

1. _____ means understanding the needs of the community and the surrounding environment.
   a. Social awareness
   b. Corporate social responsibility
   c. Architectural social responsibility

2. A common misconception is that:
   a. Trees are a renewable resource because they can be replanted
   b. Forests are a renewable resource
   c. Forest management is not necessary to forest survival
   d. All of the above

3. According to the _____, forest management needs to be environmentally, socially, and economically sustainable, as well as be in accordance with national and international forestry laws.
   a. Food and Agricultural Organization of the United Nations
   b. International Standards Organization
   c. Lacey Act
   d. Forest Stewardship Council

4. Which type of forest is clear-cut and then replanted to prevent erosion, but with the same or similar tree species?
   a. Old-growth forest
   b. Secondary forest
   c. Plantation forest

5. Challenges of specifying certain species of wood include:
   a. Global extinction of plants and animals
   b. Poor air quality
   c. Climate change
   d. Human rights violations
   e. All of the above

6. According to a national survey of architects and designers, _____% of respondents are prioritizing using responsibly sourced wood, yet _____% couldn't recall a single endangered or threatened wood.
   a. 10, 50
   b. 70, 24
   c. 24, 70
   d. 50, 10

7. To save our rainforests we must reduce our tropical wood imports by at least _____ percent, with the remaining _____ percent sourced from independently certified, well-managed forests that are third-party accredited by the Forest Stewardship Council and companies that are not logging from old-growth forests.
   a. 75, 25
   b. 80, 20
   c. 85, 15
   d. 90, 10

8. What was the goal of the Riley Woods collaboration between Interlochen, visiting artists, and an engineered laminate company?
   a. Talk to the next generation of artists and students about the role forests and materials play in art and nature
   b. Build artists' respect and understanding of material origin
   c. Teach responsible use of materials in their art
   d. All of the above

9. What term describes a thinning process that mimics what would happen should a large tree fall in the forest?
   a. Sky opening
   b. Coop
   c. Culling
   d. Harvest

10. Which exotic wood has a large-scale heartwood grain with a rich deep brown color, black graining, and pale sap lines found throughout?
    a. Mahogany
    b. Cocobolo
    c. Indonesian Redwood
    d. Quartered Koa

OPTIMIZE WALL PANEL PERFORMANCE WITH NEXT GENERATION PRECAST CONCRETE INSULATED WALL PANELS

Presented by:

PCI
Precast/Prestressed Concrete Institute

PRECAST CONCRETE INDUSTRY AND OAKRIDGE NATIONAL LABORATORY COLLABORATE

The U.S. Department of Energy (DOE) identified precast concrete systems as the optimal wall panel system for developing more energy efficient, resilient places where people live and work. Now, the DOE, Oakridge National Laboratory (ORNL), Dow Chemical, the University of Tennessee (UT), the Institute for Advanced Composites Manufacturing Innovation, and the Precast/Prestressed Concrete Institute (PCI) are collaborating on a research project that will advance the building envelope using lightweight, more energy efficient precast concrete insulated wall panels.[3]

Oak Ridge National Laboratory is the largest U.S. Department of Energy science and energy laboratory and is located in Knoxville, TN. The laboratory conducts basic and applied research on energy and security issues to solve complex problems within various industries. ORNL explores science challenges and carries out research to speed the delivery of these solutions to the marketplace. Research at the Innovations in Building Technology division focuses on reducing energy use through various methods including developing, modeling, advanced materials, design, and prefabrication techniques for building envelopes.

Buildings are responsible for a significant amount of global energy use, resource consumption, and greenhouse gas emissions. According to the International Energy Agency, "The building and construction sectors combined are responsible for 36 percent of global final energy consumption and nearly 40 percent of total direct and indirect CO2 emissions. Energy demand from buildings and building construction continues to rise, driven by improved access to energy in developing countries, greater ownership and use of energy-consuming devices, and rapid growth in global buildings floor area, at nearly 3 percent per year."[4] According to the DOE, domestic buildings consume 40 percent of the nation's primary energy and 74 percent of its electricity.[5] Thus, more energy efficient buildings are a priority for improving the nation's energy productivity and grid resilience. The DOE believes next-generation building envelopes have considerable potential to reduce energy consumption in

LEARNING OBJECTIVES

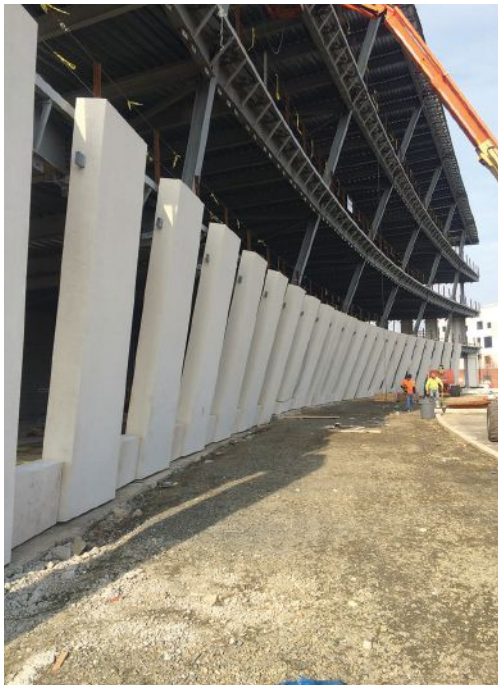
After reading this article, you should be able to:

1. Examine how the precast concrete industry and Oakridge National Laboratory are collaborating on a research project that will advance building envelopes using precast concrete insulated wall panels.
2. Discover what precast concrete is and how precast insulated wall panels contribute to an energy efficient building envelope.
3. Understand the importance of an efficient building envelope and review past performance issues of precast insulated wall panels.
4. Explore how cooperative research and development can yield a lightweight, energy-efficient building envelope while remaining cost neutral.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-7

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-7 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.



New thinner insulated wall panels will be lighter, easier to erect, have a broader range of uses, all with a higher R-value.

buildings. Building product technologies must be market-ready and cost-effective compared to traditional building materials to meet that goal and facilitate widespread adoption. This is where the DOE's Oakridge National Laboratory steps in to collaborate and facilitate research with building industry partners. American companies are competing for global leadership in the manufacture and sale of building components and materials, and their success is vital to the nation's economic health. Public-private partnerships allow ORNL to tackle basic research while industries focus on later stage research, development, and implementation.[6]

RESEARCH INTO THINNER INSULATED SANDWICH WALL PANELS

PCI and ORNL have a cooperative research and development agreement (CRADA) that enabled this opportunity for government, industry, and academia to jointly pursue common goals. The CRADA has made facilities and expertise available to collaborate and to develop technological knowledge into useful products. The research objective is to manufacture new thinner insulated sandwich wall panels that are a cost-neutral building envelope solution. These precast concrete wall panels will be lighter, easier to erect, have a broader range of uses, all with a higher R-value. Such a building envelope product has tremendous market potential, particularly because they are prefabricated with many components and manufactured-level quality control that impacts the cost of ownership substantially over the life of the system.

Ultimately, PCI has the first option for licensing any new technology developed as a result of the research. PCI is allowed to restrict the use of that new technology to its members. The result is that members who make insulated panels will have sufficient information to demonstrate to the marketplace that this system reduces operating energy as compared to conventional cladding materials. "ORNL is receiving constant feedback from PCI and its members. This guidance is very helpful because we are getting input from the end user. Having that open communication expedites our work," describes Diana Hun, sub-program manager for building envelopes at ORNL.

GLOSSARY

Consolidation
Vibration of wet concrete to remove irregularly distributed entrapped air voids while more evenly distributing constituent ingredients in the mix.

Precast Concrete
Concrete cast at a location other than its final in-service position, versus cast-in-place concrete.

Wythes
A continuous vertical section of concrete or masonry one unit in thickness.

Prestressing
Concrete's reinforcing steel is pretensioned in the form before casting; the concrete is cured to a specific strength; and the strands are cut (detensioned), which applies a compressive force that allows precast elements to span greater distances, carry more load, or a combination of both.

Flexural Strength
Flexural strength (sometimes called the modulus of rupture) is a measure of the tensile strength in bending of concrete. The flexural strength of a concrete mix is tested with a representative 40 x 40 x 160 mm sample (a beam). The beam is loaded at its center point until failure.[1]

28-Day Compressive Strength
Specified concrete compressive strength is the minimum compressive strength at which the concrete should fail in standard tests of 28-day-old concrete cylinders. A typical concrete compressive strength specification requires 4,000 to 5,000 psi at 28 days.

R-Value
The capacity of an insulating material to resist heat flow. The higher the R-value, the greater the insulating power.

Albedo
The ratio of the amount of solar radiation reflected from a material surface to the amount that shines on the surface.

Heat Island
Built-up areas that are hotter than nearby rural areas and affect communities by increasing summertime peak energy demand, air conditioning costs, air pollution, and greenhouse gas emissions, heat-related illness and mortality, and water quality.[2]

Oakridge National Laboratory (ORNL)
U.S. Department of Energy science and energy laboratory located in Knoxville, TN that conducts basic and applied research on energy and security issues to solve complex problems within various industries.

ASTM C1363 "Hot Box Test"
Measures the thermal performance of building assemblies under laboratory conditions and provides data on heat transfer through insulated structures.

Precast was selected for ORNL research because of its high durability, best fit for commercial buildings, and certified quality control.

INTRODUCTION TO PRECAST CONCRETE

Before we dig deeper into the ORNL collaboration, let's discuss what precast concrete is and how precast insulated wall panels contribute to an energy efficient building envelope. Precast concrete is simply concrete cast at a location other than its final in-service position. Concrete is placed into a form, cured, then stripped from the form the following day. The manufactured concrete components are then transported to the construction site for erection into place. In contrast, standard concrete is poured into site-specific forms and cured onsite.

Two types of steel reinforcement are typically used in precast concrete: conventional reinforcement and steel strands. Conventional rebars are positioned within the formwork based on the structural design requirements of a project. Higher structural capacity can be achieved with the use of high-tensile-strength steel strands. They are pulled, or pretensioned, in the form before casting (called prestressing). Once the concrete is cured to a specific strength, the strands are cut (detensioned), which applies a compressive force that allows precast elements to span greater distances, carry more load, or a combination of both. Prestressing also reduces cracks and reduces the size and weight of members relative to conventional reinforced, cast-in-place concrete members.

Quality control differs significantly between plant-manufactured concrete systems and site-constructed systems. For example, the quality of site-cured concrete is sometimes compromised due to the variability of weather conditions versus precast concrete, which is cast and cured under more consistent, more carefully controlled conditions. Prefabrication enables better quality control for an enhanced building envelope. The precast concrete industry assumes a lot of risks and provides a benefit in terms of cost in those regards. Precast was selected for ORNL research because of its high durability, best fit for commercial buildings, and certified quality control.

ARCHITECTURAL PRECAST CONCRETE INSULATED WALL PANELS

Architectural precast concrete insulated wall panels are a popular type of offsite commercial building construction that act as an exterior building envelope. Insulated sandwich wall panels can be architectural, structural, or a combination of both. The difference between typical panels and insulated sandwich wall panels is that the latter are cast with rigid insulation "sandwiched" between two layers, or wythes, of concrete. The insulation thickness can vary to create the desired thermal insulating property (R-value) for the wall. Solid concrete regions extended through the entire thickness of the panel are typically avoided, but occasionally will occur for embedment of critical hardware for lifting, handling, and connections.

The structural behavior is either:

- Composite in which the wythes are connected using structural connectors through the insulation that fully transfer loads. The structural performance is then based on the full thickness of the panel; or
- Non-Composite in which the wythes are connected using non-structural connectors through the insulation, which limits performance to the individual capacities of each wythe.

Whether the panel is composite or non-composite depends on the configuration and material used for the connectors. Insulated sandwich wall panels can be designed to be loadbearing and support floor and roof components. They make an ideal structural element for this purpose, normally by casting a thicker interior wythe to provide the necessary support. They can also be non-loadbearing to complete a façade. Precast wall systems are barrier- or face-sealed systems. Unlike rainscreen systems, they do not require a cavity where moisture collects, and other problems can occur.[7]

Typical widths: 4 to 15 feet

Typical heights: 8 to 50 feet

Typical thicknesses: 5 to 12 inches including 1 to 4 inches of insulation

Precast concrete sandwich panels are cast in a flat orientation, so the form side is regularly the side that will be exposed to view in the final construction. This face can be made with virtually any type of finish.

Finishes

As with typical wall panels, the panels are cast in a flat orientation, so the form side is regularly the side that will be exposed to view in the final construction. This face can be made with virtually any type of finish. The back face is generally troweled smooth or may have a light broom finish. Frequently, the interior can be finished so as not to need additional furring and drywall to create a desired finished surface.

Precast/ prestressed concrete sandwich wall panels are used as exterior and interior walls for many types of structures, as they provide the dual function of transferring load and insulating the structure. Wall panels may be used solely for cladding, or they may act as beams, bearing walls, or shear walls. Panels generally span vertically between foundations and floors or roofs to provide the permanent wall system but may also span horizontally between columns. Panels may be attached to any structural frame, including structural steel, reinforced cast-in-place concrete, pre-engineered metal, and precast/prestressed concrete. They also allow the project site to be quickly dried in so other trades can work in a clean, comfortable environment.[8]

A high-performance building offers owners a greater return on investment than a conventional building due to reduced energy and operating costs, lower maintenance costs, improved functionality, and resilience after a catastrophic event.

IMPORTANCE OF AN EFFICIENT BUILDING ENVELOPE IN HIGH-PERFORMANCE BUILDINGS

As we've discussed, buildings consume a great deal of energy and are to blame for significant carbon emissions globally. Because most of the emissions generated (90% or more) over the life of a building occur when they are heated and cooled, building product manufacturers, and the A&D industry have a responsibility to reduce building operation impacts by developing more environmentally friendly and energy efficient products and then specifying them in the buildings they design. Designing and specifying a more efficient building envelope assembly is one means to this end. A high-performance building offers owners a greater return on investment than a conventional building due to reduced energy and operating costs, lower maintenance costs, improved functionality, and resilience after a catastrophic event.

A high-performance building must be more energy efficient than a standard building that only meets the minimum requirements of the energy code. A building's energy performance is determined by the local climate, the building's system, and its occupancy. An energy efficient building envelope integrates and optimizes glazing, insulation levels, solar reflectivity of exterior surfaces, air, and vapor barriers, and thermal mass.

ADVANCING THE BUILDING ENVELOPE USING PRECAST CONCRETE INSULATED WALL PANELS

High-performance precast insulated sandwich wall panels contribute significantly toward these goals. The interior and exterior concrete wythes protect the insulation layer against damage during construction, limit production of toxic gases from the insulation during and after building fires, and do not promote flame spread to adjacent components. In addition, concrete wythes resist insect, rodent, and impact damage, do not support mold growth, provide excellent air barriers, and limit air infiltration. Further, the insulation cannot shift or settle during or after construction, so there are no gaps or degradation in thermal protection.[9]

This article continues on http://go.hw.net/AR052019-7. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. According to the DOE, domestic buildings consume _____ percent of the nation's primary energy and 74 percent of its electricity.
   a. 10 b. 20
   c. 30 d. 40

2. _____is simply concrete cast at a location other than its final in-service position
   a. Cast-in place concrete b. Precast concrete
   c. Reinforced concrete d. Pretensioned

3. Insulated sandwich wall panels can be:
   a. Architectural b. Structural
   c. Both d. Neither

4. Which of the following describes structural behavior in which the wythes are connected using structural connectors through the insulation that fully transfer loads so that the structural performance is then based on the full thickness of the panel.
   a. Composite b. Non-composite
   c. Non-structural

5. Which of the following is a use for precast concrete sandwich wall panels?
   a. Exterior walls b. Interior walls
   c. Cladding d. Beams
   e. Bearing walls f. All of the above

6. Precast concrete wall panels can reduce mechanical system requirements and energy consumption throughout a building, resulting in savings of up to _____percent of heating and cooling costs, depending on local climate.
   a. 10 b. 15
   c. 20 d. 25

7. High-performance precast concrete sandwich wall panels commonly have steady state R-values ranging from _____.
   a. 4 to 6 b. 10 to 15
   c. 12 to 22 d. 18 to 25

8. Which of the following characteristics of precast concrete wall panels contributes to superior energy efficiency?
   a. High specific heat b. High density
   c. Low conductivity d. Thermal mass
   e. High albedo f. All of the above

9. The goal of ORNL's experimentation was to reduce the weight of a typical precast concrete panel by _____.
   a. 1/4 b. 1/2
   c. 2/3 d. 3/4

10. The reduced thickness version of a precast concrete insulated panel developed by ORNL has a _____ lb density.
    a. 100 b. 50
    c. 300 d. 75

SPONSOR INFORMATION

PCI
Precast/Prestressed Concrete Institute

The Precast/Prestressed Concrete Institute develops, maintains and disseminates information to the marketplace to ensure the highest quality and safest design, fabrication, and construction of plant-manufactured precast concrete structures. PCI's members are proud stewards of the built environment, committed to creating beautiful, functional, and resilient building systems.

DESIGN OUTSIDE THE BOX.

Architectural creativity should not be constrained by the material world. With precast concrete, your vision can go far outside the box. Requirements like meeting LEED Gold certification, flexibility with colors and textures, structural strength and an efficient installation are not limitations with precast concrete. They're advantages. That's why precast concrete is so much more than a material. It's a solution.

PCI
Precast/Prestressed Concrete Institute

Find your strength in precast concrete. Visit PCI.org.

IS YOUR STUDIO FIRST CLASS?

The Studio Prize is an annual design awards program that recognizes innovative, thoughtful, and ethical studio courses at accredited architecture schools. The prize is designed to celebrate the creativity of studio course curricula as well as the sophistication of the work students produce in response. The exclusive sponsor, Sloan, has generously made $20,000 available for student prizes. The jury will also confer the $5,000 Sloan Award to students in a winning studio or studios that address sustainability, specifically water conservation.

4th ANNUAL

Call for entries

ELIGIBILITY

All full-time, part-time, and visiting faculty and administrators may submit studio course curricula, and the resulting student work, for consideration. All studio courses must have occurred in the context of an accredited Bachelor of Architecture or Master of Architecture program, or their equivalents, and all must have been concluded within the 2018–2019 academic year. Summer 2018 studios are also eligible. For full eligibility requirements, visit studioprize.com.

RECOGNITION

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

HOW TO ENTER

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DEADLINES

REGULAR	June 14, 2019
LATE	June 21, 2019

FEES

ADMINISTRATIVE FEE	$45
LATE FEE	$25 (for entries submitted after June 14)

hanleywood SLOAN® ARCHITECT

ARCHITECTURAL METAL WALL PANELS FOR CURTAINWALL, STOREFRONT, AND WALL APPLICATIONS

Presented by:

PAC-CLAD PETERSEN
A CARLISLE COMPANY

Ballet Memphis, Memphis, TN
Installing Contractor: Ralph Jones Sheet Metal
Architect: archimania
Profiles: Snap-lock seam, Perforated snap-lock seam, Corrugated, Perforated corrugated
Colors: Zinc, natural copper material

Photo: archimania

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Examine the various materials used to design metal wall panel systems for curtainwall, storefronts, or wall applications.
2. Compare and contrast the different types of architectural metal wall panels and where they can be specified.
3. Analyze coating systems for various architectural metal wall panels.
4. Identify potential sources of aesthetic issues that may affect the visual appearance of metal wall panels and how to prevent them.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-8

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-8 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

INTRODUCTION TO STEEL AND ALUMINUM CLADDING PRODUCTS

Factory-produced architectural metal wall panels are suitable for a wide range of commercial, industrial, and retail applications. Their color, trim, and coating varieties add a modern flair to any project type with the added benefits of easy installation, low energy costs, longevity, and minimal maintenance. Metal wall panels have many mechanical and aesthetic advantages over other cladding systems, which will be explored in this course.

Factory-formed metal panels are versatile and can be cut according to multiple lengths, widths, and curvatures and with greater precision than field-formed metal wall panels. Aluminum, anodized aluminum, copper, galvanized steel, zinc, and stainless-steel metal cladding products come in multiple gauges and are manufactured with advanced CNC precision shearing and bending equipment. Note that roll-formed metal wall panels will not look like aluminum composite panels, which are designed to be completely flat.

The custom, heavy gauge fabrication process for factory-made metal panels creates a product that is ideal for curtainwall and glazing industries.

Metal Types

Carbon sheet steel is an inexpensive choice for metal wall panels, but its natural chemical properties are easily susceptible to the weather.[2] The two most common steel coatings specified to prevent corrosion and create an impermeable moisture barrier are zinc and galvalume, or galvanized steel. Galvanized steel panels with a 70 percent PVDF finish are available in 16 to 26-gauge panels.

Pure zinc, otherwise known as galvanized, provides a thin coating to slow corrosion and comes in application rates of G-30 to G-60.[2] G-30 is unsuitable for metal wall panels, and G-60 is typically used to save money. G-90 is the preferred zinc coating to use on pre-painted applications.[2] Over time, the zinc coating will erode due to its natural oxidizing properties, thus exposing the metal panel to the elements and decreasing the overall service life. Zinc is not recommended for unpainted applications or wet, humid climates, or in any saltwater environment.[2]

Galvalume, an aluminum/zinc alloy is one option on the list of acceptable materials that can be painted for use as metal wall panels. The list includes painted G-90, painted Galvalume, Zinc and copper. Galvalume meets ASTM Specification A792, which covers coating weight requirements. AZ-50 and AZ-55 are the application coating weight designation indicating that the aluminum-zine alloy coating

CASE STUDY: CADE MUSEUM, GAINESVILLE, FLORIDA

Installing Contractor: Architectural Sheet Metal; Architect: GWWO, Inc. Architects; Photographer: hortonphotoinc.com
Profile: 7/8" Corrugated
Color: Galvalume Plus

Building Materials Bring Creativity to Life

A museum devoted to exploring and expanding creativity must have an eye-catching design, and that is indeed the case for the recently opened Cade Museum for Creativity + Invention in Gainesville, Florida. With its cylindrical core and extending arcs, it almost appears to be in motion – a sense of movement reinforced by the running lines of the structure's corrugated metal wall and roof panels.

The Cade Museum's namesake, Dr. James Robert Cade, embodied a spirit of creativity. In 2004, he and his wife established a foundation to fund the museum's construction, along with a permanent gift to cover a portion of its ongoing operations.

The new museum incorporates laboratory and maker spaces, gathering space for puzzling and presentations, and, of course, a permanent exhibit on the science behind the beverage that built Dr. Cade's reputation. The design is intended to grow in a planned second phase that will expand the current 21,000 square foot facility by an additional 24,000 square foot.

The museum's exploded-circle plan required some creativity on the part of metal panel installers. "There were six different radiuses around the building," explained the project manager. In total, his crew installed 11,400 square foot of 22-gauge corrugated straight panels and 6,000 sq. ft. of corrugated curved panels, all in a Galvalume Plus finish.

Detail work in the area where a 45 foot banner, with 4-in. by 4-in. structural supports, was planned to be hung proved even more time consuming than the building's curved profiles. "We had to cut penetrations into the panels as they were being installed," the project manager said. "Each one of those penetrations took four to five man-hours – and there were 45 penetrations." And, of course, all those penetrations required custom flashings to protect against water penetration.

The finished facility has garnered a number of awards, including the S.T.A.R. Award from the Florida Roofing and Sheet Metal Association, along with an ENR Southeast Best Project of the Year award.

application (0.50 ounces per square foot and 0.55 ounces per square foot applied to both sides of the Galvalume sheet)[1]. In North American measurements, AZ-50 is equivalent to about 0.8 mil (0.0008") on each side of the sheet, and AZ-55 to about 1.0 mil (0.001") on each side. Coating thickness has a direct effect on the lifespan of the metal panels. Coating thickness is measured as ounces of coating per square foot on both sides.

AZ-50 is recommended for applications that require formability to ensure maximum coating adhesion.

AZ-55 is preferred for unpainted applications and corrosion resistance. Its uniform thickness of 1.76 mils on both sides will generally last upwards of 50 or 60 years, depending on the climate. AZ-55 is starting to gain popularity in painted applications, even though the finished panel system will not withstand scratches as well as an unpainted panel.

Bare Galvalume metal wall panels should avoid contact with acids and alkalis as it tends to stain easily.[2] In addition, contact with pressure-treated wood, or wet lumbar is not recommended for bare or prepainted Galvalume sheets.[1] Galvalume can display cosmetic stains from footprints, handprints, etc, from installation so this should be avoided, and architects should specify a thin acrylic coating to be added as a temporary surface protectant.[2] In new construction, if concrete is to be poured, ensure it is completed prior to installing galvanized steel wall panels, as the mortar can damage the panel.

Painted aluminum wall panels are another option. The panels come in a versatile prefinished sheet that is pre-painted with a 70 percent polyvinylidene fluoride (PVDF) finish. The PVDF finish is applied to G-90 galvanized steel, galvalume steel, or prime quality aluminum. It was originally developed for use in abrasive environments where high winds, salt, or heavy rains would cause corrosion. This prefinished sheet metal is well suited for roofing, wall, curtainwall, storefront and trim applications.

Look for a two-step anodizing process, which produces architectural bronzes and black in coil stock. Other aluminum sheets are available with a clear finish, which is done through coil anodizing to control uniformity of appearance. Both of these coatings will be explored in more detail in a later section. Other options for metal wall panels include copper, which is available in 16 and 20-ounce cold rolled sheet and coil, and stainless-steel type 304 2B.

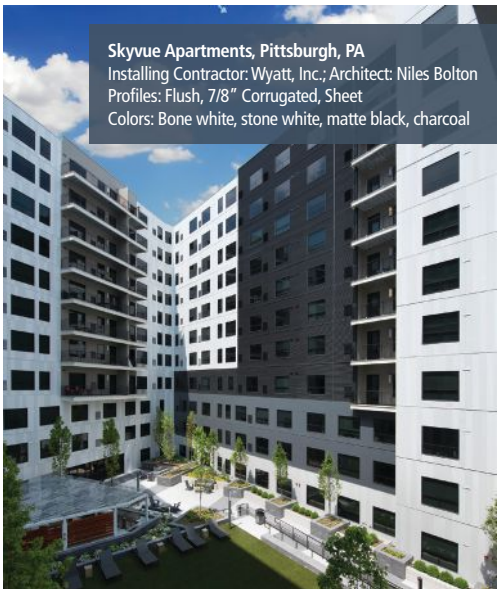
TYPES OF ARCHITECTURAL METAL WALL PANELS

Factory-made does not mean that quality, artisanship, or exact tolerances are sacrificed; in fact, factory-made panels are formed to tighter tolerances and consistency. Working with the right manufacturer allows the project to include precision-made metal wall panels produced to closely held tolerances for custom components. Advanced CNC shearing and bending equipment, and roll-formed profiles now make even difficult jobs more cost-effective. Most factory-made metal wall panels can be done for parts up to 20 feet long with custom radius and bullnose parts. Custom heavy or light gauge parts including 16 to 26-gauge galvanized steel or 16 to 20-ounce copper can be formed into custom-designed panels or simple angles.

Corrugated Wall Panels

Corrugated metal wall panels are well-suited for light commercial, agricultural, and storage facilities, as well as for decorative residential applications. It is an economical choice for wall cladding due to the single skin design.[4] Corrugated metal panels are durable, mainly due to technology advances that enhance the panels' life span. Single skin corrugated metal panels remain the top choice in commercial building construction.

When specifying corrugated wall panels, building professionals have three options: fixed-fastened (concealed clip), clip-fastened (concealed clip) and exposed fastener. The clip-fastened panel enables builders to enlarge or reduce the wall



Skyvue Apartments, Pittsburgh, PA
Installing Contractor: Wyatt, Inc.; Architect: Niles Bolton
Profiles: Flush, 7/8" Corrugated, Sheet
Colors: Bone white, stone white, matte black, charcoal

Photo: hortonphotoinc.com

panel system easily. Profile variances in rib height and spacing, plus other design features afford an architect many options to be creative with the visual aesthetic. Intermixing profiles, colors and spacing is becoming popular for creating random mosaic patterns.

Panels can be used in horizontal or vertical applications. Installation costs are kept low because the metal panels can withstand poor weather conditions, and the panels often go up quickly, allowing the rest of the build to progress with minimal delays. Corrugated single skin metal panels have a life span of up to 20 or 30 years, depending on the climate and coating.

Panel depths come in either 7/8-inch or 1 3/8-inch. Profiles can be combined on the same wall to enhance the visual intensity and depending on the type of metal. It is important to have look aesthetically at these paneling when specifying as there are anywhere between 15 and 40 colors available. The most common metal types are:

- 22-gauge steel
- 24-gauge steel
- .032 aluminum
- .040 aluminum
- .050 aluminum

Panel length depends on the type of material. For example, the maximum length for steel is 30 feet and the maximum length for aluminum is 22 feet. Clip panels can be manufactured in longer lengths and clips should be used for aluminum panels longer than 22 feet and steel panels longer than 30 feet. Corrugated metal wall panels can be specified as perforated in aluminum only for use in equipment screen applications, sound abatement or over graphics.

GLOSSARY

1. Anodized
Electrolytic process by which an aluminum metal coating provides a protective oxide layer

2. Camber
One possible cause of oil canning in metal wall panels; identified as a deviation of a side edge from a straight line

3. Delta E
The measure of change on the Hunter Scale to judge the visual perception of two colors.

4. Flashing
Aluminum or galvanized steel material installed over joints in wall and metal roof panels to prevent moisture intrusion

5. Galvalume
55 percent Aluminum-Zinc alloy coated sheet steel

6. Hunter ΔE
Refers to the Hunter Scale; provides units of measurement for anticipated color fade.

7. MCM
Metal composite materials, refers to wall panels where two single metal skins are bonded together with an engineered plastic core in the middle

8. Mica
Metal flakes made of sheet silicate minerals used in metallic paints

9. Oil canning
The elastic buckling, or visible waviness in the flat areas of metal panels

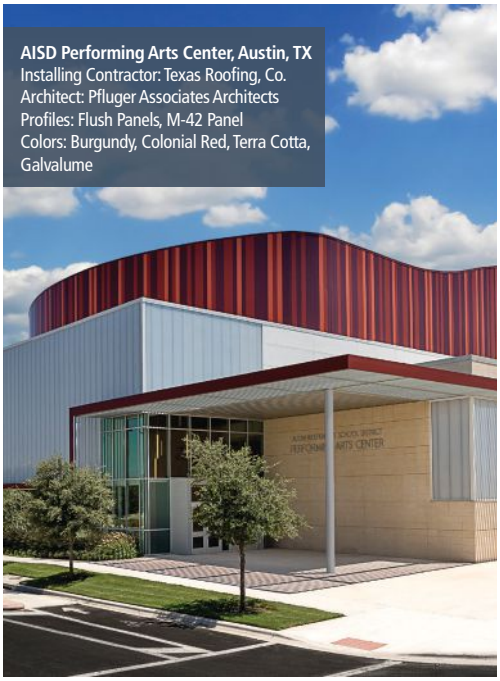
10. PVDF
Polyvinylidene Fluoride coatings that are weather resistant and contain high thermal properties, depending on the resin finish

Flush and Reveal Wall Panels

When designers want a flush or flat appearance with metal on wall, fascia and soffit applications, flush and reveal panels provide the desired look, compared to aluminum composite panels, which are completely flat. Panel lengths ranging from four to 25 feet are factory-formed to length. With longer panel lengths, it is recommended to use up to two stiffening beads. Fastener size is determined by panel and clip fastener clearances and vary according to the manufacturer. The type and thickness of the substrate will determine fastener length.

Flush and reveal panels are known for their strength and ability to withstand extreme weather thanks to the rounded interlock leg concealed fastening system. During manufacturing, precision roll-forming equipment ensures the panel profiles are consistent and exact. In high wind areas and high elevation lines, the addition of restrictor clips is recommended.

Flush and reveal panels can be installed against substrates of lumber, plywood,



AISD Performing Arts Center, Austin, TX
Installing Contractor: Texas Roofing, Co.
Architect: Pfluger Associates Architects
Profiles: Flush Panels, M-42 Panel
Colors: Burgundy, Colonial Red, Terra Cotta, Galvalume

Photo: Tom Coplen

Patuxent River Naval Air Museum & Visitor Center, Lexington Park, MD
Installing Contractor: AGM Contracting, Inc.
Architect: Westlake Reed Leskosky
Profiles: 7/8" Corrugated
Colors: Custom Cadet Grey

Photo: hortonphotoinc.com

cold-formed Cee and Zee sections, hot rolled beams or concrete and masonry. Specific installation requirements and specifications vary by region and project type. For example, in windscreen applications, flush and reveal panels should be fastened through side joints if possible, or use restrictor clips. Panels should always be installed over a solid substrate with an ice and water shield, when needed, or over framing sections.

Materials used in flush and reveal panels include 22- and 24-gauge steel, .032 and .040 aluminum, and galvalume plus. Color choice is important as there are many colors available; however, it is important to note that there is a visual difference between flush and reveal panels and aluminum composite panels. Camber and oil canning are to be expected with this panel type.

Exposed Fastener Panels

Unlike flush and reveal panels, which conceal the fasteners and provide a seamless look, exposed fastener panels attach directly to the frame supports with fasteners that are visible on the exterior. For this reason, exposed fastener metal panels have another dimension to visual appeal: the fasteners themselves. If the fasteners are screwed in too tightly, the panels can bend in extreme cases. Extra maintenance is required over time. Architects should consult local building codes prior to specification, especially in areas that experience high winds.

While these panels are less expensive and more efficient to install than hidden fastener panels, in industrial buildings with vertical applications, exposed fastener panels still offer an architecturally attractive metal panel option.

Profile options available include 7/8-inch and 1/2-inch corrugated panels and come with color-matched screws and rivets. Closure strips are available and pre-cut lengths vary by manufacturer. Gauge, spacing, design wind loading, and gauge and configuration of the panel are the four main elements to consider when choosing the best fastener. To demonstrate, steel thickness can limit fastener diameter; the panel's surface area will impact fastener resistance to pulling; and, wind load requirements determine how strong the fastener needs to be.

M-36 and 1/2-inch corrugated panels are suitable for wall and equipment screen projects. Flashing for exposed fastener panels ranges from .032 to .050 gauge for aluminum and 24- or 22-gauge for steel.

QUIZ

1. According to the course, the two most common steel coatings specified for corrosion prevention and moisture impermeability are _____ and _____.
   a. Zinc/Stainless Steel
   b. Zinc/Galvalume
   c. Galvalume/Stainless Steel
   d. Zinc/Aluminum Alloy

2. According to the course, most factory-made metal panels can be done for parts up to ____ feet long with custom radius and bullnose parts.
   a. 5
   b. 20
   c. 45
   d. 50

3. Flush and reveal panels CANNOT be installed against which type of substrate?
   a. Soil retention system
   b. Lumber or plywood
   c. Cold-forrmed cee and zee sections
   d. Hot rolled beams

4. The course mentions four elements to consider when choosing the best fastener. Which of the following is described as an element that should be considered?
   a. Material choice
   b. Impact resistance
   c. Design wind loading
   d. Thermal pressure

5. According to the course, normal bowing of up to ____ or more is possible.
   a. ¼ inch
   b. 1/6 inch
   c. 1/8 inch
   d. ½ inch

6. According to the course, deflection is caused by which of the following:
   a. High wind load
   b. Expansion/Contraction due to temperature changes
   c. Both A&B
   d. None of the above

7. PVDF coatings are used in all of the following extrusion applications **except**:
   a. Curtainwall systems
   b. Aluminum panels
   c. Soffits and fascia
   d. Doors and windows

8. An example of a surface imperfection due to poor framing is:
   a. Deflection
   b. Color fading
   c. Dents or dimples
   d. UV-damage

9. When choosing a metallic color, a _____ is required for any color that contains bright, exotic colors or metallic flakes.
   a. Clear top coat
   b. Primer
   c. Colored top coat
   d. None of the above

10. Custom heavy or light gauge parts including _____ galvanized steel or _____ copper can be used for metal wall panel installations.
    a. 16-26 gauge // 16-20 oz
    b. 12-14 gauge // 16-20 oz
    c. 25-30 gauge // 12-20 oz
    d. 16-20 gauge // 16-26 oz

This article continues on http://go.hw.net/AR052019-8.
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SPONSOR INFORMATION

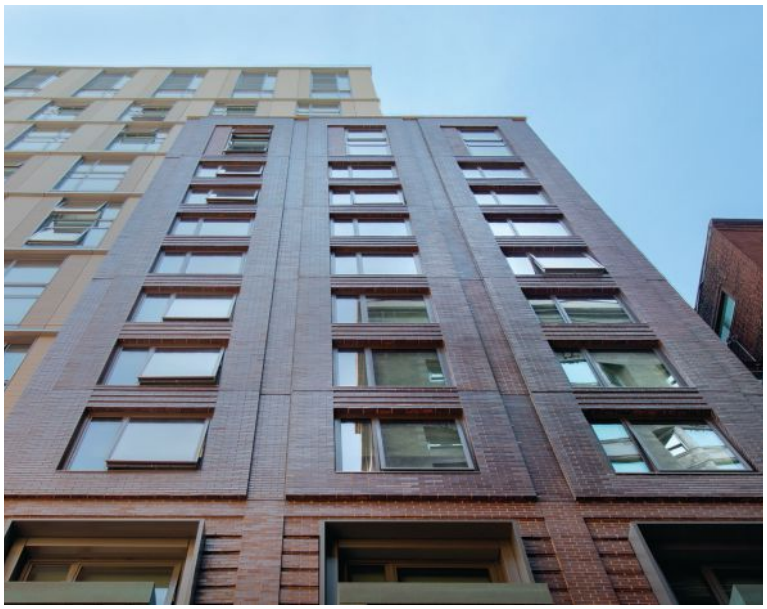
PAC-CLAD PETERSEN
A CARLISLE COMPANY

Petersen, a Carlisle company, manufactures PAC-CLAD metal cladding products in multiple gauges of steel and aluminum, including standing seam roof panels, hidden- and exposed-fastener wall panels, flush panels, soffit panels, perforated metal, coil and flat sheet, fascia and coping, composite panels and column covers. All are available in 70% PVDF finish in 45 colors.

THE EVOLUTION OF BRICK CONTINUES: MECHANICALLY ANCHORED BRICK RAINSCREEN ASSEMBLIES

Presented by:

Desana Partners
- Engineered Rainscreen Systems -



Emerson College, Boston, MA
Photo Credit: Bill Horsman Photography.

LEARNING OBJECTIVES

Upon completion of this course, the student will be able to:

1. Review the history and traditional use of brick over the centuries, and how the brick industry has evolved in recent years.
2. Examine mechanically anchored brick rainscreen assemblies, including how they improve the performance of wall assemblies and why they are easier to install than traditional brick or brick veneer.
3. Understand why moisture management is imperative and how brick wall systems with a built-in rainscreen assembly can help to mitigate moisture.
4. Explore case studies where mechanically anchored brick rainscreen assemblies were used.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR052019-9

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR052019-9 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

BRICK: A BRIEF HISTORY

Across the globe, ancient structures made of brick, including parts of the Great Wall of China, have stood the test of time. In other regions of the world, like Egypt, ancient houses made of clay and straw brick in ancestral villages in the countryside are still standing. Some are still inhabited.

The ancient bricks used to build such structures were made by letting the clay and straw dry in the sun. Eventually, fired bricks were invented, and cooler climates were able to manufacture them. Romans took this technology a step further and introduced mobile kilns. This allowed them to build brick structures throughout the empire, including arches, aqueducts, vaults, walls, and forts.

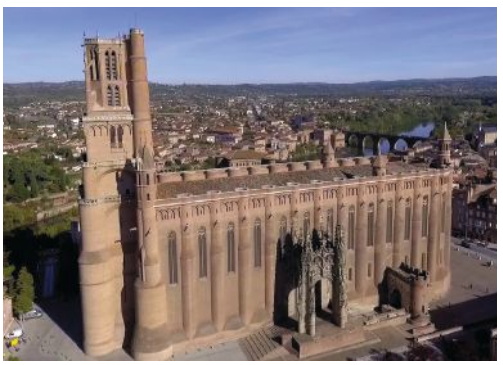
Bricks continued to be made by hand until 1885. Out of the Industrial Revolution, however, came machinery to make bricks. By 1925, a single machine could produce 12,000 bricks a day compared to about 5,000 made by hand. Because of these advances and the relative affordability of the materials, brick structures soon outpaced those made of stone, and during the 19th century, American cities like Boston and New York preferred the use of brick. At this time, as the popularity of brick grew, more than 10 million bricks were produced annually in the United States.[1]

Now, however, one of the world's oldest and most revered building materials finds itself in the tumult of a changing industry.

Changes in Construction

Some experts claim that the construction industry in general has changed more in the last two decades than at any other time, including during the Industrial Revolution. Most of these changes can be attributed to the adoption of a variety of technology, such as digital records and plans, smart gadgets, and construction management software.[2] Technology, as well as changing attitudes, has now opened the way for new construction methods in general and in the brick industry.

Part of the changing attitudes of the construction industry involve building for the moment rather than for longevity. Las Vegas, for example, is emblematic of the changing of priorities. Many structures are built with the recognition that at some point in the future, they will be knocked down and replaced, and words like "lightweight" and "quick-built" have



The Albi Cathedral was first built as a fortress, and beginning in 1282, was under construction for 200 years. Today, some claim it is the largest brick structure in the world. This demonstrates the life span and durability of brick used in buildings.

GLOSSARY

Continuous insulation (ci)
No break in insulation across all structural components with the exception of fasteners and service openings.

DBV rainscreen system
A drained and back-ventilated (DBV) rainscreen system "features an exterior control plane and/or cladding panels with open joints designed to accommodate differentials in pressure between the exterior air and [the air] behind the cladding."

Kerf
The width of a cut in a piece of material; "kerf cuts" refers to making many cuts along the width of a material

Pressure equalization
"When the outside air pressure is transferred to an air space behind the exterior cladding, the cladding is exposed to a near-zero pressure differential."

R-value
The ability of insulation to resist heat flow.

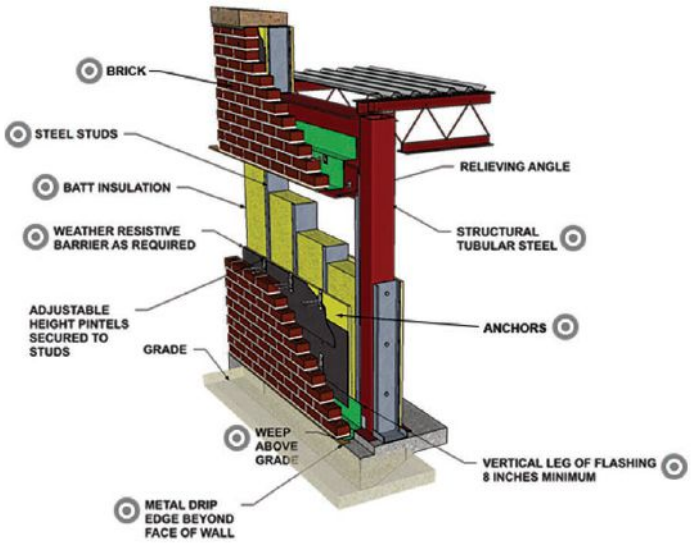
Solid masonry wall
Made of multiple wythes of brick, concrete, cinder block, or some combination of those three.

Thermal mass
The ability of a material to absorb and store heat

Wythe
A continuous vertical section of masonry; one unit thick; can be independent or locked together with another adjoining wythe; can be structural or non-structural

Single wythe
A single vertical layer of masonry

Multiple wythe
More than one vertical section of masonry laid behind or in front of one another



Full Wall Assembly of Traditional Brick Veneer

become buzz words. Concurrent with the drive to build quickly and temporarily is the skilled labor shortage. *Tradesmen International* notes that from 2006 through 2011, the construction industry lost 2.3 million jobs. Since 2011, both residential and commercial construction have rebounded; however, a generation of potential skilled laborers have shied away from entering the industry or have chosen not to return after the recession caused so many jobs to be lost. According to the Bureau of Labor Statistics and National Association of Home Builders (NAHB), there are currently 143,000 vacant construction positions nationwide. The NAHB states that one of the effects of this skilled labor shortage is that 69% of its members are experiencing delays in completing projects on time.[3]

Mechanically engineered rainscreen systems are lighter and easier to install than traditional brick, utilizing a wider labor force. Brick rainscreen systems also offer better protection against weather and water and increased thermal performance over simple brick veneers. Driven by newly evolved technologies, brick rainscreen assemblies point to the future of building with brick.

PROS, CONS, AND THE EVOLUTION OF THE BRICK INDUSTRY

For millennia, bricks have been used for their strength, durability, and aesthetic. Brick also allows less air infiltration than many other siding materials. Due to its density, it has a high thermal mass. In the summer, it is more likely to remain cool during the day, and in the winter, it stores and reflects heat back into living spaces. Bricks are noncombustible, cannot be eaten by termites or insects, and do not rot or corrode. Compared with wood, vinyl, aluminum, or artificial-stucco sidings, brick buildings need little maintenance.

Despite these attributes, however, bricks are losing market share, particularly in the commercial sector. Their weight, cost, and installation time have become drawbacks. For instance, steel framing behind a brick wall requires additional reinforcement to support the heavier and more rigid 4" thick brick wall buildings, the weight of brick requires extra structural components to anchor it safely to the upper floors. A traditional brick veneer typically weighs about 40 pounds per square foot making one of the heaviest facades use today.

In addition to structural reinforcement, the weight of traditional brick requires extra equipment and handling on site. Building with brick also requires skilled laborers working longer hours, as brick structures are built by hand, one brick at a time.

Weather conditions further affect the construction process of building with brick, as brick cannot be laid in inclement weather. Brick structures require strong attraction between the brick and mortar, and rain and cold can reduce stability. Once the walls of a structure are built, the brick must be treated for protection from the weather; untreated brick must be shielded from the weather for the duration of construction.[4] More and more conventional brick is perceived as old-world technology, more labor intensive, heavier construction, more time consuming, creating unnecessary clutter at the job site.

Other experts, however, note a paradox seemingly inherent in the brick industry. Authors Rosefielde and Mills, quoted in an article written for Carnegie Mellon University state the following:

"Bricklaying…is said not to have changed in thousands of years; perhaps in the literal placing of brick on brick it has not. But masonry technology has changed a great deal. Motorized wheelbarrows and mortar mixers, sophisticated scaffolding systems, and forklift trucks now assist the bricklayer. New epoxy mortars give stronger adhesion between bricks. Mortar additives and cold-weather protection eliminate winter shutdowns."[5]

Apart from advances in machinery, the firing of brick, and the composition of mortar, the laying of traditional brick has not changed much. However, recent technological advances have allowed brick to evolve from ten feet thick walls, to gravity loaded single wythe brick, and now to a stud loaded mechanically anchored brick rainscreen assembly viable for Class A construction.

From Multiple Wythe Structural Brick, Single Wythe Gravity Loaded Veneer to Stud Loaded, Mechanically Anchored Brick Rainscreen Assembly

In recent decades, the brick industry has seen countless attempts at modernization. Most attempts fall into the category of adhered veneers

FROM MULTIPLE WYTHE STRUCTURAL BRICK, SINGLE WYTHE GRAVITY LOADED VENEER TO STUD LOADED, MECHANICALLY ANCHORED BRICK RAINSCREEN ASSEMBLY

Within the last century, single wythe masonry systems have replaced multiple wythe systems. The Mason Contractors Association of America (MCAA) notes several benefits to working with a single wythe masonry system:

- Can be designed as panels, curtain walls, load bearing walls, shear walls, bomb blast walls, fire-rated shelter walls, and more.
- Unlike veneer, does not require back up, shelf angles, or perimeter beams.
- Can be used for interior partitions where noise abatement, fire separation, and durability are important, such as in offices, schools, and hotels.
- Durable and long-lasting.[6]

Despite the durability, aesthetic appeal, and cost-effectiveness when compared to a multiple wythe system, the MCAA notes several drawbacks to single wythe assemblies:

- Can be difficult to make weather-tight; no drainage cavity.
- Batt insulation cannot be used, as water may leak through; rigid insulation board must be used that can tolerate occasional moisture.
- If in an area with high levels of moisture, a drainage cavity should be built; closed-cell rigid insulation should be used, as well as flashing, and joints should be taped.[7]

glued to various substrate materials. To date few, if any, of these systems have reached the level of performance and security required for Grade A construction nor have they made the kind of headway hoped for from an industry in transition.

When brick was first used millennia ago, it was primarily used structurally. Multiple wythe brick walls were heavy, damp, and thick. Using multiple wythes made for exceptional durability and long life as inner sections were not exposed to weather. The cavity that existed between wythes also helped to increase insulation and waterproofing. Water that entered the external-facing wythe could be channeled out through the cavity. In other words, water was controlled through absorption and evaporation. With single wythe brick veneer, however, flashings might be missing in places like window heads, mortar can deteriorate over time, and steel embedded in the masonry walls can rust or "exfoliate," which would result in increased water entry and the cracking of masonry.

> "We have been using thin brick [on a current project], and we are not happy with the performance and quality. We are building a project next to another project that is using a fully anchored masonry rainscreen system. After seeing this system and interacting with the mason on the other project, we are never going to use thin brick again. [With the masonry rainscreen system,] bricks do not pop off like with thin brick. This system is heads and shoulders above conventional masonry and thin brick that we've used in the past, and we will be using it going forward."
>
> –Joe Ferolito, Tocci Building Corporation

In many buildings over the last 80 years, veneer has become the norm instead of a solid masonry wall. When veneer is used, rather than the brick holding up the structure of the building, the building holds up the brick. The brick masonry is gravity-loaded and supported by the foundation. At the third floor and above relieving angles and lintels must be used to support the weight of the brick further. After 40 to 50 years, many steel angles have started to rust and deteriorate, which in turn has caused the brick to crumble.

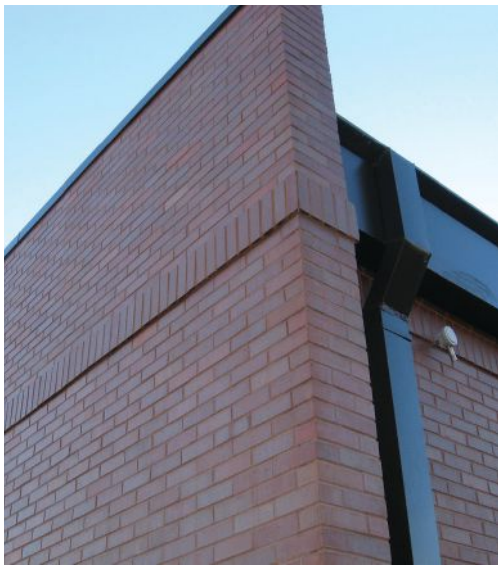
It has become relatively slow, tedious, and expensive to build with brick in this traditional manner. Existing buildings that need to be brought up to code face an expensive and daunting task. However, the next iteration of brick—mechanically engineered brick rainscreen systems—offers the same aesthetic as traditional brick and better performance.

Not "Sticky Brick"

Mechanically anchored and fully engineered rainscreen systems are not to be confused with "sticky brick" or adhered veneers. Adhered brick veneer can come in a variety of forms and is used solely for aesthetic purposes: thin set (directly applied with no lath), thick set (with metal lath), panelized, and as prefabricated panels. As the Masonry Society notes, there are a multitude of problems associated with adhered veneer:

- Freeze-thaw durability; if one unit fails, the rest will most likely fail; susceptible to water intrusion
- The scratch coat is often skipped and daubs of mortar are applied to back of brick; "lick and stick" method offers less than 100% coverage on back of masonry
- Materials not rated for wet environment
- Insufficient drainage/trapped moisture; cannot install below grade; surface seal unreliable
- Problems with movement accommodation[8]

Despite these issues and drawbacks adhered brick veneer has continued to be used, as it is promoted and sold as relatively inexpensive compared to traditional masonry in spite of the masons' claims of not much difference in installed costs. It is thin profile, lighter weight, and can be installed by a



Multiple bond patterns can be created including staggered, stacked, horizontal, soldier, and can be used at soffit overhangs.

"moderately skilled craftsman." It is also easier to transport adhered brick veneer to the construction site. However, new code requirements emphasize the drawbacks of using adhered brick veneer. For instance, the product struggles to meet air barrier/vapor retarder, continuous insulation, and drainage plane requirements.[9]

MECHANICALLY ANCHORED BRICK RAINSCREEN ASSEMBLY FOR CLASS A CONSTRUCTION: A PREFERRED ALTERNATIVE

New technology developed in Europe and Canada is now being manufactured and installed in the United States. Fully anchored rainscreen brick façades are designed for commercial, institutional, and healthcare markets. As opposed to "sticky brick" veneers, anchored brick systems provide security and confidence for long-term performance.

They are ideal for mid- and high-rise construction as well as recladding. These systems provide for continuous insulation, rear ventilation, and uninterrupted air/moisture barrier. Lighter, quicker, and higher performing than traditional or conventional brick veneer installations, the mechanically anchored brick rainscreen assembly is at the cutting edge of high performing brick wall assemblies. As noted, it is now manufactured in the United States and offers a wide selection of brick color options and types. The system, with sub-framing, weighs in at less than 15 pounds per square foot and is ideal for new construction and retrofit projects. It is designed to last the life of the building, and some manufacturers offer a 50-year warranty. This innovation is changing the way brick is installed in the United States.

Bricks are permanently secured into custom perforated trays.

This article continues on http://go.hw.net/AR052019-9. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Bricks continued to be made by hand until _____.
   a. 1601 b. 1776
   c. 1885 d. 1923

2. The National Association of Home Builders notes that there is a current labor shortage. This has resulted in _____ vacant construction positions nationwide.
   a. 43,000 b. 143,000
   c. 161,000 d. 200,000

3. Traditional 4-inch brick veneer weighs about 40 pounds per square foot. Mechanically anchored brick veneer rainscreen systems, which have brick measuring about 1-inch thick, weigh less than _____ pounds per square foot.
   a. 15 b. 20
   c. 24 d. 33

4. Problems with "sticky brick" or adhered brick veneer include which of the following:
   a. Susceptibility to water intrusion, problems with movement accommodation b. Materials not rated for wet environment
   c. Insufficient drainage, trapped moisture, cannot install below grade d. All of the above

5. Which of the following are attributes of mechanically anchored brick rainscreen assemblies?
   a. Continuous insulation b. Rear ventilation with full and open cavity
   c. Uninterrupted air/moisture barrier d. All of the above

6. Mechanically anchored rainscreen assemblies create a full _____ inch cavity for ventilation, drainage, and possible pressure equalization.
   a. ½ b. ¾
   c. 1 d. 2

7. Traditional brick has a framing load of L/900. Brick rainscreen assemblies are compatible with _____loads, which eliminates the need for reinforced framing loads.
   a. L/360 b. L/390
   c. L/630 d. L/700

8. Mechanically anchored brick rainscreen assemblies are tested and meet or exceed which of the following codes?
   a. AAMA 501.5 - Thermal Cycling of Exterior Walls, ASTM E283 - Air Leakage, and ASTM E330-Structural Performance
   b. ASTM E331 - Water Penetration, ASTM 1886-13a - Large Missile Impact, and ASTM 1996-14a - Large Missile Impact
   c. ASTM C216 Face Brick Grade SW (Severe Weathering) and ASTM C270 Type N Mortar Cement with polymer additives for work-ability and durability
   d. All of the above

9. Emerson College constructed a new, _____-story building using mechanically anchored brick rainscreen assemblies as exterior cladding.
   a. 5 b. 11
   c. 18 d. 20

10. The contractors working on the new building for Emerson College that utilized brick rainscreen assemblies maintained that the assemblies had which of the following characteristics?
    a. Cost-effective, durable finish b. Light-weight, traditional look
    c. Meets/exceed all applicable codes d. All of the above

SPONSOR INFORMATION

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INCORPORATING HUMAN CENTRIC LIGHTING INTO WORKPLACE LIGHTING DESIGN

Presented by:

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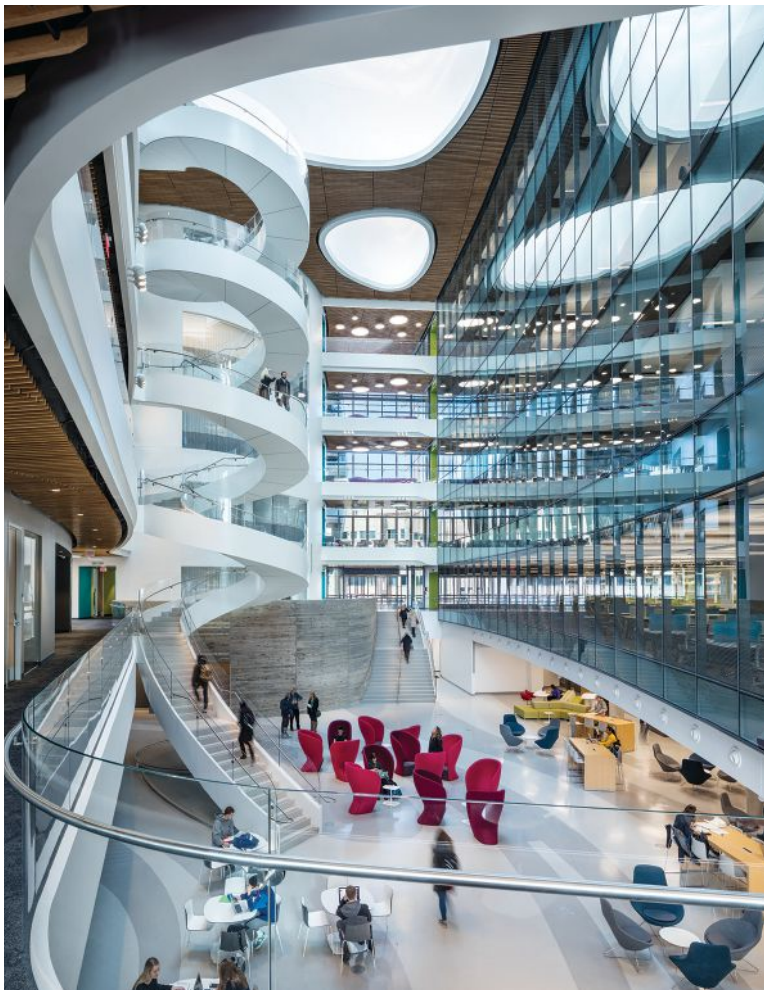

Human centric lighting is a key element to optimizing the work environment and enhancing productivity. Photo Credit: Photo © Warren Jagger Photography

WHAT IS HUMAN CENTRIC LIGHTING?

Light has a psychological impact on our mood, energy, motivation, well-being, and productivity. Human centric lighting is a broad approach to lighting design that employs multiple strategies to improve the human experience. It is a framework to guide the integration of lighting and shading solutions, not just for aesthetics but in a way that caters to the occupants in a space by delivering the right light at the right time with good lighting design.

There are four elements that comprise proper human centric lighting design: quality light, natural light, connection to the outdoors, and adaptive and personalized control. Further, a holistic human centric lighting design may also support sustainability, biophilia, and activity-based design ideals—as we'll discuss next.

Sustainability

Human centric lighting supports sustainability in various ways. The implementation of natural light in a space provides a seemingly obvious opportunity for energy savings, but daylight is highly variable and can be challenging to incorporate for functional use. The range of daylight conditions—such as light intensity, view clarity, and light distribution—make it particularly tricky to use passive, fixed shading devices (e.g. overhangs, permanent glass tint, fixed louvers, and light shelves) and still experience a high-performance environment across all daylight conditions. Instead, the use of interior shading solutions with proper openness factor and total visible light transmittance can make better functional use of natural light—allowing daylight into the space while mitigating glare and reducing solar heat gain. When combined with an automated daylight autonomy solution, your design can maximize useful daylight—ultimately reducing the need for electric light with dimming and related energy consumption.

The use of occupant controls can also contribute to overall sustainability goals—as personal control for dimming and shading adjustment enable occupants to use only the light they need in their space.

LEARNING OBJECTIVES

1. Define human centric lighting and examine its four elements: quality light, natural light, connection to the outdoors, and adaptive and personalized control.
2. Explore design best practices for human centric lighting and determine ways to communicate the value to clients.
3. Analyze opportunities to specify human centric lighting in the modern workplace to create a more comfortable and productive workplace.
4. Examine key design considerations and smart technologies that enable human centric lighting.

CONTINUING EDUCATION

CREDIT: 1 LU/HSW
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Biophilia

Research suggests that contact with nature can be beneficial, leading to improvements in mood, cognition, and health. Those who are more connected to nature tended to experience more positivity, vitality, and life satisfaction compared to those less connected to nature.[1] However, Americans spend approximately 90 percent of their time indoors. Creating an environment where employees feel connected to nature is the basis of biophilic design. Fundamentally, we need nature. Human centric lighting is one solution to bringing the natural environment indoors, as it incorporates daylighting, access to outdoor views, and tunable lighting that can dynamically change with daylight. Lighting designers can embrace the issues of biophilia and natural lighting conditions by incorporating human centric lighting elements in their plans.[2]

Activity-Based

More recently, there is amplified focus in lighting design and architecture to create spaces that can flex and adapt to the task at hand, a concept often called "activity-based design." This is in response to a changing work environment, where employees are rarely sedentary but instead moving from space to space and task to task—often requiring more space for collaboration than for individual tasks. As workers move and space use changes, the environment must adapt, as well. Human centric lighting solutions offer activity-based lighting that is conducive to varying tasks across space types.

Intuitive personal controls give the power to change the space where and when needed. Personal control can be deployed in spaces for social interaction and at the individual level, so occupants may change their personal lighting situation as their tasks and desires change. Automated solutions adapt the space to how people work—changing the lighting condition and shading position driven by environmental sensors and scheduling.

BENEFITS OF HUMAN CENTRIC LIGHTING

Why is human centric lighting important? While we continue to explore the advantages, there are two specific "user" groups who stand to benefit the most: occupants and end-user/owners.

Good for Occupants

Improves overall well-being and comfort

Human centric lighting enables enhanced well-being and promotes comfort through quality lighting and connection to outdoors, affecting both mood and focus. The dynamic nature of daylight and a view of the outdoors provides visual interest and breaks the monotony of repetitive tasks and static interior views. According to the Heschong Mahone Group study on office worker performance and the indoor environment, better access to views consistently predicted better performance.[3] Exterior views give our eyes a chance to relax—a moment to take a break from focusing on close indoor objects, like a computer screen, instead focusing on urban or natural landscapes at a distance. Access to views and daylight are particularly beneficial for learning and office work performance. One study showed an improvement in both memory function of office workers and improvement in test scores for students.[4] Additionally, providing personal control to occupants allows them to adapt the environment as they'd prefer and dynamic overhead lighting that can be tuned for the task improves motivation.

Good for Business

Increases productivity, engagement, and talent acquisition & retention

The effects of human centric lighting have piqued the interest of building professionals and business owners because it is not only good for the occupant experience; it is also good for business. Business leaders in today's competitive workforce are looking for ways to attract and retain talent, as well as maximize staff productivity. Improving the overall well-being of people is also an important goal.[6]

Shades are a critical component for managing daylight and preventing glare. Photo Credit: Photo © Chris Cooper

GLOSSARY

Human Centric Lighting—an approach to creating an environment in lighting that changes over the day and supports people's comfort, well-being, and productivity

Biophilia—human tendency to interact with other forms of nature

Daylighting—maximizing useful daylight to reduce the use of electric lighting

Natural Light—light from the sun, or electric light that is intended to dynamically match the sun

Dynamic Lighting—lighting solutions adapting to changing needs

Daylight Autonomy—The result of designing a space to maximize the amount of useful daylight, thereby minimizing or eliminating the need for supplemental electric light

Circadian Rhythms—physical, mental, and behavioral changes that follow a daily cycle

Energy Efficiency—the goal to reduce the amount of energy required to provide products and services

Energy Management System—total light and heat management by integrating all controls to one

WELL Building Standard—provides a model for space design and construction that uses performance-based systems to positively impact the well-being of the people in the built environment

FACTORS OF ENVIRONMENTAL CONTROL

1. **Personal control of environment**—provide accessible control of lighting and shading of an individual's, or a group of people's, space
2. **Task light level**—provide control of light level and color to the individual so it can be tuned to the task at hand
3. **Light distribution**—targeted lighting for vertical and horizontal surfaces where tasks occur (e.g. a white board)
4. **Color appearance**—ability to change color temperature of white light or full-spectrum control
5. **Connection to outdoors**—provide views, mitigate glare and maximize daylight
6. **Daylight glare**—avoid glare without sacrificing view or daylight
7. **Daylight access**—employees prefer spaces with significant daylight availability[5]

Gains in worker productivity may be impacted by lighting solutions. Multiplying these potential productivity gains over a workforce population represents a substantial return on investment for employers.

Moreover, human centric lighting should be considered not just a design strategy but an amenity that contributes to overall workplace satisfaction. Recent research points to natural light and access to windows/views as one of the top-requested workplace amenities—a more straightforward request than the snacks and services often discussed as key amenities. In the competition to attract and retain quality employees, human centric lighting can be an amenity that sets the company apart. Offices with access to natural light, views of a skyline or natural feature, and personal control technologies that support activity-based work are highly sought after. Access to daylight is even more appealing for lease and purchase value, as well.

FOUR ELEMENTS OF HUMAN CENTRIC LIGHTING

Specifying human centric lighting requires a holistic design approach. By including human centric lighting in the early planning stages of a project, the design professional can develop an approach customized to the client's specific needs. Lighting design experts argue that just having a circadian-based approach is much too narrow. Rather, human centric lighting plays to the ability of the design professional to look at a project as a whole and make design decisions that achieve multiple project goals, like incorporating daylight and reducing energy consumption while maintaining aesthetics.

Creating a holistic approach to design involves focus on four elements pivotal to human centric lighting design. Quality light, natural light, connection to the outdoors, and adaptive and personalized control are the foundation of human centric lighting design and ensure the design professional achieves a truly human centric environment.

Quality Light

The first element, quality light, illuminates the human experience by creating beautiful, comfortable, and productive environments with flicker-free lighting, high-fidelity whites, saturated colors, and consistent light output and no color breakup over time. Lighting should be smooth and continuous in its transition, working the way you expect it to. When using a lighting control and energy management system, quality light is harnessed to improve engagement with high-performance dimming, tunable white controls, and full-color spectrum controls.

Natural Light

The second element, natural light, encourages us to maximize the use of natural daylight in a design and provide a natural light experience for every building occupant, regardless of their location in a space. This is accomplished through the use of real daylight (delivered with window and shading solutions) and electric light that can reproduce the experience of natural light. The result is an experience of natural light extending endlessly into a space—far beyond what daylight could achieve on its own.

Connection to the Outdoors

The third element of human centric lighting is connection to the outdoors and recognizes our desire for quality views and biophilia. Some studies indicate that outdoor views improve the mood, focus, and productivity of occupants. The use of interior shading solutions with proper openness factor and total visible light transmittance make it possible to provide visual connection to the outdoors while mitigating glare and bringing useful daylight into the space. In short, shading solutions are critical to the human centric lighting environment—as they preserve views to the outdoors without compromising building or workspace function.

Human centric lighting solutions have evolved to provide activity-based lighting that is conducive to varying tasks, whether in meeting rooms or flexible workspaces. Photo Credit: Photo © Eric Laignel of Perkins and Will

Studies have indicated that connection to the outdoors is a key aspect of human centric lighting, helping to improve mood and focus. Photo Credit: Photo © Warren Jagger Photography

Adaptive and Personalized Control

The final element, adaptive and personalized control, allows spaces to dynamically change as the needs of the occupants change. Harnessing lighting and shading solutions with intuitive personal controls gives occupants the power to change their space where and when they need it. Complementing personal control is automation, which creates an environment that intelligently adapts throughout the day as smart systems and sensors behind-the-scenes react to environment conditions and respond accordingly.

FOUR ELEMENTS, FOUR BENEFITS

Quality Light
Create beautiful, comfortable, productive, and even "wow-factor" environments with gorgeous high-fidelity whites, saturated colors, and pastels—with consistent output, no flicker, and no color breakup over time.

Benefit: Comfort

Natural Light
Extend natural light seamlessly throughout the space—delivered via a combination of shading solutions that maximize useful daylight, and dynamic, full-spectrum electric light sources.

Benefit: Engagement

Connection to the Outdoors
Satisfy our desire to feel connected to nature with shading solutions that balance daylight and mitigate distracting glare to provide comfortable, seamlessly lit environments.

Benefit: Views

Personal Control and Automation
Deliver an environment that adapts to meet changing functions and environmental conditions with automated smart building systems, and provide personal control to occupants—allowing them to customize lighting to fit their moods, tasks, and changing needs.

Benefit: Flexibility

HUMAN CENTRIC LIGHTING SUPPORTS DESIGN GOALS

Human centric lighting supports the goal to create environments that maximize natural light, meet sustainability objectives, and—most importantly—provide comfortable, collaborative, productive working environments for their employees. How then do architects and designers put this to practice?

This article continues on http://go.hw.net/AR052019-10. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. The four elements of HCL are quality of light, natural light, adaptive and personalized control, and _____.
   a) Credible design
   b) Connection to the outdoors
   c) Light intensity
   d) Sustainability

2. In activity based design what gives the power to change the space where and when needed?
   a) Mainframe computers
   b) Sun shading options
   c) Intuitive personal controls
   d) None of the above

3. Designing best practices for HCL should include harnessing daylight, controlling glare and heat, and meeting building standards for wellness and stability. The WELL Building Standard prioritizes how many key features?
   a) Three
   b) Six
   c) Nine
   d) Seven

4. Smart enterprise management systems can easily scale from a single area to an entire building or a campus with many buildings—making them ideal for _____.
   a) Manufacturing plants
   b) New construction
   c) Retrofit applications
   d) Both B and C

5. What term describes maximizing useful daylight to reduce the use of electric lighting?
   a) Daylighting
   b) Energy consumption
   c) Ventilation
   d) Overhead lighting

6. What is becoming more commonplace in the modern workplace, allowing communication to be technology driven and accessible to all?
   a) Internet of things
   b) Wireless connectivity
   c) Stagnant controls
   d) Both A and B

7. What creates high-quality whites, pastels, and saturated color enhancing the experience of the space?
   a) LED dimming
   b) Full-color, four-channel tunable light system
   c) Shading
   d) Automation

8. What is the term that describes human tendency to interact with other forms of nature?
   a) Natural light
   b) Dynamic lighting
   c) Shading devices
   d) Biophilia

9. In relation to the "3-30-300 Principle", which of the following statements is not true?
   a) People are the most valuable asset of any building
   b) Enhanced office design has been shown to improve employee well-being
   c) Real estate costs make up the largest expense for employers
   d) Giving employees personal control of their light reduces energy costs

10. Which of the following is a benefit when automated solutions adapt the space to how people work?
    a) The space adapts without the occupant needing to press a button
    b) It can minimize energy costs
    c) It offers amenities to attract talent
    d) All of the above

SPONSOR INFORMATION

LUTRON

Lutron Electronics, founded in 1961, is a leader in the lighting control and management industry. From dimmers for the home, to lighting management systems for entire buildings, the company offers more than 15,000 energy-saving products, sold in more than 100 countries. The company is headquartered in Coopersburg, Pennsylvania. www.lutron.com/humancentriclighting

THE RISE OF GABLED MODERN ARCHITECTURE

FROM ORIGINS TO FUTURE DIRECTIONS

Presented by:
BORAL®

The Gabled Modern House as we commonly see it today—primarily in spec homes and custom builds.

LEARNING OBJECTIVES

Upon completion of this course the student will be able to:

1. Discuss the core differences between gabled modern styles by geographic setting and market type.
2. Demonstrate the relationship between various cultural, economic, and consumer trends and the rise of this architectural style.
3. Identify the key features, characteristics, and trending variations of this contemporary look.
4. Explain why the gabled modern style is influencing trends and treatment of roofs.
5. List the various design elements impacting the look of roofs moving forward.

CONTINUING EDUCATION

AIA CREDIT: 1 LU/ELECTIVE
AIA COURSE NUMBER: AR022019-2

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR022019-2 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

INTRODUCTION

Residential architecture is always changing. The news headlines and social trends that represent a period of time also influence how homes are built. From available materials and consumer wealth to how people consume information, the effect on residential architecture can be seen in home design and construction.

Most single-family homes in the U.S. today are designed by staff architects and designers working for developers. Further, many homes that are being designed incorporate some blend of traditional gabled roofs, and the traditional use of the gabled style has given way to architectural sameness. As a result, most award-winning home designs do not use gabled roofs but instead incorporate a flat roof design. There exists an opportunity for forward-thinking builders to shift their design from traditional to modern using a familiar style with a modern twist. An architect's ability to identify and incorporate these design trends into client projects is important; they're expected to recommend designs that not only reflect today's style but also tomorrow's needs.

What works for one project may not work for another, depending on the region, location—urban or rural—or market. Up until recently, designers had to choose different styles to suit different project needs. With the rise of the internet, there are more architectural styles playing out across larger regions. This is compared to the unique regional influences that used to exist, such as the contemporary white farm house, for example. The Gabled Modern home can be seen in rural and urban communities and in luxury and middle markets alike with their wide range of applicability and design options. The Gabled Modern style may have its origins in post-Depression era Minimal Traditional homes, but there are several other influencing factors helping to propel Gabled Moderns to the forefront of modern architectural design.

This article will help architects understand this trend through its origins and influences. Readers will learn how they can help builders and homeowners design a Gabled Modern home using the latest in color and material options. Finally, an exploration of how existing design styles and accents are being incorporated into Gabled Moderns will enable designers to apply a wide range of stylistic accents to any project. This knowledge will set readers apart as they will be able to incorporate a unique design trend and know how to apply it in different scenarios.

First, a look back in time to see the origins of Gabled Moderns.

THE GABLED MODERN STYLE: A RISING TREND

An individual can drive through any neighborhood in the United States, urban or rural, and deduce when the houses were built and what the major economic influences were at the time, based on the design characteristics of the homes. Each decade tends to have its identifiable style: a trend that represents a generation and reflects the culture of the time. One can look at a Minimal Traditional-style home and know that it was the hallmark style of the 1930s, for example.

GLOSSARY

1. Gabled Modern
Recently named home style featuring the stylistic elements of the gabled roof combined with modern design accents and clean lines so the entire home is seen a single silhouette

2. Minimal Traditional
Popular home design style in the Depression-era featuring low ornamentation, simplistic designs, local materials, and small footprints

3. Historical Vernacular
Referring to America's residential architectural history and characterized by homes built without skilled architectural guidance

4. Tiny Homes
Homes on a small footprint of less than 800 square feet and representing minimalistic living

5. Rural-Urban
A cultural shift not only in where people live, but in how urbanites want to incorporate elements of rural living into city dwellings

6. Sensorial Ease
A minimalistic approach to design that relies on simplicity and fewer visual distractions to help consumers reconnect with their environment

7. Digital Overload
Over-exposure to social media and digital life that causes numerous negative side effects

8. Monochromatic
A single-color approach to residential building design where the roof color and/or material is the same or closely matches the rest of the home's exterior

9. Subtraction/Duplication
Variations on the Gabled Modern style utilizing architectural "cuts" that remove a section of the original shape and/or use the basic shape in layered repeats

10. Traditional Mash-Up
Another variation on the Gabled Modern style that uses traditional building layouts and materials with contemporary design accents

Gabled Modern homes are a new construction style and exhibit parallels between minimalist, Depression-era homes of the 1930s. A close relative to barn homes, Gabled Moderns give the builder industry unique options to experiment with construction details, stylistic accents, and the freedom to work with small or large residential footprints. What sets this type of home apart is similar to modern design trends but applied differently and for different reasons. Distinguishing these differences is crucial to properly apply the Modern Gabled style to new construction.

A full understanding of the new Gabled Modern styles requires reaching back several decades—referencing both vernacular architecture and post-depression homes of the 1940s to the variety of present-day applications in residential architecture. Following that will be a discussion on the contributing economic, cultural, and consumer factors influencing why this home style is trending. Lastly, new and evolving trends for the Gabled Modern house and beyond will be analyzed, with special attention paid to roofing systems.

The gabled moderns of today are a contemporary take on the simple barn homes of the past and of vernacular architecture.

Vernacular History

Any discussion on the Gabled Modern home must include a reference to America's residential architectural history.

1930s and 1940s

Architectural similarities can be traced back to the 1930s and 1940s, where function was the primary focus and simplicity was key due to the harsh economic climate. Like the Gabled Moderns, Minimal Traditional homes of the '30s and '40s were and characterized by a few key points. Stylistic cornerstones consisted of the following features:

- simplistic silhouettes
- basic box shapes with open gable roof,
- little to no overhang of eaves,
- highly austere, low ornamentation,
- basic building materials—primarily wood or stone,
- single level or one and-a-half levels common, and
- small footprint—low square footage.

Compared to the Minimal Traditional homes of the Great Depression and World War II era, Gabled Moderns share a few characteristics, namely simplistic silhouettes, basic box shapes with open gable roofs, and little to no overhang of eaves. From there, the gabled moderns of today take this simplistic architectural style further, which will be discussed later.

Post-World War II, the trend of affordable, simplistic homes gave rise to suburban sprawl as entire housing communities sprang up. These homes were sometimes pre-fabricated, allowing for mass production. Architects and builders had more design choices and building materials to choose from, since consumers started to demand more ways to express individual preferences in the look and style of their homes. Most homes were still built on a relatively small footprint and featured little ornamentation, like Gabled Moderns. Stylistic preferences favoring simple, practical designs with little ornamentation were about to fall by the wayside as the nation's confidence grew.

1950s and 1960s

In the decades following World War II, residential articular styles reflected the America's growing wealth and economic strength. Cape Cods rose in popularity in 1950s suburban living and allowed homeowners to express their individuality

through modern siding and roofing choices. Like the Gabled Moderns of today, Cape Cods feature little ornamentation, one and a half levels, and traditionally small footprints.

The 1960s gave rise to Usonian homes, inspired by the designs of renowned architect Frank Lloyd Wright.[1] These homes were considered practical and modern, characteristics shared by Gabled Moderns.

Mid-Century Modernism in the 1960s was reflected by the ideal that 'bigger is better.' One-story ranch homes became two stories, and homes started to occupy larger footprints. Yet, the focus was still on suburban living; there was not yet an architectural style that could adapt to urban dwellings the same as suburban or rural homes.

Gabled Moderns draw features and characteristics like Minimal Traditional, Cape Cods, Usonians, and Ranch-style homes. Features like simplistic, practical design, basic building design and materials, single-story, and low square footage could be seen in different variations from the 1930s to the 1960s. Today's Gabled Moderns share the above features and are also characterized by:

- highly austere, low ornamentation,
- single level or one and-a-half levels common, with two-story versions popular with families and urban dwellers, and
- small and large footprints.

Unlike the pre-fabricated, mass-produced homes of the Mid-Century Modernism movement, Gabled Moderns commonly seen today are primarily in spec homes and custom builds. These stylistic differences are explored next.

STYLISTIC DIFFERENCES OF THE GABLED MODERN HOME

This style has been growing in popularity over the last decade, but it didn't have a name until recently. Gabled Moderns have borrowed different construction and design elements from other styles over the years, but they don't "look" like anything seen before. This growing interest in applying and adapting the style in ways not typical to its historical origins reflects current influences and consumer trends. The Gabled Moderns of today are a contemporary take on the simple barn homes of the past—homes that were erected not by an established architect but rather by local contractors or home owners with available (and usually locally sourced) materials.

In this regard, vernacular styles were the architecture of common people, built without guidance from a formally educated professional. Function was the most important requirement, and any aesthetic ornamentations without purpose were usually omitted. Gabled Moderns, on the other hand, are intentional designs. Skilled architects consciously borrow design elements from vernacular history and apply them to functional, practical, and beautiful home builds. Examples of this can be seen across the world.

Global Appeal

This evolution of early vernacular barn house styles into Gabled Modern ones began popping up in various regions throughout Europe in the wake of the great recession of 2008. These regions have a strong focus on repurposed architecture as well as an aesthetic austerity that is often built into the DNA of the culture. From there, the trend expanded and is now popular among custom architectural projects in the United Kingdom, Australia, Canada, the United States, and beyond.

Today's builds amplify the simplicity of country living, marked with a new "less is more" sense of contemporary elegance. These dwellings range from large, luxury homes to casual family residences, to simple, one-room escapes.

Rural regions aren't the only ones noticing the influence of this architectural style. Urban areas—often in redevelopment and infill projects—are also showing a rise in attention to this style.

STYLE VARIATIONS IN LUXURY, MIDDLE, AND ENTRY MARKETS

Gabled Moderns in cities are typically longer rectangular forms and two- or three-story heights—ideal for the narrow lots typical in urban areas where space is limited, and upward builds are encouraged. For neighborhoods with larger plots, L- and C-shape formations are popular. The beauty of Gabled Moderns is their adaptability to these variety of dwellings and lot sizes. Design flexibility is a hallmark of this style, as it can be used in custom architecture for the middle market as easily as luxury dwellings.

The luxury market is not limited to variations based solely on land sizes. Today, the

Larger footprints and greater use of windows and skylights are common among luxury designs seen with the Gabled Modern home.

consumer's expanded ideas of luxury include simplicity and austerity—paving the way for upscale adaptations of the Gabled Modern style. Larger footprints and greater use of windows and skylights are common among luxury designs.

Of course, mid-level and entry price points are two areas where the Gabled home can be well-applied. Fewer and/or smaller windows and more modest materials are more typical here. Mid-level looks are growing in popularity in up-and-coming urban neighborhoods, and even for some tract home developments where younger buyers and new families may be looking for a new, contemporary style of home at an affordable price.

Entry-level styles tend to sacrifice square footage before anything else. As single stories, the pitched roof allows for a greater sense of space by way of cathedral ceilings. The tiny-home trend (under 800 square feet) appeals here. Some homes blend various vernacular styles, such as barn with cape cod, shotgun shack, or even salt-box styles.

Tiny homes reflect a modern trend toward minimalism and simplicity, details that work well with Gabled Moderns. Unlike the 'bigger is better' culture, consumers favoring this philosophy desire that space be used smarter and with greater emphasis on the environment. They also desire more financial freedom and less materialism than what traditional homes often entail.

Gabled Moderns also focus on minimalism and simplicity, and designs that blend in with the surrounding environment. The Gabled roof style is designed to improve energy efficiency and sustainability. Their longevity also saves money and their design flexibility allows for a wide range of creative influence, no matter the square footage. In few other architectural design styles can the needs of luxury also intersect with the needs of living smaller.

With all these variations at hand, the notion of an evolution from any sort of vernacular simplicity starts to feel less relevant. In fact, while the idea of a barn house or the simplistic designs of Depression-era homes as stylistic parallels re relatable, they don't entirely explain the catalysts to this design trend. What continues to move Gabled Moderns forward is the impact of societal changes and consumer influences on building choices. To get a better understanding, one must review some of the cultural and economic shifts that have impacted consumers over the past decade and thus have paved the way for an interest in Gabled Moderns to rise.

This article continues on http://go.hw.net/AR022019-2. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Gabled Moderns draw the most influence from _____ homes of the _____.
   a. Cape Cod/1930s and 1940s
   b. Barn/1930s and 1940s
   c. Barn/1940s and 1950s
   d. Usonian/1950s and 1960s

2. Minimal Traditional homes had many characteristics, such as _____.
   a. Simplistic silhouettes
   b. Basic box shapes with open gable roof
   c. Basic building materials, usually locally sourced
   d. All of the above

3. Early vernacular barn-style homes gained popularity in what regions first?
   a. Rural Europe, Scandinavia, and Japan
   b. Rural Europe
   c. Scandinavia and Japan
   d. Japan and Australia

4. Entry-level and middle-market Modern Gabled houses blend various vernacular styles, such as shotgun shack, salt-box, or _____ styles.
   a. Cape cod
   b. Ranch
   c. Barn with cape cod
   d. Barn

5. There are approximately ____ percent of people living in urban areas today.
   a. 55
   b. 60
   c. 65
   d. 75

6. Sensorial Relief design examples include all the following EXCEPT:
   a. Multi-purpose spaces
   b. Single color for the roof and walls
   c. Reduced ornamentation
   d. Austere design

7. The idea that 'bigger is better' was reflected by which time period of history?
   a. Mid-Century Modernism/1960s
   b. Early 1900s
   c. World War I era
   d. None of the above

8. _____ as an all-over color is seeing the strongest uptrend growth of all popular colors.
   a. White
   b. Tan
   c. Black
   d. Gray

9. In Traditional Mash-up architectural designs, _____ can be combined with familiar building materials like wood, brick, and stone.
   a. Double-hung windows
   b. Double-hung windows, eaves
   c. Single-pane windows, eaves
   d. Single-pane windows

10. Modern roofs provide which of the following benefits:
    a. Save and produce energy
    b. Stormwater capture
    c. Material use (instead of waste)
    d. All of the above

SPONSOR INFORMATION

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AN INTRODUCTION TO ELECTROCHROMIC GLASS: WHAT IT IS AND HOW IT WORKS

Electrochromic glass preserving great views at the University of Colorado, Boulder.

LEARNING OBJECTIVES

At the end of this course, learners will be able to:

1. Understand the importance of electrochromic (EC) glazing and how it can be used to solve the challenges of simultaneously achieving energy performance, daylight and views, and comfort.
2. Analyze the aesthetic performance of next-generation EC glazing and how it works compared to conventional solar control solutions.
3. Examine EC's benefits.
4. Explain how EC systems can be controlled to meet energy performance and user comfort needs.
5. Understand the key aspects of zoning with EC and how zoning can be used to optimize tradeoffs between the competing goals of glare control, daylight admission, energy performance, and light color quality.

CONTINUING EDUCATION

AIA CREDIT: 1 LU
COURSE NUMBER: AR102018-4

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR102018-4 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

ELECTROCHROMIC GLASS: BENEFITS, FEATURES, AND COMPARISONS TO STATIC WINDOWS[1]

Electrochromic (EC) glass, sometimes known as smart glass or dynamic glass, is an electronically tintable glass used for windows, skylights, facades, and curtain walls. It is automatically controlled by light sensors and can also be directly controlled by building occupants. It is popular for its ability to maximize access to daylight and outdoor views, reduce energy costs, and improve occupant comfort.

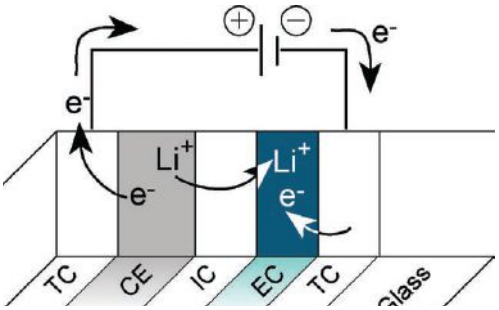
Electrochromic Glass versus Other Smart Glass

Electrochromic glass can also be referred to as "dynamic glazing" or "smart glass." Dynamic glazing is defined as "'any fenestration product that has the fully reversible ability to change its performance properties, including U-factor, solar heat gain coefficient (SHGC), or visible transmittance (VT).'"[2] The category not only includes electrochromic glass, but also photochromic (PC), thermochromic (TC), suspended particle device (SPD), and polymer dispersed liquid crystal (PDLC).

With electrochromic glass, an electric charge is applied that allows it to change its performance properties, specifically visible light transmittance and solar heat gain coefficient. Suspended practice devices and polymer dispersed liquid tend to be either on or off, meaning they are either transparent or opaque; however, some have intermediate tint states. Electrochromic, photochromic, and thermochromic are all able to provide gradations of tint but do not become opaque. Photochromic means that light initiates its ability to change, and thermochromic changes are initiated by heat. As opposed to photochromic and thermochromic glass, which are reactions that cannot be controlled, electrochromic is a unique smart glass that can be controlled and set.

Components of Electrochromic Glass[3]

For some manufacturers, electrochromic coating consists of five layers that are less than a fiftieth of the thickness of a single human hair. The five layers of electrochromic coating include two transparent conductor (TC) layers; one electrochromic (EC) layer, sandwiched between the two TC layers; the ion conductor (IC); and the counter electrode (CE). Applying a positive voltage to the transparent conductor in contact with the counter electrode causes lithium ions to be driven across the ion conductor



Movement of lithium ions and electrons between the layers gives EC the ability to change tint.

and inserted into the electrochromic layer. Simultaneously, a charge-compensating electron is extracted from the counter electrode, flows around the external circuit and is inserted into the electrochromic layer.

The tint of electrochromic glass is controlled by the amount of voltage applied to the glass. Applying a low voltage of electricity darkens the coating as lithium ions and electrons transfer from one electrochromic layer to another. Removing voltage, and reversing its polarity, causes the ions and electrons to return to their original layers, causing the glass to lighten and return to its clear state.

The result is that one piece of glass that can dynamically alter its visible light transmittance at different times as needed. While there are differences among manufacturers, there are typically four primary tint states to electrochromic glass: 60% (clear), 18% (intermediate state #1), 6% (intermediate tint state #2) and 1% (fully tinted).

While coatings enable these transitions to be made, the control system is the intelligence that allows users to take full advantage of electrochromic glass's range of functions.

In-Pane Zoning

In-pane zoning achieves multiple tint states, or zones, within a pane of glass and offers the ultimate level of daylight management and glare control. At many points in time only a portion of a given window is subjected to glare and strong solar radiation. To control this, entire windows would typically have to be tinted, which would detract from the quality of natural light emitted into a space. However, in-pane zoning allows for some areas of a pane to be tinted while others remain clear. The clear areas of the pane permit natural light to enter a room while the tinted areas control glare and heat gain. Light quality can be maintained even if just 10-15% of a glazed area remains clear.

Control Categories

Electrochromic glass offers a variety of control options. Users can operate automatic control settings to manage light, glare, energy use, and color rendering. The controls can also be integrated into an existing building automation system. For users who desire more control, electrochromic glass can be manually overridden using a wall panel, allowing the user to alter the tint of the glass. Depending on the manufacturer, users can also change the tint level via mobile app.

Different manufacturers approach system design differently; however, there are two main categories for control systems: centralized and decentralized. All systems are comprised of EC glass in an integrated glass unit (IGU), along with sensors, cables, control panels, and switches. From a user standpoint the system design approach is not a factor, it just refers to how the glass is setup and controlled but the resulting functionality is the same.

In-pane zoning on display at the University of New Mexico Farris Engineering Center.

Overall, the components of electrochromic glass allow it to maximize daylight and views while still offering control of energy usage and glare. These functions help to increase productivity and aid mental health, all while adding to the aesthetic of a building's design and lowering life cycle costs.

Sunlight

Electrochromic glass's ability to provide both energy and health benefits is inseparable from its ability to control and distribute sunlight. When the sun rises in the morning, electrochromic glass can fully tint east-facing windows to block harsh morning sun. Other orientations remain clear, maximizing (or harvesting) daylight. By noon, when the sun is directly overhead, portions of glass can be tinted as needed. For example, some can be moderately tinted to 20%, while others are at 6% or perhaps, if facing to the south and west, fully tinted.

The different tint states of electrochromic glass in action at Ashford Castle in Cong, Ireland ©Sean Conboy.

EC glass allows patients at this hospital enhanced control of their environment from their bed.

Late afternoon, in a cooling-dominated climate zone, is peak load time. The grid is often stretched, and energy rates can spike; consumption must be lowered. During this time of day, the BMS can override standard controls and become fully tinted, maximizing heat rejection and load reduction. By sunset, the majority of the building is back to a clear state. With zoned glare control, where only part of a pane tints, glare can be blocked while daylight enters.

Daylight and Views[4]

Controls translate to a building's functionality in several ways, but initially by regulating natural daylight and views. Daylight, as opposed to artificial electric light, has been shown to provide mental health benefits and increase productivity. Research has demonstrated that with daylight and a view of the outdoors, mental function and memory are 10-25% better, cell processing is 25% faster, and hospital stays are 25% shorter. Daylight also allows workers to be 18% more productive and students to score 5-14% higher on test scores and learn 20-26% faster. When buildings have sufficient natural daylight, retail sales increase 15-40%. Daylight and views contribute to better health, better sales, and better buildings.

While daylight and views can contribute to the overall well-being of the individuals within a structure, significant amounts of daylighting and views have the potential to cause unwanted heat gain or loss in addition to glare. Blinds have been the traditional "solution" to preventing temperature fluctuations and controlling glare. However, blinds eliminate daylight and views, negating the initial purpose of the window installation. Electrochromic glass provides a genuine solution to all of the issues mentioned above.

Electrochromic Glass Versus Traditional Glass

By adapting to the external climatic conditions, electrochromic glass minimizes energy use by reducing heating loads in winter, air conditioning in summer, and electrical lighting all year long. According to the U.S. Department of Energy,[5] energy lost through conventional windows accounts for approximately 30% of heating and cooling energy.

Conventional windows also contribute to glare and heat gain and require blinds and shades to offset the negative effects of the sun. Electrochromic glass eliminates the need for additional solar shading systems, as well as the use of additional energy and resources for their manufacturing, transportation, and installation.

If shades and blinds are used, not only do the windows need to be cleaned and maintained but also the window coverings. With electrochromic glass, there are no additional maintenance requirements besides keeping the glass clean, thus limiting the environmental impact of the building.

Because EC glass delivers the performance of four different types of glass, it is further helpful to compare it to several types of traditional static glass.

No static glass can meet the performance of EC at 1% Visible Light Transmittance (VLT) and 0.09 Solar Heat Gain Coefficient (SHGC).

	VISIBLE TRANS (%)	VISIBLE REFL. OUT (%)	VISIBLE REFL. IN (%)	SHGC	WINTER U-FACTOR
TYPICAL EC (CLEAR STATE)	60	16	14	0.41	0.28
COMPARABLE STATIC GLASS (TRIPLE SILVER LOW-E)	51-70	11-14	12-19	0.23-0.39	0.29
TYPICAL EC (TINT #1)	18	10	9	0.15	0.28
COMPARABLE STATIC GLASS (NEUTRAL REFLECTIVE)	19-21	6-20	7-18	0.15-0.17	0.24-0.25
TYPICAL EC (TINT #2)	6	10	9	0.10	0.28
COMPARABLE STATIC GLASS (NEUTRAL REFLECTIVE)	9-13	10-12	7-27	0.13-0.19	0.24-0.33

EC values can vary by manufacturer as well as substrate color. Values listed are for standard clear glass. Data on comparable static glass products derived from Oldcastle BuildingEnvelope's GlasSelect tool, Oct. 2017. Data indicative, does not represent all comparable static glass products available.

For triple silver low-E products, shown on line two, the values are all within range of typical static options, with the SHGC slightly higher. For EC product at the first tint state, which is referenced in the third line, the benchmark is neutral reflective products, as seen in the fourth line. Most values are within the typical range, with the interior and exterior reflectance at the lower end of the range. At the second tint state for EC glass, noted in the fifth line of the chart, are "more aggressive" neutral reflect products. Here, EC outperforms SHGC and is at the low end of reflectance, with a U-factor in the middle of the range. While EC glass varies by manufacturer, this chart still provides a general sense of the differences between static and electrochromic glass.

When evaluating EC, it is important to understand that glare control is a function of proper controls but also the inherent product capability. Lawrence Berkeley National Labs maintains, "An EC with a broader switching range and a very low transmittance (1% or less) […] would reduce or eliminate the dependence on interior sun-blocking shades for some applications."[6] Having 1% VLT eliminates the need for shades or blinds and avoids the blackout that occurs with 0% VLT.

The components of electrochromic glass gives users precise control over the amount of sunlight entering a space, helping to lower a building's energy costs all while eliminating the need for shades or blinds and maintaining natural views.

SUSTAINABILITY, CODE, AND DESIGN[7]

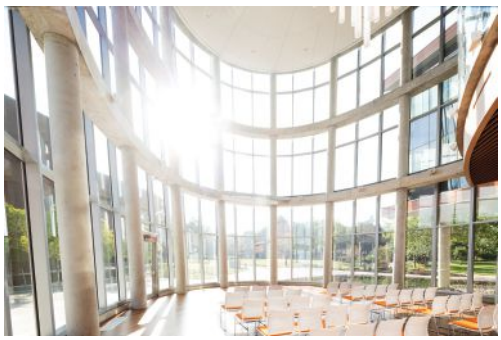
In addition to maximizing occupant comfort, electrochromic glass is also a sustainable product that allows architects and builders to elegantly solve solar-control challenges without sacrificing aesthetics. A building even partially glazed with EC can be designed to take advantage of natural daylight without compromising the connection to the outdoors, making it a great fit for projects aiming to achieve sustainability certifications.

Energy Performance

In addition to occupant benefits, electrochromic glass helps building owners achieve their sustainability goals through energy conservation. By maximizing solar control while minimizing heat and glare, electrochromic glass allows building owners to achieve cost savings

over the building's life cycle by reducing overall energy loads by an average of 20 percent and peak energy demand by up to 26 percent.

Due to electrochromic glass's reliance on low-voltage electricity, it takes less electricity to operate 2,000 square feet of electrochromic glass than to power a single 60-watt light bulb. Maximizing daylight through the strategic use of smart glass can reduce a building's reliance on artificial lighting and significantly reduce its cooling load. In addition to sustainability and occupant benefits, architects are also given the freedom to design without the need for blinds and other shading devices that clutter the exterior of the building.



Uncontrolled glare and heat gain at Bowie State University could have made this space unusable.

Electrochromic Glass tints to control heat and glare, making the space usable again.

This article continues on http://go.hw.net/AR102018-4. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. How many layers are in electrochromic coating?
   a. 2 b. 3
   c. 4 d. 5

2. True or False: In-pane zoning can achieve multiple tint states within a pane of glass.
   a. True b. False

3. Users can operate EC glass control setting to
   a. manage light and glare b. energy use
   c. color rendering d. All of the Above

4. True or False: Daylight enables more worker productivity, higher student test scores, and increased retail sales.
   a. True b. False

5. Most EC products have a range of VLT from below _____% to above _____%.
   a. 2,5 b. 3,10
   c. 5,10 d. 10,50

6. True or False: It takes less electricity to operate 2,000 square feet of electrochromic glass than to power a single 60-watt light bulb.
   a. True b. False

7. EC glass can help earn credit towards green building certifications such as
   a. LEED b. BREEAM
   c. WELL d. LBC
   e. All of the Above

8. EC glass installed at SCHEELS reduced energy demand and the need for HVAC in the store by blocking up to _____% of solar heat.
   a. 33 b. 45
   c. 51 d. 91

9. True or False: EC glass can eliminate the need for blinds.
   a. True b. False

10. True or False: No static glass can meet the performance of EC at 1% Visible Light Transmittance (VLT) and 0.09 Solar Heat Gain Coefficient (SHGC).
    a. True b. False

SPONSOR INFORMATION

SageGlass®

SageGlass is wholly owned by Saint Gobain, one of the world's largest glass manufacturers. SageGlass electrochromic glass is a revolution in building products, providing glass that automatically changes tint in response to exterior conditions, transforming glass from a static to active part of building design.

EXPLORING TRIM OPTIONS AND USES FOR MULTIFAMILY DESIGN THAT ENGAGE MILLENNIALS

Presented by:

TAMLYN

35 Dolores, Levy Design Partners. Located in the San Francisco Mission District is a 33 condominium project on the site of a former car wash. Multiple materials including extruded aluminum trim help in creating a unique and desirable property.

LEARNING OBJECTIVES

After reading this article, you should be able to:

1. Recognize how current trends in urban/suburban multifamily apartment design are influenced by the style preferences of the millennial generation and the hospitality industry.
2. Outline the advantages of extruded aluminum trim components over traditional materials in terms of the manufacturing process, environmental impacts, safety and resiliency.
3. Identify the ways in which exterior and interior metal trim applications can provide clean, ultra-modern details that support the contemporary design of today's multi-family dwellings.
4. Understand the variety of options available for creating custom or semi-custom metal trim profiles in a cost-effective manner.

CONTINUING EDUCATION

AIA CREDIT: 1 LU
AIA COURSE NUMBER: AR062018-3

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INTRODUCTION

Multifamily apartment demand continues to be on the rise in the United States. A growing desire for millennials to live close to the city, in a minimalist space, and with trendy design is influencing how and where these apartments are being built. Based on the millennial design preferences, designers and building professionals must specify products that attract this generation to the space. In this course, we will examine the impact of the millennial generation to multifamily space design and how extruded aluminum trim can provide an aesthetic design while being a smart choice economically.

MULTIFAMILY DWELLINGS—STILL VIABLE

Over the past decade, multifamily units have been on the rise, and that trend is continuing. According to the National Multifamily Housing Council (NMHC), demand for rentals has increased by nearly 1.7 million year after year.[i] According to the National Association of Home Builders: Eye on Housing, multi-family housing ended the fourth quarter of 2017 strong. The demand for multifamily units coupled with an increasing employment rate continues to strengthen the demand for this type of dwelling.

Marketplace, Studio Intrigue Architects. Located in Lansing Michigan this project strives to offer high quality amenities both shared and in each unit.

Multifamily Demographics

So, what types of consumers are purchasing multi-family apartments and where are they going? According to NHMC (2017), 37% of the United States live in renter-occupied homes with 50% of those renters being under 30 years old, also known as Millennials.[i] Considering that the millennial generation equates to around 55,518,756 people that is a HUGE number for developers to consider.[i]

Where do these renters want to live? According to NMHC (2017), New York, Los Angeles, San Francisco, Houston, Dallas, and Washington D.C. are the top cities occupied by renters.[i] New York has the highest apartment percentage of housing at 45% with 1,556,161 people occupying apartment buildings in 2017.[i]

What does this mean for building professionals? The growth and development is not going away for multi-family construction, in fact, according to NMHC, 4.6 million new apartments are needed between now and 2030 (2017).[i] But how do we meet that demand? Building professionals must understand what renters expect in multifamily dwellings while also being sensitive to the current challenges facing the building sector. According to the Barriers to Apartment Construction Index, 50 metro areas were examined, and two major barriers emerged: regulations and available land. To continue meeting the demand for multifamily dwellings, building professionals must acknowledge millennial influences while combating the construction barriers to entry.

The "Millennial Impact"

Seeing that 50% of renters are part of the millennial generation, it's important to understand the impact their preferences have on multifamily building design. The American Dream has always focused on owning a home, but for Millennials, this generation is saddled with student loans and low earning jobs. Renting is a viable option that helps them begin to save for their future home. Millennials are better informed about their choices than any other generation—they want everything to be just right, and they are willing to spend to get what they want. According to a recent study by Schlage (2016), millennial renters are willing to pay about 1/5 more to have smart home features.[ii]

In line with trendy design, this generation desires minimalistic interior design. Whereas baby boomers loved warm and rich design, millennials seek to avoid clutter. With multifamily spaces providing smaller spaces rather than a large home, designers should design the space to be functional, minimal, yet with elements of luxury.

Extruded aluminum can be used to create minimalistic reveals with drywall (left wall) or bold accents with other panels (rear wall)

Hospitality's Influence on Multifamily Design

Research shows that millennials continue to be a key demographic who want to rent near the city with the ability to be close to work and entertainment, without the hassle of maintaining a home or yard. So where do we look for inspiration? According to Britney Littleton Gilley, ASIS, IIDA, and Vice President of Design at Builders Design (2018), "Multifamily design trends continue to be influenced by the high style of boutique hotels." Trend spotting, predicting future design peaks, and trending being ahead of the trend are all ways for apartment developers to catch renter's eyes. Just as a hotel must attract and hopefully garnish repeat customers, a multifamily unit must attract and retain residents. According to Jamie Gorski, chief marketing officer at Bozzuto in Greenbelt, Maryland, apartment managers can look at the hotel industry for design, technology, and branding opportunities.

Extruded Aluminum Trim paired with multiple siding products including a commercial rainscreen fiber cement and others on a Holiday Inn and Suites.

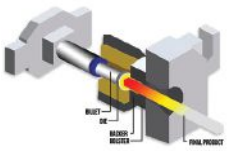
WHAT MAKES EXTRUDED ALUMINUM UNIQUE?

Because of the durability and stability of aluminum, it has become a go-to product for many types of applications both in and out of the home. Foil, zippers, smart phones and even power grids are all products of extruded aluminum. It is true that aluminum is common in our day-to-day lives, the unique aspects it possesses are what make it a perfect choice for multifamily building design.

Manufacturing Process

Crafting extruded aluminum is a highly versatile metal-forming process that has a wide array of desirable physical characteristics. Aluminum is a mineral that is found in abundance earth's crust and then mined into alumina. To make the alumina useful for building, the alumina must be smelted, mixed, and cast into billets. Created extruded aluminum is dependent upon heat, so billets are heated at 750–900 degrees Fahrenheit, and the process of extrusion begins. Extrusion is the process of taking and shaping aluminum by forcing it to flow through a shape called a die. The extruded aluminum then passes through a backer and bolster which maintains the shape while adding space. 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.

Most extruded shapes for architectural use are fabricated from 6063, an aluminum alloy with

Step 1: Aluminum is processed into alumina. The alumina undergoes smelting and alloying producing solid billets of cast metal.	
Step 2: Billets are heated and pressed into a die which creates the shape or profile.	 
Step 3: The extruded aluminum then passes through a backer and bolster which maintains the shape while adding space.	

magnesium and silicon as the alloying elements. Known as 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. The T5 designation indicates it has been artificially aged and moderately heat-treated.

Environmentally-Friendly

Millennials are more concerned with the environment than previous generations. And because they're concerned about the long-term viability of the earth's ecosystems, they prefer to purchase products from sustainability-focused companies, even if it costs more. According to the Global Corporate Sustainability Report (2015), 73% of Millennials prefer to choose a product that comes from a sustainable brand.

Extruded aluminum trim is constructed from post-industrial and post-consumer scrap, meeting requirements for sustainability and contributing to the U.S. Green Building Council's Leadership in Energy and Environmental Design (LEED®) certification for Recycled Content. Today's building professionals want to focus on green materials and visually appealing looks, aluminum trim products provide the best of both worlds.

Aluminum adheres to the following LEED® v4 certification criteria:

- Energy and Atmosphere Credit: Optimize Energy
- Materials and Resources Credit: Building Product Disclosure and Optimization—Environment Product Declaration (EPD)
- Indoor Environmental Quality Credit: Low-Emitting Materials

Safety

Fire or water damage in a multifamily structure is devastating to not only the tenants but also

CASE STUDY: PROMINENT HORIZONTAL REVEAL PROFILES

Located on the border of Emeryville and Oakland, this multifamily housing development on 3900 Adeline Street includes 91 residential and 10 work/live rental units.

Located on the border of Emeryville and Oakland, this multifamily housing development on 3900 Adeline Street includes 91 residential and 10 work/live rental units. The building has a partially submerged garage, and the exterior design responds to the varying scale of three different neighboring characters. The units on the first level have stoops and setbacks for the townhouse and work/live units, adding scale and interfacing with the neighborhood.

"This was a large project with 101 units, and a major challenge was modulating the scale and being able to address its varied context, from single family homes to other 4-story multifamily buildings," says Toby Levy, FAIA, President of Levy Design Partners, Inc. "The project had a tight budget, so cement siding and panels were used on the majority of the building with accents of corrugated metal panels. The intersection of these materials was critical."

With a limited palette to select materials from, the solution was to use the sheet materials of cement panels and corrugated metal cut down in size to add an intermediate scale. "We wanted to emphasize the horizontality of the façade, so we looked for more prominent horizontal reveal profiles and less noticeable vertical reveals," says Casey Feeser, AIA, architect at Levy Design Partners, Inc. A horizontal reveal board was used due to its larger size and multiple shadow lines. In addition, an H mold was used for vertical siding, and an open outside corner mold was used for outside corners. These materials were made from extruded aluminum. "The reason we specified extruded aluminum trim is because it is available in many profiles and sizes," says Feeser. "This allowed us to create patterns with affordable materials to create additional interest. The aluminum trim pieces also provided a clean transition between the materials."

Aesthetically speaking, the designers wanted a variety of reveals and shadow lines. The extruded aluminum trim system made this possible. "Another benefit of using extruded aluminum trims was that it allowed us to make clean transitions and create clean corners," says Levy. To help emphasize the form, the reveals were painted to match the wall color.

The various profiles and sizes of trim helped architects integrate the different materials into the facade. At 3900 Adeline, trim options allowed developers to cut down larger cement panels to create an intermediate scale, as well as to reorient the corrugated metal panels.

"We had a positive experience using extruded aluminum in this project," says Feeser. "The different profiles offered in the market enabled us to articulate and emphasize various design choices." Extruded aluminum trim comes in many sizes and configurations. This leads to cleaner transitions between materials of different sizes and shapes. Another benefit is that extruded aluminum trim allows for the completion of the substrate and waterproofing before installation of the final finish. According to Feeser, "Using aluminum trim creates a durable solution, which will result in a longer life cycle than wood trims and a more maintenance-free solution due to no use of caulk."

Project: 3900 Adeline Street, Emeryville, California

Architect: Levy Design Partners, Inc.

the building owner. Extruded aluminum is considered fire resistant, non-combustible, and weather-resistant. Even at high temperatures, toxic fumes are not produced by the aluminum making it a good choice for occupied buildings. Since aluminum is protected by naturally-occurring oxide film, it does not rust making it moisture resistant. Another interesting characteristic of aluminum is that as the weather becomes colder, the aluminum becomes stronger which is a good thing for exterior aluminum trim in areas where cold weather is common.

Building professionals have a responsibility to choose materials that are safe and have little to no health risks. Because the material is lighter, construction professionals are less likely to experience injuries due to lifting heavy materials. Millennials value companies that demonstrate social responsibility and ethical behavior.

Resiliency

Extruded aluminum is lightweight, durable, and resilient. This material is nearly one-third lighter than other materials on the market which equates to cheaper shipping costs. The rigid metal created through the extrusion process is strong, reliable, and doesn't swell regardless of the weather conditions.

While extruded aluminum is lightweight, the material is very durable. Compared to galvanized steel or polyvinyl chloride (PVC), extruded aluminum is stronger adding to the longevity of the material. Galvanized steel may be less expensive, but it is also less durable. In addition, when bare mill galvanized steel and aluminum flashing are used in direct contact with most claddings, there is an increased chance of a chemical reaction, causing wear and break down of both products. PVC, a commonly used plastic, is the cheapest of the three materials, but is susceptible to swelling, bucking, warping, and distortions. PVC, when exposed to direct sunlight, will experience thermal expansion and contraction distorting the material and/or paint.

Resilience is important to building professionals, designers, and most importantly, consumers. Homes that have little maintenance or repair are highly attractive to the Millennials. So choosing a product that is resilient is preferred. Also, in disaster-prone areas, especially flood-prone areas, using a trim that is moisture resistant will protect the home.

QUIZ

1. True or False. According to the National Multifamily Housing Council, the demand for rentals is decreasing.

2. According to the National Multifamily Housing Council, ____ percent of renters are under 30 years old and known as the millennials.
   a. 10 b. 20
   c. 90 d. 50

3. According to the article, to attract and retain residents in multifamily buildings, it is recommended to look at the hotel industry for:
   a. Design, technology, and branding opportunities b. Revenue calculations for future renovations
   c. Structural components to resist natural disasters d. Customer satisfaction survey results

4. _____ is the process of taking and shaping aluminum by forcing it to flow through a shaped called a die.
   a. Melting b. Extrusion
   c. Moulding d. Firing

5. True or False. An advantage of using extruded aluminum trim is that is meets the requirements for sustainability and LEED certification for Recycled Content.

6. A multifamily building designer might choose to specify extruded aluminum trim because:
   a. The sleek design is attractive to renters b. The trim is durable, leading to less maintenance
   c. The installation is easier than wood d. All of the above

7. To create a unique look with aluminum trim that varies from one piece to the next, designers should specify which type of finish?
   a. Pre-colored b. Pre-painted
   c. Anodized finishes d. Aluminum trim can't be painted

8. True or False. According to the article, extruded aluminum trim provides long-term cost savings due to the fact that it is more durable and needs less maintenance.

9. According to the article, modern design trends favor:
   a. Clean intersections b. Horizontal and vertical lines
   c. Separation of wall materials d. All of the above

10. True or False. Choosing a complex design and shape is easily achieved by using extruded aluminum trim.

This article continues on http://go.hw.net/AR062018-3. Go online to read the rest of the article and complete the corresponding quiz for credit.

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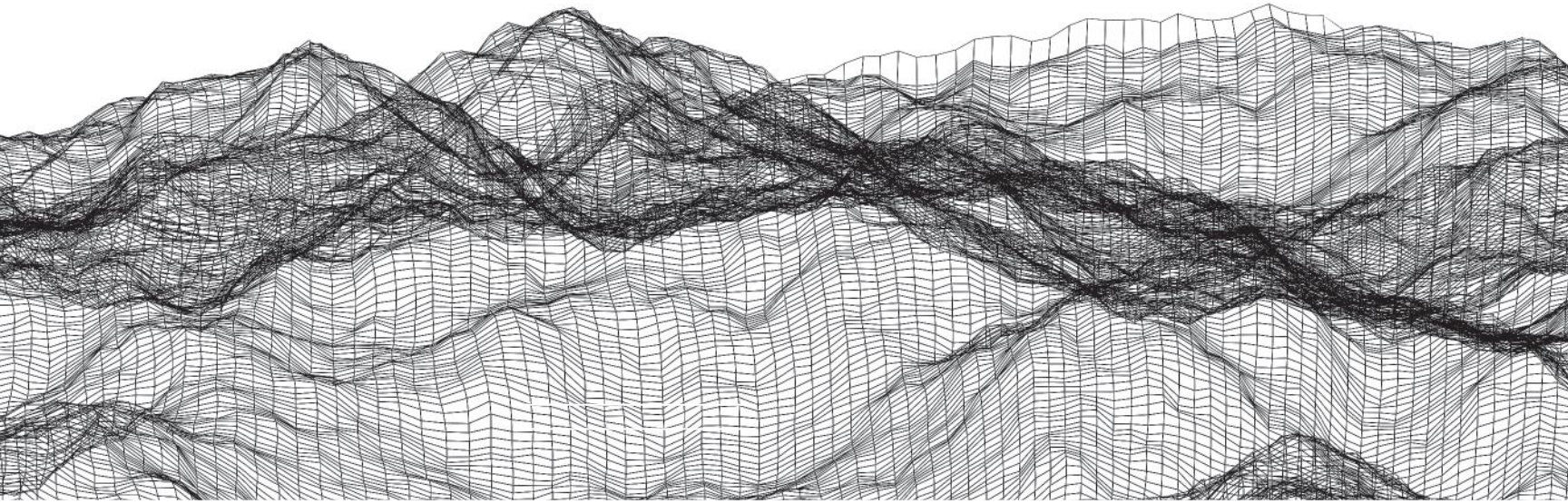

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PHOTOGRAPHY: COLIN LENTON

One Architect, Many Hats

Denise Scott Brown, HON. FAIA, reflects on the intersections of her life.

Denise Scott Brown, HON. FAIA, has been a writer, planner, activist, and educator throughout her long and prestigious career. Together with her late husband Robert Venturi, FAIA, Scott Brown designed some of the boldest and most distinctive buildings of the last century. In 2018, the Sainsbury Wing at the National Gallery in London was listed by Historic England as a prime example of postmodern architecture, and this year it received the AIA Twenty-Five Year Award. Through their 1972 book *Learning from Las Vegas* (MIT Press), Venturi and Scott Brown also shaped critical thought around modern architecture. Scott Brown reflects on the intersections of her life as a designer.

As told to Katherine Flynn

We were surprised to hear people say "*Learning from Las Vegas* turned around architectural research." I could imagine they were right, because—though most of the ideas came out of my planning education—they lead to design-related research of the kind architects preferred.

I started out by saying that I was a circus horse rider and I rode two horses, architecture and planning, which were moving away from each other. My job was to bring them back together, but in the end my views were mostly heard by architects and the effect was to make them rethink their assumptions.

But as the window of architecture was opening onto new worlds, women saw the troubles that existed there and began to flee the field. Because of delays in my own life—primarily the death of my first husband—by the time Bob and I married we could afford childcare, and I could go on working. But a great worry for him was that the childcare would leave, and I wouldn't be able to go on helping him in the office.

Our experience of collaboration proved to us that two people's creativity makes things so much more intense. But it's a hard thing to realize if you haven't tried it. I say to women, "You didn't come into architecture saying, 'I'm going to study architecture to win a Pritzker Prize.' What did you, in fact, think you would be doing in architecture that would make you happy?" Whatever it is, get to be awfully good at it, so you will be happy in your work. Then a few years of experience will give you the ability to lead the profession in directions you find good.

There's a phrase that African resistance fighters used to use: "Seek ye the political kingdom, and all else shall be given unto you." In other words, go into politics and then you'll get what you want. I say, "Become good at doing your work, love doing your work, and you'll be better at being political when you're in your middle age, and more powerful." And it is lovely for me now to see the younger architects who have worked with me say, "We look at that office, and we see where so many of the good ideas come from. They come from Denise." AIA

AI

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AIANow

Uncommon Vegas

New photographs capture three decades of midcentury Las Vegas architecture.

By Steve Cimino

The Las Vegas Valley is a land of hidden treasures. Though most tourists come for the bright lights, the Nevada Preservation Foundation has made it its mission to hunt down and highlight striking midcentury modern buildings that are oft-ignored, even by locals. Through the power of Instagram and a passion for preservation, it was able to gather hundreds of options for a project that it has dubbed #UncommonVegas.

"It stems from a misunderstanding of modern architecture," says Michelle Larime, the foundation's deputy director of neighborhood stabilization, "and this idea that the recent past isn't necessarily important. In the preservation field, the last decade has seen a real effort to help educate and advocate for why these buildings are relevant in our historic landscape."

These three buildings are a fraction of the chosen 100 photographed by Kirsten Clarke for the project-culminating book *Las Vegas: Uncommon Modern*, which can be purchased at nevadapreservation.org. All were designed and built between the mid-1940s and the 1970s; some were known but underappreciated, while others were hiding in plain sight. Regardless, they're all part of what Larime calls "the first and only mass effort to document what the Vegas midcentury modern architectural scene looks like on a great scale."

Guardian Angel Cathedral: Designed by pioneering African American architect Paul Revere Williams, the Guardian Angel Shrine opened in 1963 and became a cathedral upon the creation of the Diocese of Las Vegas in 1995. Its A-frame design features a large mosaic over the main entrance by Los Angeles artist Edith Piczek.

Brutalist/New Formalist/postmodernist structure: This building, Michelle Larime says, was discovered through the survey. "The assessor's record shows it was built in 1975, making it a late-modern building," she says. "You can see elements of Brutalism, New Formalism, and even some Postmodernism."

Speedee Cash: This folded-plate Googie building houses a small checking-cashing business.

PHOTOGRAPHY: KIRSTEN CLARKE

AIAFeature

The Rise of Adaptive Reuse in Las Vegas

Las Vegas has a reputation as a city that loves the wrecking ball. Increasingly, it's embracing adaptive reuse.

By Mimi Kirk

ILLUSTRATION: LAUREN NASSEF

The implosion of the Stardust Hotel and Casino on March 13, 2007, befitted its glitzy history. At 2:30 a.m., fireworks exploded, lights flashed, and a countdown to its demise ensued, chanted by a crowd watching from a nearby parking lot. After it fell, enormous clouds of dust rose into the sky and then settled on the Las Vegas Strip. The Stardust had been a favorite haunt of the Rat Pack and home to the Siegfried & Roy show. The excesses of organized crime that took place within its walls inspired the book and the film *Casino*.

The death of the Stardust encapsulates Las Vegas' reputation as a fan of the wrecking ball—a city that builds only to destroy and replace with something new, regardless of historical significance or environmental impact. And in many ways, that has been Las Vegas' trajectory.

Yet there's another side to the city, one concerned with preservation, sustainability, and adaptive reuse—and one that has long been in evidence. "People see Las Vegas as a place of excessive waste," says Stefan Al, a Dutch architect and author of *The Strip: Las Vegas and the Architecture of the American Dream* (MIT Press, 2017). "Even though a lot is unsustainable when you're building in the desert and relying on tourists flying in, many practices are innovative." Such practices are found both on the Strip as well as downtown, located to the north of all the flash and in the midst of an urban renaissance. Residents are also preserving many of the midcentury modern homes that grace the city.

The Strip

One might think that the hotels and casinos on the Strip are the main consumers of water in Las Vegas, but in fact it's homeowners who guzzle most of it. In the mid-1950s wastewater began to be treated and pumped into Lake Mead, the city's main water supply, and all of the water used in the massive properties makes its way through this process. Hotel and casino owners also work to preserve water and keep costs low through other green strategies: CityCenter, a $10 billion development that houses hotels, a casino, residences, and more, worked with manufacturers to design its own low-flow showerheads that use a third less water.

CityCenter also boasts energy-efficient marquees, signs, and slot machines; the Mandalay Bay Resort Conference and Convention Center has a rooftop solar array that powers over 20 percent of the hotel and casino. Jennifer Turchin, AIA, principal of the Coda Group and president of AIA Nevada, says another way such properties encourage sustainability is by purchasing open source electricity. "These sources can be more sustainable than NV Energy [the state power company] because they use more solar, geothermal, and wind power than the power company can produce," she says.

The practice of adaptive reuse—in which existing buildings are updated for a new purpose—is perhaps an even more important means of promoting sustainability. The practice retains the embodied energy that went into construction in the first place. "The materials have already been extracted or manufactured, and have contributed to the carbon footprint," says Michelle Larime of the Nevada Preservation Foundation. "If they stay in place, they're no longer contributing to the further degradation of our environment."

Adds Dwayne Eshenbaugh, AIA, founder of Las Vegas firm NOVUS Architecture: "Utilizing our existing building inventory has a pretty large environmental impact, and that's important for combating climate change."

Adaptive reuse has been practiced on the Strip for decades. Al recounts how, starting in the 1950s, hotel and casino structures were retained and their signage repurposed to make way for the new. When it opened, in 1942, the Last Frontier Hotel and Casino, for example, featured an Old West theme, with cowboys adorning its front; in 1955, in the midst of the space race, it was renamed the New Frontier. "They changed the building by adding a new sign, adapting the façade, and hanging up images of astronauts," Al says. "The practice meant that a business evolved while the structure essentially stayed the same. Many hotels and casinos did this, and even pieces of old signs were reused during an upgrade."

Today, the casino and hotel complex SLS Las Vegas is an adaptive reuse project that goes beyond signage. The property lies within what was once the famed Moroccan-themed Sahara Hotel and Casino. The Sahara's three guest towers were retained and renovated, for example, and its showroom kept as a ballroom.

AIA Feature

CONTINUED

Downtown

Architect Craig Sean Palacios, AIA, worked on projects similar to SLS Las Vegas, including CityCenter and the Fontainebleau Las Vegas, before 2014, when he co-founded Bunnyfish Studio, a Las Vegas firm that specializes in adaptive reuse. He uses lessons learned through casino work to promote green building on a smaller scale. "Adaptive reuse is comfortable for me," he says.

One of Palacios' projects is the Inspire Theater, a coffee shop, bar, and theater complex he and partner Tina Wichmann, AIA, designed out of an abandoned convenience store. Palacios and Wichmann created a three-story building within the one-story structure to make room for the variety of businesses; the project was funded by Zappos CEO Tony Hsieh, who in 2013 moved his headquarters to the former Las Vegas City Hall building and wanted nearby amenities for his employees.

The complex is just one example of many recent adaptive reuse projects in and around downtown Las Vegas—the oldest part of the city—which began to flourish after the 2008 economic crash. With fewer resources to build, developers and designers looked to repurpose older buildings in the city's core rather than start from scratch. Today, says Eshenbaugh, whose firm is also known for its downtown adaptive reuse work, "people are generally interested in keeping buildings intact. They're demolished only when they're absolutely unusable."

Just southwest of downtown is Faciliteq, an office furniture store and showroom located in a building that once was an auto repair shop. Turchin was involved in the garage's transformation as a sustainability consultant. "Not only did we get LEED certification," she says, "but a majority of the interior is comprised of furniture that guarantees future flexibility." For instance, none of the building's walls are permanent, and they can be easily moved to create different-sized spaces. "People know what they want their building to be today, but what about in 10 years?" Turchin asks. "This is easier and creates much less waste."

In the middle of downtown is another adaptive reuse project fashioned out of an old garage. The Kitchen at Atomic, designed by Eshenbaugh's firm, is now a hip restaurant that's an extension of Las Vegas' oldest freestanding bar, Atomic Liquors, where in the 1950s customers would crowd the roof to watch the nearby atomic test explosions. The garage's roof had to be redone, but Eshenbaugh kept the masonry walls, concrete lintels, and an intricate mid-century window wall that had divided the main space of the garage from the office. It now divides the dining area from the kitchen, so customers can watch the chefs at work.

The thirst for such projects in and near downtown hasn't just emerged from financial constraints. It's also related to a trend occurring in cities across the country, in which many residents are seeking more walkable, denser environments. Older downtowns—in contrast to spreading suburbs—can furnish these spaces.

"Las Vegas has a serious car culture and there's a lot of sprawl," says Bunnyfish Studio's Wichmann. "But people want to live in more urban environments and use their vehicles less." Wichmann says that more condos and apartments are beginning to appear downtown and off the Strip to provide housing from which people can walk to nearby services. "That also helps with the carbon footprint," she adds.

Even the architecture of the Strip is showing signs of increased walkability. Al reports that the New York-New York Hotel & Casino used to feature fake storefronts on its façade, but now has actual shops in which pedestrians can browse. "It's emblematic," he says, noting that the Strip's spaces are becoming more externally oriented in general. "Twenty to 30 years ago, casinos were designed to make it difficult to navigate out of, to keep people inside and gambling. But today there's a recognition that walkable exteriors are beneficial and sought-after."

> "Preservation is highly flexible in that it tends to only apply to a building's exterior, and there's a lot that can be replaced with modern materials in the interior."
> — Michelle Larime

Homes

The desire for walkability has also translated to a desire for single-family midcentury modern homes closer to downtown and the Strip—and with it a more tightknit, communal way of life. "People want more of a sense of community," says Turchin. "It's a resurgence of the traditional neighborhood with blocks and houses, with nearby schools, grocery stores, and restaurants."

The Nevada Preservation Foundation's Larime has noticed this trend in her position as director of neighborhood stabilization. In this adaptive reuse work, she and her colleagues work with owners to update historic homes (as well as commercial buildings) with new plumbing, wiring, and the like while preserving the integrity of the exterior. (Larime experiences such an environment every day: Her organization is a tenant of the Historic Westside School, Las Vegas' oldest school building, which was built in 1923 and ceased to function as a place of learning in 1966. It was renovated in 2015 and opened a year later as an office complex.)

"Preservation is highly flexible in that it tends to only apply to a building's exterior, and there's a lot that can be replaced with modern materials in the interior," Larime says, adding that many homes and buildings in Las Vegas are currently "aging to significance" as they approach their 50-year mark and beyond—making it easier to preserve them with historic designations and grant and tax credit options.

Tax credits, in many cases, make historic rehabilitation projects a viable option in scenarios where they otherwise wouldn't be feasible. Although reuse projects are subject to a number of stringent guidelines—the buildings in question must be listed on or be eligible for the National Register of Historic Places, and they must also be certified by the National Park Service as having met the U.S. Secretary of the Interior's Standards for Rehabilitation—the Nevada State Historic Preservation Offices encourages the adoption of historic preservation and adaptive reuse as an economic development strategy with short and long-term economic benefits.

Though preservation, sustainability, and adaptive reuse have been part of the Las Vegas built environment for decades, the last 10 years have witnessed a sea change in the types of buildings and spaces people are drawn to—for financial and environmental as well as cultural reasons.

Palacios sums it up: "The driving trend is to take advantage of existing architecture," he says. "We're even seeing new buildings that go up that try to mimic historic elements. It's driven by consumer interest—it's what people want." AIA

AIADesign

PHOTOGRAPHY: TIMOTHY HURSLEY

The 4,500-acre Shelby Farms Park features programmed nodes of concentrated activity.

The master plan process for the park, started in 2007, aimed to transform the park into a showcase of the region's geography and ecology.

An Urban Park for All

This award-winning penal-farm-turned-park has already reinvigorated the east side of Memphis.

By Dominic Mercier

On the site of a former penal farm on the east side of Memphis, the 4,500-acre Shelby Farms Park blends pastoral landscapes with an active central park to form the linchpin for the greening of the region. A true 21st-century urban park—and recent recipient of a 2019 AIA Award for Regional & Urban Design—it has already boosted the quality of life for citizens of western Tennessee.

A master plan process for the park began in 2007 through an international competition sponsored by the Shelby Farms Park Conservancy; it was won by James Corner Field Operations. The conservancy approached the process with a clearly defined set of principles and turned to the design team—which included Marlon Blackwell Architects—to suss out a program that resonated with their vision.

At more than five times the size of New York City's Central Park, the project's scale was simply too large to spread resources and social energy throughout its entirety. To that end, the team programmed nodes of concentrated activity, allowing for quiet spaces to remain as such, and for active areas to bustle with energy. Investment and infrastructure were focused on Heart of the Park, the 195-acre core that opened in 2016. Centered around Hyde Lake, which was expanded from 50 to 80 acres, it is ringed by a two-mile pathway filled with seating, pavilions, and plantings. A new boathouse, visitor center, and restaurant bring people closer than ever before to the water and offer discrete architectural spaces that clearly mark key locations around the lake.

Through thorough analysis of the site and its character, the design team identified the major challenges that threatened the park's long-term viability and role as a driver of the region's economic and environmental health.

The final plan directly addresses those challenges—including the absence of a strong identity, fragmented habitats, and deficient public access—to transform the park into a showcase of the region's geography and ecology. It calls for embracing Memphis' vibrant culture and food scene, developing a hub for nature-based recreation, and creating gathering places for all members of the community. AIA

NOTICE

of AIA candidates & Convention business items

CANDIDATES FOR INSTITUTE OFFICERS

Elections for the Institute's 2020–2022 At-large Director on the AIA Board of Directors, 2020–2021 Treasurer, and 2020 First Vice President/2021 President-elect, will be held at the AIA Convention/Conference on Architecture, June 5–8, 2019. If no candidate for First Vice President or Treasurer obtains a majority of the votes cast during the initial round of voting on June 6, 2019, a run-off election will take place on June 7, 2019. The following members have declared themselves candidates for national office.

2020–2022 At-large Director (one will be elected)

Verity L. Frizzell, FAIA
AIA New Jersey

Britt Lindberg, AIA, LEED AP
AIA Silicon Valley/
AIA California

2020–2021 Treasurer

Evelyn M. Lee, AIA
AIA San Francisco/
AIA California

2020 First Vice President/2021 President-elect

Peter J. Exley, FAIA
AIA Chicago/AIA Illinois

Bruce W. Sekanick, FAIA
AIA Eastern Ohio/
AIA Ohio

To view candidate speeches, visit **aia.org/2019candidates**. For candidates' statements, and the full text of the proposed Bylaws amendments and resolutions, visit the AIA Conference on Architecture web site, **conferenceonarchitecture.com/aiabusiness**.

ACCREDITATION

Accreditation of delegates for the 2019 National Convention (at the AIA Conference on Architecture) will take place online beginning in early April 2019 and will also take place at the Las Vegas Convention Center in Las Vegas, Nevada, on Wednesday, June 5, 2019, at 11am–12pm. Only accredited delegates may take part in the annual meeting or vote for candidates for Institute office.

ANNUAL MEETING

The Institute's annual meeting will begin promptly at 3:45pm in the Las Vegas Convention Center on Wednesday, June 5, 2019. Delegates who fail to claim their voting keypads and to use them to register their presence at the start of the meeting, will not be able to vote at the meeting.

PROPOSED BYLAWS AMENDMENTS

The AIA Board of Directors is sponsoring amendments to the Institute's Bylaws, scheduled for consideration by the delegates at the annual business meeting at the Las Vegas Convention Center on June 5, 2019. Bylaws amendments require approval by an affirmative two-thirds majority of the votes cast (or accredited to be cast) by delegates at the meeting, determined in the manner prescribed in Section 9.011 of the Bylaws.

Bylaws Amendment 19-A

Titling of Allied Members. This proposal calls for changes to Bylaws provisions governing how chapter Allied members may describe themselves.

Bylaws Amendment 19-B

Expenditure Limitations. This proposal calls for changes to Bylaws provisions governing the Institute's expenditures and liabilities.

RESOLUTIONS

The delegates at the AIA National Convention will also be asked to consider resolution(s), which require approval by a majority vote of the delegates present and voting.

AIA

AIACollaboration

Above: *Frank Gehry: Building Justice* follows students at Yale and SCI-Arc as they examine U.S. prison design in 2017. Below: *Do More With Less* showcases how Latin American architects are building sustainable, affordable projects in their communities.

PHOTOS COURTESY OF THE ARCHITECTURE AND DESIGN FILM FESTIVAL

In Its 10th Year, the Architecture & Design Film Festival Emphasizes Social Justice

At the Blueprint for Better film series A'19 in Las Vegas, films from this year's ADFF highlight how designers can remedy pressing social concerns

By Kathleen M. O'Donnell

Many of the best-known architecture documentaries profile notable designers. Take 2003's acclaimed *My Architect*, where director Nathaniel Kahn examined the life of famed architect Louis Kahn, his father. More recently, the widely released films *REM* and *Big Time* focused, respectively, on the work and design philosophies of Rem Koolhaas, HON. FAIA, and Bjarke Ingels.

While films like these delight architects and public audiences alike, the Architecture & Design Film Festival (ADFF), now in its 10th season, showcases stories that extend beyond the accomplishments of individual designers, demonstrating a commitment to enhancing public understanding of the value of architecture. "One of the festival's goals is to inspire and educate everybody about the power of design," says ADFF director and founder Kyle Bergman, AIA.

To help achieve this goal, the festival's 2018–19 season kicked off in New York City last fall, featuring its most diverse lineup of films yet. This season's films promote inclusive design by highlighting projects that seek to remedy the 21st-century challenges of urbanization, climate change, and social injustice.

Frank Gehry: Building Justice, directed by Ultan Guilfoyle, follows students at the Southern California Institute of Architecture (SCI-Arc) and Yale as they attempt to understand how the design of current U.S. prisons has contributed to mental and physical health problems within incarcerated and formerly incarcerated populations. Partnering with Impact Justice, the George Soros Open Society Foundations, and A New Way of

AIA Perspective

Life, educators (including Frank Gehry, AIA) took a multidisciplinary human-centered approach and encouraged students to propose design solutions for restorative justice and rehabilitation facilities. "As architects, we have to lead by example. We have the opportunity to design for positive change, and we should act on that," Bergman says. "It's inspiring to see that Frank Gehry is spending some of his time trying to encourage students to be civically engaged."

The Ecuadorian film *Do More with Less* explores how architects and architecture students are making the most of space and resources in Latin America. By building with local materials and training young people in construction skills, the featured designers put a sharp focus on their environment and economy, with an acknowledgment that a sustainable built environment is crucial for the future of their communities.

While they are only two of ADFF's many films to be featured this year, *Do More with Less* and *Frank Gehry: Building Justice* both signify how conversations about the relationship between design and social responsibility are making their way into mass media.

For the third year, ADFF has partnered with AIA to bring films to the Conference on Architecture. Along with *Frank Gehry: Building Justice* and *Do More with Less*, the Blueprint for Better Film Series at A'19 in Las Vegas will feature a variety of other films from recent festival programs. Like the bigger festival, Blueprint for Better will screen films connecting social causes with design.

The series will feature more than a dozen finalist films from the annual AIA Film Challenge in short-film sequences on topics such as housing, resilience, culture, and equity and inclusion. Among the most moving of these are the 2018 AIA Film Challenge winners *Past/Presence: Saving the Spring Garden School*; *A Joyful Gathering Place*; and *ChildSafe: Designed to Heal*, all of which have been screened at ADFF events this year.

After a decade of bringing the best new design films to audiences around the world, ADFF has become a mainstay in both the architecture and film communities through innovative programming and partnerships. As ADFF continues to expand, the films it showcases will not only highlight design's impact to the public, but also serve as a reminder to architects of their responsibility to contribute. "At the end of the day, if we can encourage some architects who attend the festival to be socially active, then we have accomplished something important," Bergman says. AIA

Beyond Our Comfort Zones

The A'19 Conference gives architects countless opportunities to learn and connect.

AIA's Conference on Architecture 2019, scheduled for June 6–8 in Las Vegas, is an opportunity to listen, learn, and exchange ideas with other members of our profession, as well as leaders from other disciplines who share our love of smart, sustainable, leading-edge design.

This year's theme, Blueprint for a Better Future, will encourage and empower architects to go beyond our traditional comfort zones as designers, creators, and trusted advisers and become even more engaged in our communities.

Just as AIA's Blueprint for Better campaign seeks to hone the innate talent of architects as conveners and problem-solvers, we continue to refine the conference experience to deliver the information and thought leadership that informs and energizes attendees long after they return home.

While the focus of A'19 is architecture and architects, it continues the transformation of the conference into an event that is more inclusive and appealing to everyone along the career continuum, from young professionals to seasoned architects with decades of experience.

Roman Mars, creator and host of the 99% Invisible podcast, will host our main stage sessions. His is one of the most popular architecture and design podcasts today. By pairing his exceptional storytelling skills with his ability to draw connections and highlight important themes, Roman will augment the big ideas we'll hear from keynote speakers who will help us look at issues in a new way.

This year's keynote presenters are more than pioneers in their respective fields; their continued success and positive impact highlight what can be created and achieved when preconceived notions and stereotypes are overcome.

The first keynote speaker is Reshma Saujani, CEO and founder of the nonprofit organization Girls Who Code and a trailblazer in the world of technology. Girls Who Code was at the top of *Fast Company*'s not-for-profit sector list of the World's 50 Most Innovative Companies for 2019, which honors "the businesses making the most profound impact on both industry and culture."

Our day two keynote event will feature a conversation with Ryan Coogler, one of the most successful and critically acclaimed directors, writers, and producers in Hollywood. His work on *Fruitvale Station* won top audience and grand jury awards in the U.S. dramatic competition at the 2013 Sundance Film Festival, and Ryan was included on Time's 30 Under 30 2013 list. Ryan's latest work, last year's blockbuster *Black Panther*, continues to rewrite Hollywood history and break barriers.

A'19 will include more than 50 events that will link you with colleagues at every stage of their careers, from young professionals to practice leaders to firm owners and partners. In addition, socials, happy hours, receptions, lunches, and breaks between sessions will offer ample opportunity to grow your network by making new professional connections.

The 2019 Architecture Expo will feature 200,000 square feet of the newest high-tech products and materials. More than 700 companies will exhibit at the Expo, which has been recognized as one of the Top 100 Expos in the country by the Trade Show News Network.

The conference is a unique forum that provides information and networking opportunities that help us do our jobs better, make a bigger difference in the communities we serve, and ultimately achieve our vision of a brighter future for architecture. We can do this by positively advancing conversations on essential topics, including stopping or mitigating climate change and ensuring social justice and economic opportunity for all—without regard to race, gender, or nation.

In that regard, joining thousands of your colleagues from around the world isn't just an investment in your career and the careers of your teammates. It is also an investment in the future of the profession.

William Bates, FAIA, 2019 AIA President

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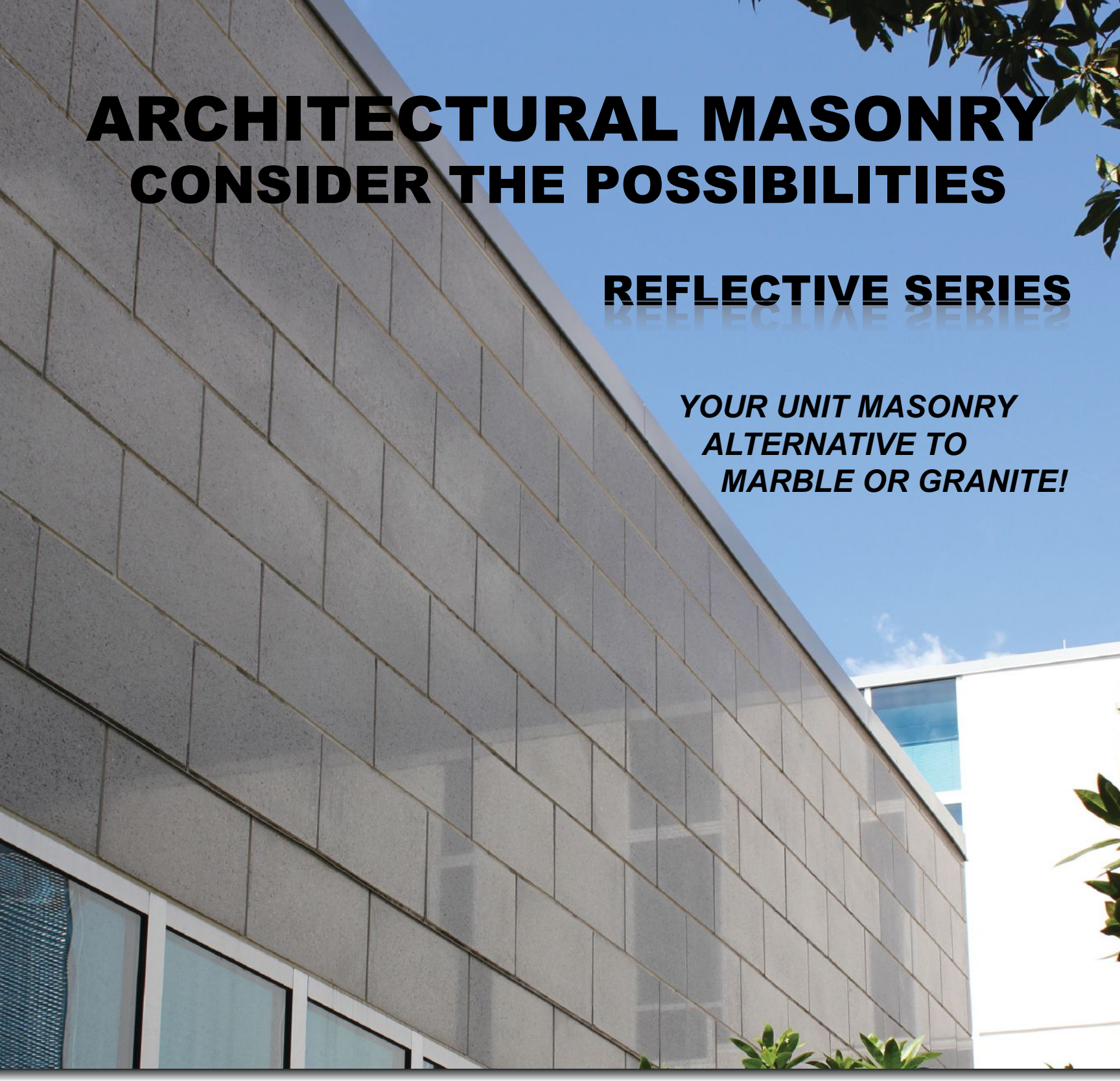

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“Now I observe myself ardently promulgating the Eero-myth. … He is all of this and none of this. But recorded, it becomes truth for the future.”

Aline Louchheim Saarinen, Publicist by Eva Hagberg Fisher

In 1953, an established arts journalist named Aline Bernstein Louchheim, then working as an associate art critic for *The New York Times*, flew to Bloomfield Hills, Mich., to interview Eero Saarinen, the son of renowned architect Eliel Saarinen and solo architect on the rise, and write a profile for the newspaper. She hadn't been the first choice for the assignment; that was John McAndrew, a professor at Wellesley College, but something had happened with him, and she'd volunteered, or been volunteered to go, and so there she was, ready to meet Saarinen, do the requisite interview, and go home.

The assignment itself was nothing new for Louchheim: She was as comfortable reporting on executive shake-ups at the California Modern Institute as she was exploring the issue of monumentality in architecture; as well-versed in the formal qualities of Alvar Aalto's curved forms as she was in Mies' Modernism. She was part of an exclusive social milieu in New York, attending garden parties with Philip Johnson, palling around with playwright Clifford Odets (she broke a date with him to write the Saarinen profile), becoming romantically entangled with Edgar Kaufmann Jr., son of the Fallingwater Kaufmanns. She'd never met Eero, although she'd written about him once before: in 1948, when she'd reported on the results of the St. Louis Gateway Arch competition, the event that ended the partnership between the elder and younger Saarinen, when, after years of working together, they submitted separate designs—and Eero won.

Louchheim's editorial brief was to portray Eero's life post-Arch. "What we would like is a combination personality piece and discussions of the man's work," her editor, Daniel Schwars, wrote in a memo. "You would give the reader an idea of the kind of man that Saarinen is and how he developed personally and artistically, together with an evaluation of his work." The piece, which was published in April 1953, ran with the headline "Now Saarinen the Son." It was a loving profile; Louchheim called Saarinen "the most widely known and respected architect of his generation." She described his buildings as those that "interlock form, honest functional solutions, and structural clarity," and wrote that they "become one expression of our way of life."

It was an idea that she—and he—would repeat for years, from their shared breakfast table, in their shared house. For this particular assignment not only changed Louchheim's life, as well as Saarinen's; it also helped change his practice, not to mention the lives of countless architects (and magazine editors, and writers) to come.

Aline Louchheim in the '60s

ALINE AND EERO SAARINEN PAPERS, 1906–1977.
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The Modern Architectural Publicist

Louchheim and Saarinen drove from one building to another on the first night of her visit, and they did more than talk about architecture: As they rounded a corner in the car, they also metaphorically rounded a different kind of corner, when one of them touched the other's hand—an event that we can find described in one of the thousands of letters that they wrote to each other, and which was followed, very quickly, by a far greater intimacy.

I spent four years reading those thousands of letters, now physically and digitally held by the Smithsonian's Archives of American Art, as well as papers from Saarinen's office held at Yale, to research and write my recently finished dissertation at the University of California, Berkeley, which argued that Louchheim was indispensable in Saarinen's rise to fame. More broadly, I illuminated the ways in which her press machinations and editorial acuity (exemplified in her job as "Head of Information Services" for Eero Saarinen and Associates) amplified not only his career, but helped codify a cultural and professional position: the modern architectural publicist. As I argue, most biographical treatments documenting Saarinen's smooth rise to fame post-1953 have either ignored or glossed over Louchheim's contributions. When mentioned, she has been categorized as something between helpful wife and casual observer. The oversight warrants more than just a feminist reworking of our understanding of his career, though it definitely warrants that. It also neglects the actual ways in which fame has been produced since the second half of the 21st century. I wrote this dissertation because my experience working in the field of architectural journalism did not square with the ways in which I saw architectural historians rely on the press as a neutral and representative agent of an architect's value. I wanted to correct—and add to—the record. I also wanted to read Louchheim and Saarinen's sexts.

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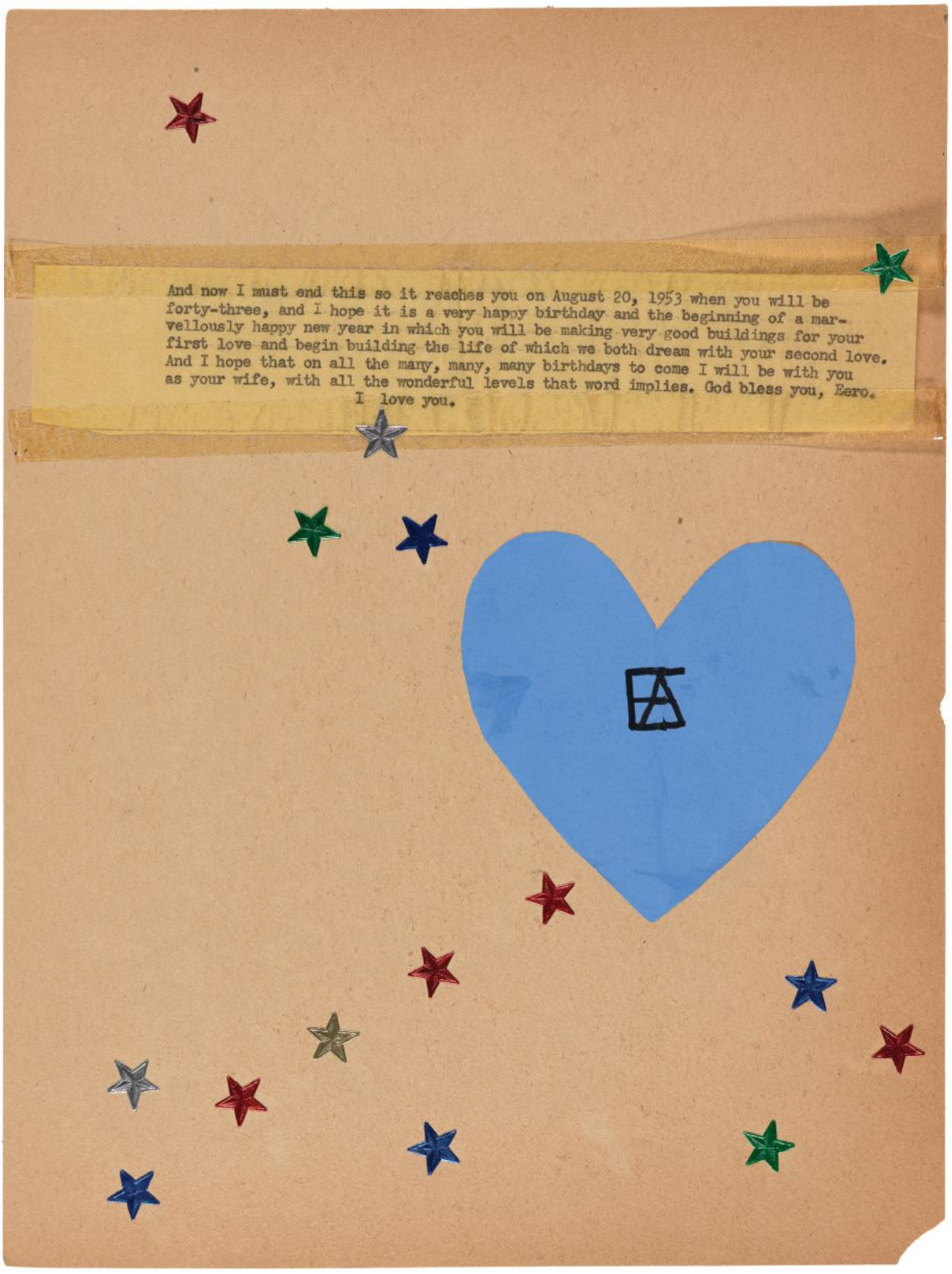

A 1953 birthday card from Aline to Eero

ALINE AND EERO SAARINEN PAPERS, 1906–1977.
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It is a cardinal rule of journalism that profile subjects have no editorial control over the story: They are not allowed to "check their quotes," or "read over the draft for accuracy," though enterprising publicists—we'll get to how and why architectural publicists work the way they do shortly—have tried, and will continue to try. Which is why I was astonished to learn, based on letters written in the first few months of their 1953 courtship—letters that alternated between the professional and the deeply personal—that Louchheim had solicited line edits and quote checks from Saarinen, line edits that came with admonitions about how many "spanks" he would give her because of her "scalpel"-like critiques.

For the most part, if an architect has been widely and legibly published, if their work has appeared in magazines and was written about in a forthright and cohesive manner, then that has suggested that the work was inherently valuable. The Avery Index to Architectural Periodicals, a Columbia University–sponsored database that tracks press appearances, is often used to measure how seriously we should take someone. It shows a marked increase in articles about Saarinen (from 32 to 157) after Louchheim's story was published. Yes, Saarinen's winning of the St. Louis Arch competition inspired new interest in his work (hence Louchheim's assignment from the *Times*), but his presence in the press—and, more importantly, the clarity with which his work began to be represented—shifted dramatically post-Louchheim.

You see where I'm going with this, or at least you should, because what I'm arguing is that Louchheim's interventions—which she formalized with her job at the firm and which ranged from editing speeches that Saarinen gave, preparing text to send to magazines, coordinating the dissemination of photography and which photographer to hire for which job, managing competitive editors who each wanted to be the first to publish a project, deftly managing job and press opportunities by writing letters to the likes of Ada Louise Huxtable (whom she recommended for her job at *The New York Times*), and generally keeping the message extremely on track, not to mention the ways in which she invited Saarinen to intervene in creating his own profile—had a profound impact on the way in which his work and career were subsequently represented.

As she wrote to the art critic Bernard Berenson in 1958: "Now I observe myself ardently promulgating the Eero-myth. All of us around create situations to reveal him as we understand him. He creates situations to reveal himself as he understands himself and as he wishes to be understood. Reporters and

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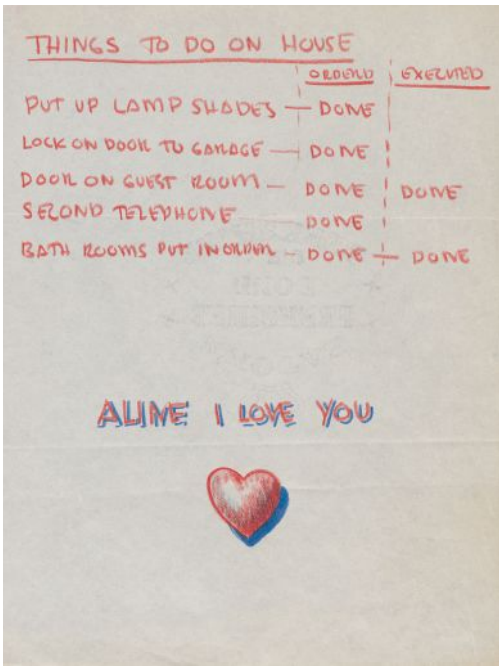

Saarinen's house to-do list
circa 1954

photographers create situations to satisfy editorial demands. He is all of this and none of this. But recorded, it becomes truth for the future."

A Euphemism for Lying

Saarinen was married when they met, and Louchheim's story portrayed his wife, the sculptor Lilian Swann, as a domestically oriented helpmeet who produced a sculpture of "a fantastic three-toed sloth"—not exactly on a par with her description of Saarinen's "talent." Letters, written around this time, show Louchheim mounting extraordinarily compelling and well-constructed arguments for why Saarinen should leave Swann for her. "We find this candidate fitted intellectually, emotionally, and physically to the job," she wrote to him in a mock job application (the job was wife/adviser). She was also concerned about her *Times* article. "It's not really good," she wrote to him. "You deserve much better. … I console myself by saying this is just journalism, any way, and not very important. But YOU are important—and it would be nice if anything that had to do with you did you justice."

She kept writing to him, taking every opportunity to mention her skills and her connections. She also reminded him that it was the combination of their talents—his with architecture, hers with words—that would produce so much more than the sum of their parts. Saarinen finally relented. In February 1954, the two secretly married in New York City; in 1956, she moved to Bloomfield Hills to take a permanent position with Saarinen's firm. Publicity as a practice may have been standard in corporate America, and was increasingly becoming standard for art, but her

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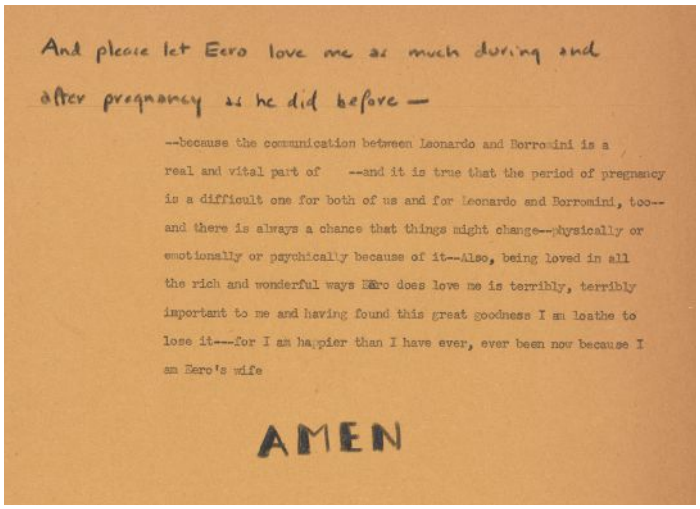
organization and control of the firm's publications was the first time an architecture studio had had a figure like hers on staff, someone who could blend a personal relationship to her subject and professional expertise, to considerable effect. Before Louchheim and other pioneers of PR, architects relied on their own cult of personality for fame; think Philip Johnson, perhaps the best at the game, who single-handedly cultivated his own image (read Mark Lamster's 2018 biography *The Man in the Glass House,* published by Little, Brown and Co.). Architects who could convince society doyennes to fund them and enterprising journalists to write about them could become successful; those without such access were, until Louchheim's role was professionalized, at a clear disadvantage.

Professional memos between 1956 and 1961, when Saarinen died suddenly of a brain tumor, demonstrate Louchheim's skills at maneuvering—which, in this case, is a frequent euphemism for lying. One of her most frequent press contacts was Douglas Haskell, editor of *Architectural Forum*, one


And please let Eero love me as much during and after pregnancy as he did before —

--because the communication between Leonardo and Borromini is a real and vital part of --and it is true that the period of pregnancy is a difficult one for both of us and for Leonardo and Borromini, too-- and there is always a chance that things might change--physically or emotionally or psychically because of it--Also, being loved in all the rich and wonderful ways Eero does love me is terribly, terribly important to me and having found this great goodness I am loathe to lose it---for I am happier than I have ever, ever been now because I am Eero's wife

AMEN

A 1954 birthday card from Aline to Eero

of the major architecture publications of the time, and one that frequently featured Saarinen. As she was figuring out her job, he was figuring out how to navigate a changing publishing world. For many years, it was standard practice to send project photos to all the magazines, but Haskell had decided to try something else: the exclusive. In 1961, Saarinen wrote a memo to Louchheim outlining a phone call he had had with Haskell negotiating the publication of the upcoming TWA Terminal at John F. Kennedy Airport. "If FORUM does this, then they would insist on the same kind of an arrangement as they had with Chase

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Manhattan," Saarinen wrote. "This arrangement is that all the ordinary information … is available to all the magazines, but the FORUM had the inside track on special and more information."

Louchheim had angered Haskell on a previous project, when she had given the same information to his magazine and to *Architectural Record*. She'd written Haskell a long letter saying that she had given him special access—"the series of candid camera shots of Eero and the designers at work on models," and expressed surprised and dismay that "you would be so distressed that another magazine should publish a particular job with a limited point of view." Her willingness to insult *Record* by calling its point of view "limited" smoothed things over. Haskell forgave her.

Today, for magazine editors, the "exclusive" is often all that matters—sometimes to writers' great distress, and architects' total chagrin. A building can be held by a magazine for years, with the writer attached and unable to file an invoice. Some writers, sometimes, try to game the system. So do publicists—a practice that is whispered about in a "can you believe they tried to pull this shit" kind of way. Let it be known that no one was better at pulling that kind of shit than Louchheim. She pretended to lose photographs, pretended that she had accidentally thrown away her carefully typed written responses to editors. She was the original staller, waiting weeks to respond to an editor's inquiries and then acting, in her correspondence, as if she just couldn't get it together to assemble the materials. Meanwhile, she would be offering those very materials to another editor; if the ruse was ever uncovered (as it was with Haskell), she could lean on her sly confidences, extolling the virtues of the publication in question, and roundly insulting the others. Louchheim was playing "bad cop" to Saarinen's innocent "genius architect good cop"—and accomplishing her goal for the studio: to get as much exposure, in as wide a variety of outlets, as possible.

The best example of this is the publication of the TWA Terminal (which has been recently restored and will reopen as a hotel in May). Louchheim ensured that a combination of early news pieces in *The New York Times*, glossy coverage in *Architectural Forum*, and more would keep the structure alive in the public eye, and, with her emphasis on its being compared to a "bird in flight," a legible structure despite its formal unusualness for the time.

Louchheim understood the challenges of translating the ways in which Saarinen wanted to talk about architecture—with an emphasis on humanism, deep phenomenological experience, and also the geometric possibilities of certain concretes—and

she encouraged him to speak in metaphors and emphasize simple ideas. People got that Saarinen's Ingalls Rink at Yale curves like a whale mid-swim. They got that the TWA Terminal looked like a bird in flight. In particular, I can tell you that the famous 1956 *Time* magazine story that describes Saarinen and Louchheim sitting at a breakfast table as he turns a grapefruit peel upside down, depresses the middle, and uses the resulting shape to demonstrate his vision for the TWA Terminal roof was an Aline Louchheim production. It would have been hard to get the magazine's readers on board a discussion of thin-shell construction; but this intimate scene was a delight. Aline had described it in a letter she sent to the *Time* reporter, and in the retelling the story changed, so

> I was astonished to learn, based on letters written in the first few months of their 1953 courtship, that Louchheim had solicited line edits and quote checks from Saarinen, line edits that came with admonitions about how many "spanks" he would give her because of her "scalpel"-like critiques.

that it sounded like Saarinen had been struck by a burst of inspiration as he manipulated the peel.

It was all a bit of clever marketing, in much the same way as Saarinen (publicly, and strategically) took every chance to disavow the bird-in-flight metaphor. That doubling—of saying one thing behind the scenes to writers, and another in public—allowed the office to both create a gimmicky and sticky metaphor that was easily understood while at the same time publicly maintaining that Saarinen himself was a true genius beyond such easy similes.

Shaping His Legacy, Posthumously

After Saarinen died, Louchheim kept the office together to finish TWA. Saarinen's partners, Joseph Lacy, Kevin Roche, and John Dinkeloo, stayed together until 1966, when Roche and Dinkeloo formed their own firm. Louchheim moved into television, where she worked as an on-air art and architecture critic for NBC, and wrote more books, but not before finishing what was then a definitive biography of Saarinen. The title was *Eero Saarinen On His Work* (Yale University Press, 1962). Yet the words—the on—were hers. Even after his death, she was the one truly

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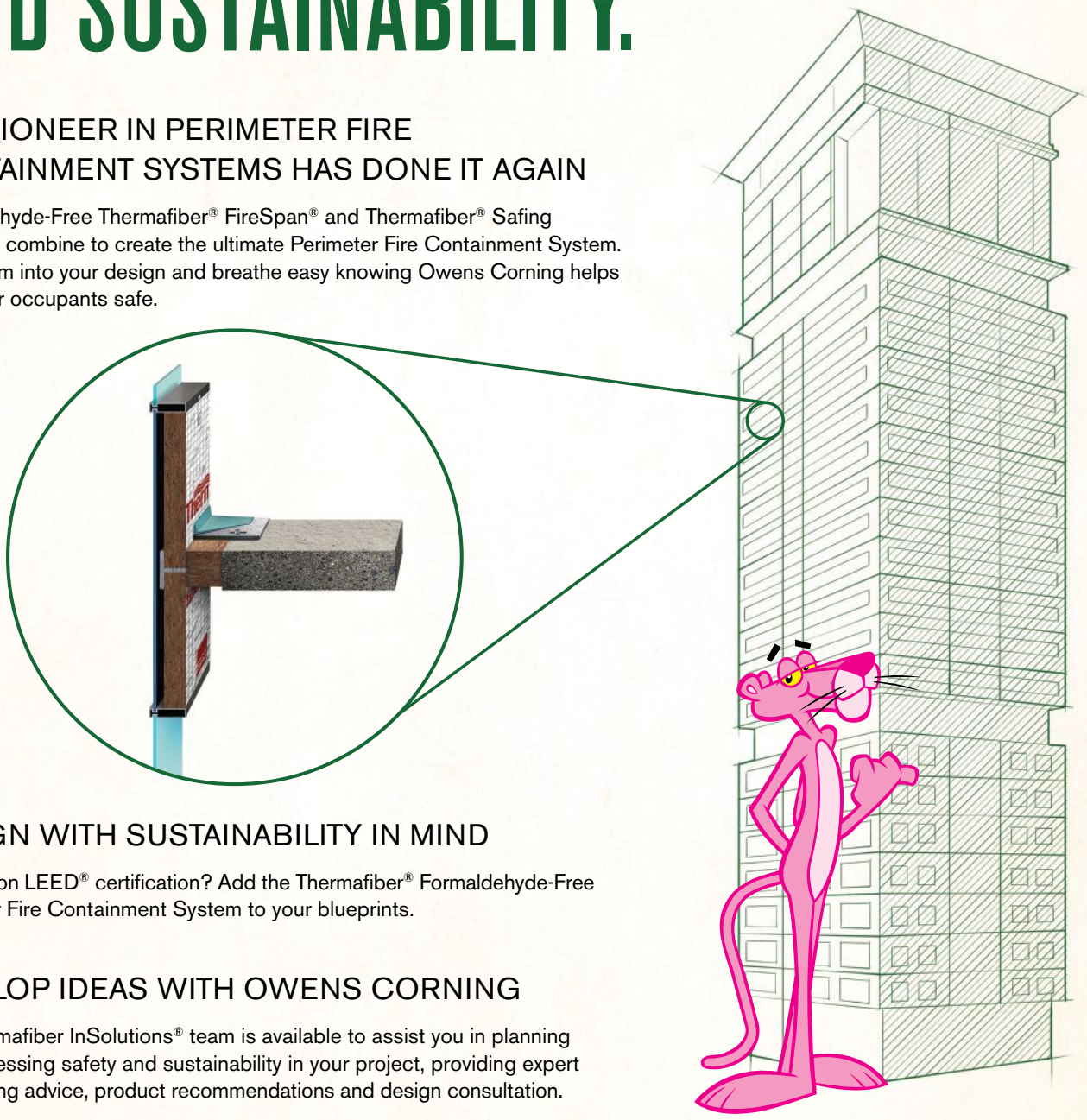

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shaping his image in this posthumous biography that cemented so much of his reputation, and set the stage for later analyses of his ouevre.

Recently I had lunch with a respected architectural publicist and friend whose client, Margi Nothard, ASSOC. AIA, lives in Florida and wanted to meet me and show me her work. I told them a little bit about Louchheim as we talked. Nothard showed me images of two projects. One of them I knew I could work with, and I watched as my friend picked up on my interest, navigated me in a direction she knew—having worked with me for 15 years—would suit me. I agreed to pitch the story until I landed it. I kept thinking of Louchheim, of how proud of my publicist friend she'd be. At lunch, I felt special, smart, like I deserved this story because I'd done a good job. I knew the machinations behind this. I could see the strands of this publicity dance and all the ways in which we were doing each other favors. But I also knew that this person and I are real friends, that when we hugged and I said goodbye and she then sent me an email with the pitch information and said, "This was the best work lunch I've had in a while," that she meant it. My friend never met Louchheim. But her practice, the way she works, the way she gives voice to architecture all the while maintaining hundreds of interpersonal relationships, that job can was profoundly shaped by Aline Bernstein Louchheim Saarinen.

Aline and Eero in the 50s

ALINE AND EERO SAARINEN PAPERS, 1906–1977. ARCHIVES OF AMERICAN ART, SMITHSONIAN INSTITUTION

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Teamwork Leads to Unique Project at University of Texas

Ellsworth Kelly developed a clear vision for the final piece of his career as an internationally-acclaimed artist. In the building he designed, *Austin*, Kelly wanted to bend light in different ways through an array of 33 colored windows, 14 black and white marble panels and an 18-foot tall totem, one of Kelly's common sculptural forms. The project, constructed at the Blanton Museum of Art on the campus of the University of Texas, was hailed by *The New York Times* as "not just a summation of his work's themes but his masterpiece, the grandest exploration of pure color and form in a seven-decade career spent testing the boundaries of both."

Kelly's signature project required extreme collaboration with the design team at Overland Partners, construction teams and contractors. While Kelly was brilliant at understanding art, he was not accomplished in building design. "We had to understand who he was and what his artwork was about," said James Lancaster, the project manager for Overland. "It was a process that began with listening. Before we put pencil to paper, we had to become attuned to Ellsworth and his vision for Austin."

One of the most unique challenges architects faced was concealing the apparatus required for 21st century buildings. Kelly sought to have the art serve as the centerpiece of the exhibit. Mechanical equipment for heating and cooling needed to be concealed. All wiring to electric and technology systems, plumbing fixtures and all of the other building components also needed to be hidden. There was also a laundry list of items to meet University compliance that required installation – and concealment. "While every aesthetic decision was his, we did not simply abdicate to whatever Ellsworth asked for," said Rick Archer, the Principal in Charge for Overland. "Codes, material selection, constructability, structure and HVAC resulted in modifications to Ellsworth's original design in terms of the scale and proportion."

The largest pieces of equipment for the 2,715-square-foot structure – which cost $23 million to complete – were heating and air conditioning units. The units, roughly the size of an automobile and weighing a ton or more, needed to be installed in an 1,800-square-foot-basement. To accomplish this feat, the project utilized a large custom floor access door manufactured by The BILCO Company. The door was equipped with a special finish on the covers to make them less noticeable from the exterior and a keyed cylinder lock for added building security. The large custom door sits on the outside of the structure, next to one of only two emergency exits in the building and features BILCO's engineered lift assistance for one-hand operation. "Many people don't even know where there is access to the basement," Lancaster said. "We had to have access to the basement, but we also had to make the door, as much as we could, invisible."


Photo: Anna Munoz

Austin delivers precisely the objective Kelly intended when he conceived the project, which he first started working on in 1986. The building opened in February 2018, a little more than two years after his death. "Although the work is not a chapel and has no religious connection, there is something deeply spiritual that visitors experience," Lancaster said. "The interior surfaces serve as a stage of sorts, and the colored windows are the actors."

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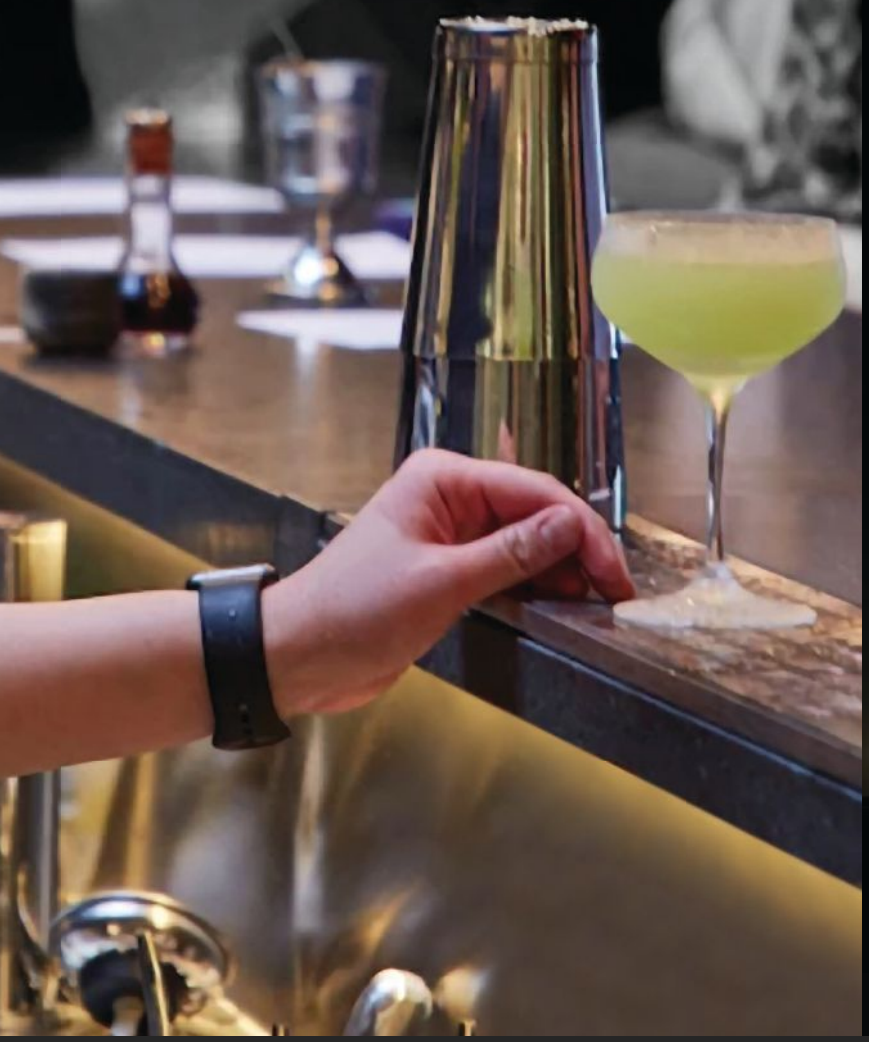

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“When architects design new additions for older museum buildings, frequently the new outshines—or simply ignores—the old. … That is not the case here.”

A Big Architect for a Little Museum by Witold Rybczynski, HON. FAIA

How does a little museum in South Florida snag a high-profile international maven like Norman Foster, HON. FAIA, whose client list includes the British Museum in London, the Smithsonian in Washington, D.C., and the Prado in Madrid? This is the question I put to Hope Alswang who, as executive director and CEO of the Norton Museum of Art in West Palm Beach, oversaw a major expansion and renovation of the museum by the celebrated British architect.

Alswang described a meeting nine years ago with Gilbert C. Maurer, the Norton Museum board member who had chaired the search committee that had just tapped her to be the new director. Maurer was COO of the Hearst Corp., and they met in his office on the 43rd floor of the Hearst Tower in New York. "We were discussing how the museum should move forward," she recalled. "We agreed that what we needed was a master plan, and Gil asked me who I would like to do the job. Rather cheekily I answered, 'What about Norman Foster?'"

Alswang knew that Foster was the architect of the Hearst Tower, completed four years earlier. What she didn't know was that Maurer had worked closely with Foster on the project. "Gil picked up the phone and called the Foster + Partners New York office, which was in the same building. Michael Wurzel, a partner, immediately came up and we talked about what was involved in a master plan. That's how it started."

Alswang didn't exactly pull Foster's name out of a hat. "I knew that my board would want a Pritzker Prize winner, and I wanted a rational modernist who would build a building that respected art. There have been a number of museum additions where that has been a problem." Alswang was too diplomatic to name names; perhaps she was thinking of Daniel Libeskind, FAIA's 2006 addition to the Denver Art Museum, which Christopher Hawthorne, in the *Los Angeles Times*, called "a pretty terrible place for showing and looking at art.") Alswang had seen Foster's work at the British Museum and the Imperial War Museum in London, as well as his first art gallery, the 1978 Sainsbury Centre for the Visual Arts at the University of East Anglia. She had also visited the Reichstag in Berlin, which the architect had renovated in the late 1990s. "I knew that Foster was interested in combining the new with the old, and that was one of our main issues."

The Legacy of a Society Architect

The Norton Museum of Art was built in 1941, designed by the Palm Beach firm of Wyeth & King. Marion Sims Wyeth (1889–1982) was a prize-winning graduate of the École des Beaux-Arts who apprenticed with Bertram Goodhue and Carrère & Hastings. After serving in the Royal Flying Corps during the First World War, Wyeth established a practice in Palm Beach, becoming what was then called a society architect. He was an eclectic, often working in the Spanish Colonial Revival style pioneered by Goodhue and popularized

Wyeth & King's original Art Moderne entrance to the Norton Museum of Art

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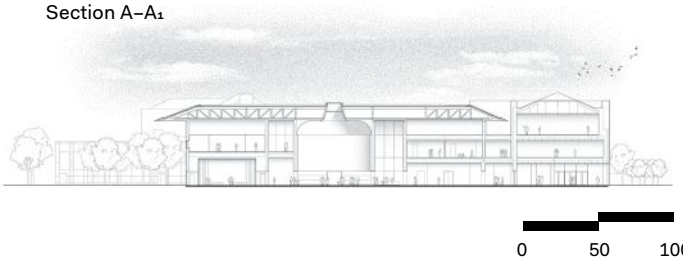
locally by Addison Mizner. He designed a beautiful Moorish mansion in Honolulu for Doris Duke. Wyeth's residential clients in Florida included Ralph and Elizabeth Norton, whose house he renovated in the then-popular Monterey Colonial style. When Norton, who belonged to a prominent Chicago family, retired as president of the Acme Steel Co., he and his wife settled in West Palm Beach, where they had been wintering for years. The pair were serious art collectors, and in 1940 they decided to found a museum and art school to house their sizable collection.

The Nortons turned to Wyeth. He designed a low, flat-roofed building with white stucco walls and limestone trim in a style that is often called Art Deco. Wyeth's design has little to do with the frothy confections of South Beach, however, and is more in the vein of Holabird & Root's Palmolive Building in Chicago (1929), Paul Cret's Folger Shakespeare Library (1932), and Raymond Hood's Rockefeller Center (1930-39). More accurately called Art Moderne, this American version of early Modernism is distinguished from the European International Style by its respect for the classical tradition, its discreet use of ornament, and its integration of artwork with architecture. The

Section A–A₁



- Original building
1. Main entrance
2. Great Hall
3. Converted galleries
4. Existing galleries
5. Original galleries
6. Original entrance
7. Courtyard
8. Auditorium
9. Restaurant
10. Events space
11. Parking
12. Sculpture garden
13. Future expansion

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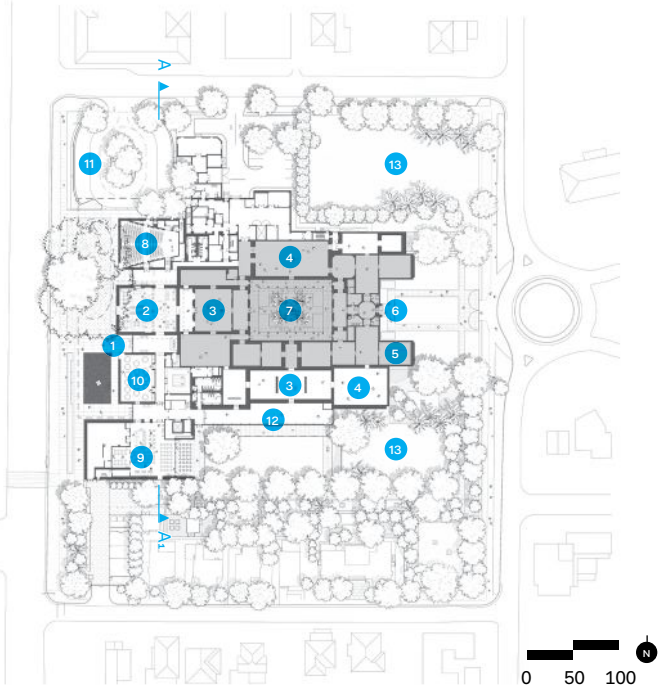
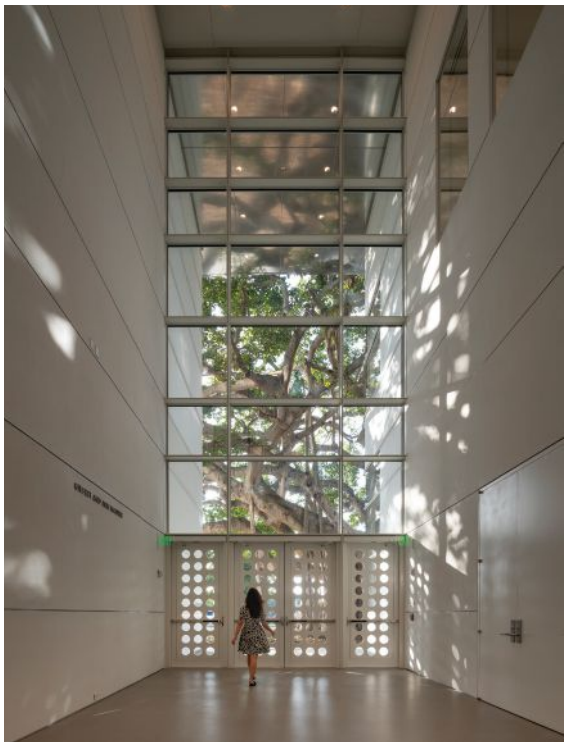
Ground-Floor Plan



Top: The new entrance faces the South Dixie Highway and is dominated by a giant banyan-like tree

Above: The Great Hall, which is lit by an oculus in the ceiling



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last is evident in the Norton Museum's façade, which includes two sculptures and three bas-reliefs by Paul Manship, a leading sculptor at the time and the author of Rockefeller Center's Prometheus. The façade also displays these lines from Théophile Gautier: "All passes. Art alone enduring stays to us; the Bust outlasts the throne, the Coin, Tiberius."

Wyeth's rigorous Beaux-Arts plan was a group of pavilions symmetrically organized around an outdoor court. The intimate galleries resembled the rooms of a large villa. By the time that Alswang commissioned Foster, however, two infelicitous additions in 1997 and 2003 had compromised Wyeth's intentions by shifting the entrance to the side to facilitate car access and provide parking. The result recalled nothing so much as a suburban shopping center.

"We first looked at re-establishing the original front door," Alswang told me. The problem was that the museum's main parking lot, which was on the far side of South Dixie Highway, a broad avenue at the back of the building, was simply too far away. Foster's

Opposite: The polka-dot pattern on the doors and the wall stripes are subtle Art Moderne touches

Above: A refreshed existing gallery

Right: A new gallery

solution was to move the main entrance to face the avenue, which not only solved the parking issue but also gave the museum a more visible public face. At the same time, he reinforced the prime axis of the original building, replaced the side entrance with a new gallery, and turned the adjacent parking area into a lush subtropical garden. The master plan also envisaged two pavilions flanking Wyeth's original entrance to accommodate growth in the undetermined future. "We were thinking maybe a $20 million thing," Alswang told the *Palm Beach Daily News*. It turned into a $100 million thing instead.

Alswang was not without experience in museum building. Before joining the Norton Museum she had worked with Rafael Moneo, HON. FAIA, on an addition to the Rhode Island School of Design Museum, of which she was director. "All top architects are expensive," she told me. "It's not so much the design cost as the cost of building well. For example, we built a full-size mock-up of a corner of the building to test different alternatives."

The Norton Museum restaurant overlooks the new subtropical garden

NIGEL YOUNG/FOSTER+PARTNERS

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All the Modern Amenities

The reconfigured and enlarged Norton Museum opened in February. Like Wyeth's original entrance façade, the new "public face" features a work of art—Claes Oldenburg and Coosje van Bruggen's *Typewriter Eraser, Scale X*. But the real attention grabber is a huge banyan-like *Ficus altissima* that had been planted when the original museum was built. The building appears to embrace the tree—the cantilevered aluminum roof canopy, that resembles an airplane wing, has a curved cutout to accommodate the 100-foot-wide arboreal giant.

The original Norton collection consisted chiefly of European and American art as well as Chinese pottery and paintings, later augmented by contemporary art and photography. Of the museum's 130,000 square feet of gallery space, only about 10,000 square feet are new. The rest of the Foster addition includes additional classrooms, a 210-seat raked auditorium, and a room that the museum calls the Great Hall. In the past, a "great hall" in a museum was a monumental space, like the Pantheon-like rotundas of Karl Friedrich Schinkel's Altes Museum in Berlin and John Russell Pope's National Gallery of Art in Washington, D.C. Times have changed. Foster's Great Hall is more like a large living room, furnished with groups of easy chairs and low tables, art books for browsing, and a convenient coffee bar. A lingering vestige of the neoclassical past is a rather mysterious oculus in the domed ceiling that recalls a James Turrell "skyspace."

The Norton Museum addition also includes an amenity that's become commonplace in museums: a restaurant. I'm not sure when museums first provided their visitors with a place to eat; the Museum of Modern Art in New York had a restaurant (with a garden terrace) as early as 1939. My vague memory of early museum restaurants is that they had Eames or Breuer chairs as well as a modern decor; in short, they were distinctly different from regular restaurants. Today, with so many commercial restaurants embracing modern design, how is a museum eatery to distinguish itself? Frank Gehry, FAIA's new restaurant in the

Philadelphia Museum of Art takes the minimalist road—and all that Douglas fir plywood creates the charmless atmosphere of a high-school cafeteria. Foster's restaurant at the Norton has the advantage of an outdoor terrace and the surrounding garden, although its high-style chairs (a very comfortable design from the German company Walter Knoll) and somewhat austere decor reminded me of an upscale spa. Perhaps there should be some art on the smooth concrete walls?

Maintaining an Intimate Scale

When architects design new additions for older museum buildings, frequently the new outshines—or simply ignores—the old, a charge that has been leveled at Snøhetta's recent addition to the San Francisco Museum of Modern Art. The usual rationalization is that hardy chestnut, "contrast." That is not the case here. The new architecture does not overwhelm the intimate scale that is one of the charms of the Norton. Moreover, the new addition blends seamlessly with the old museum as the visitor moves effortlessly from the entrance area to the galleries. This is partly because the old galleries have been freshened up—repainted, new LED lighting installed, carpeting taken up to reveal the original oak floor—and partly because the new layout is informed by the axial Beaux-Arts plan.

Foster + Partners is too much of a modernist firm to attempt an updated version of Art Moderne, yet there are subtle stylistic touches. The horizontal stripes on the consistent stucco exterior and on the walls of the Great Hall are a low-key reminder that streamlining was often part of Art Moderne buildings. So are the polka dot patterns on the front doors that are echoed, on a smaller scale, in the auditorium. Neither reference is literal, yet they function as effective visual cues.

During a 2017 press briefing in New York to unveil the design of the addition, Alswang (who retired last March) said it would be a dramatic upgrade—like going from "driving a Subaru to driving a Maserati." I've never driven a Maserati, but I have owned a Subaru and a Mercedes. They both had four wheels, four doors, and a steering wheel; the chief difference was in the details: the precision of the bodywork, the ergonomic controls, the solidity of the handling. I think that the renovated and enlarged Norton Museum can also be found in the details: Precise, carefully thought out, meticulously assembled, and solid—made to last. The doors close with a nice thunk, too.

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“At the moment that Trump is trying to build up walls, we’re trying to break down walls and invite people in.”

TEN Arquitectos Designs a Beacon for the Resistance by Karrie Jacobs

While sitting in the crowded waiting area of Make the Road New York's storefront offices in Queens, formerly a Blockbuster video outlet, I think about my grandmother. She left Poland at 18 and, working as a seamstress along the way, immigrated to America in the late 19th century. She eventually opened a Kosher restaurant in Hoboken, N.J., where my mother grew up, safely, happily, and far from the nightmare that overtook the family that remained in Poland. It doesn't take much empathy or imagination to make the connection between my family's story—more or less the story of most American families—and those of the people around me on a March afternoon, mainly Spanish-speaking women, waiting for healthcare counseling or an appointment with a lawyer. Until recently, the scene at Make the Road New York (MRNY) would have been just another heartwarming portrait of the American fabric, part of the melting pot or the gorgeous mosaic. We used to be proud of our immigrant heritage, of our openness to those seeking a better place to live.

With over 23,000 dues-paying members, MRNY is one of New York City's most formidable immigrant rights organizations. Founded in 2007 as a merger of two smaller groups, it has taken on a wide range of issues that affect immigrant communities: workers' rights, access to healthcare, and all the problems associated with the current administration's punitive approach to immigration law. MRNY, which derives its name from a poem by the Spanish writer Antonio Machado ("Searcher, there is no road. We make the road by walking."), used to be famous, locally at least, for its work on behalf of the carwasheros, the men who dry and buff newly washed cars, mostly for tips (which were often pilfered by the management). Since the dawn of the Trump administration, MRNY has increasingly been on the front lines of a cultural and political war, protesting almost daily. The waiting area where I sat was decorated with artifacts of those demos, cardboard signs shaped like butterflies, with slogans like "Resist," "Rise Up," and "Here to Stay."

In February, MRNY made an announcement on Twitter, not of a protest but of a groundbreaking: A rendering of an architectural section showed a tightly configured, 24,000-square-foot modern building, all glass and corrugated metal, with the 7 train immediately adjacent, a ghostly blur, roaring by on elevated tracks. I was amazed that a grassroots organization was building from the ground up and had obviously hired an architect. My assumption was that, somehow, Trump's barrage of anti-immigrant invective had helped elevate the group politically and financially, making a project of this scope possible.

Sectional rendering of MRNY's new home

COURTESY MAKE THE ROAD NY; TEN ARQUITECTOS

I was half right. There is an architect involved, specifically the New York branch of Enrique Norten, HON. FAIA's firm, TEN Arquitectos, founded in Mexico City. But I was wrong about the project's genesis. In my first conversation with Andrea Steele, AIA, who runs the New York office, she said that the firm was hired prior to the 2016 election. Then, soon after, MRNY told her, "We need to speed things up."

An Anchor and a Beacon

Depending on whom you ask, MRNY's project to build a permanent home in Queens goes back even further—nearly a decade or more. Including the former Blockbuster store, the organization maintains five rented offices in New York City, Westchester, and

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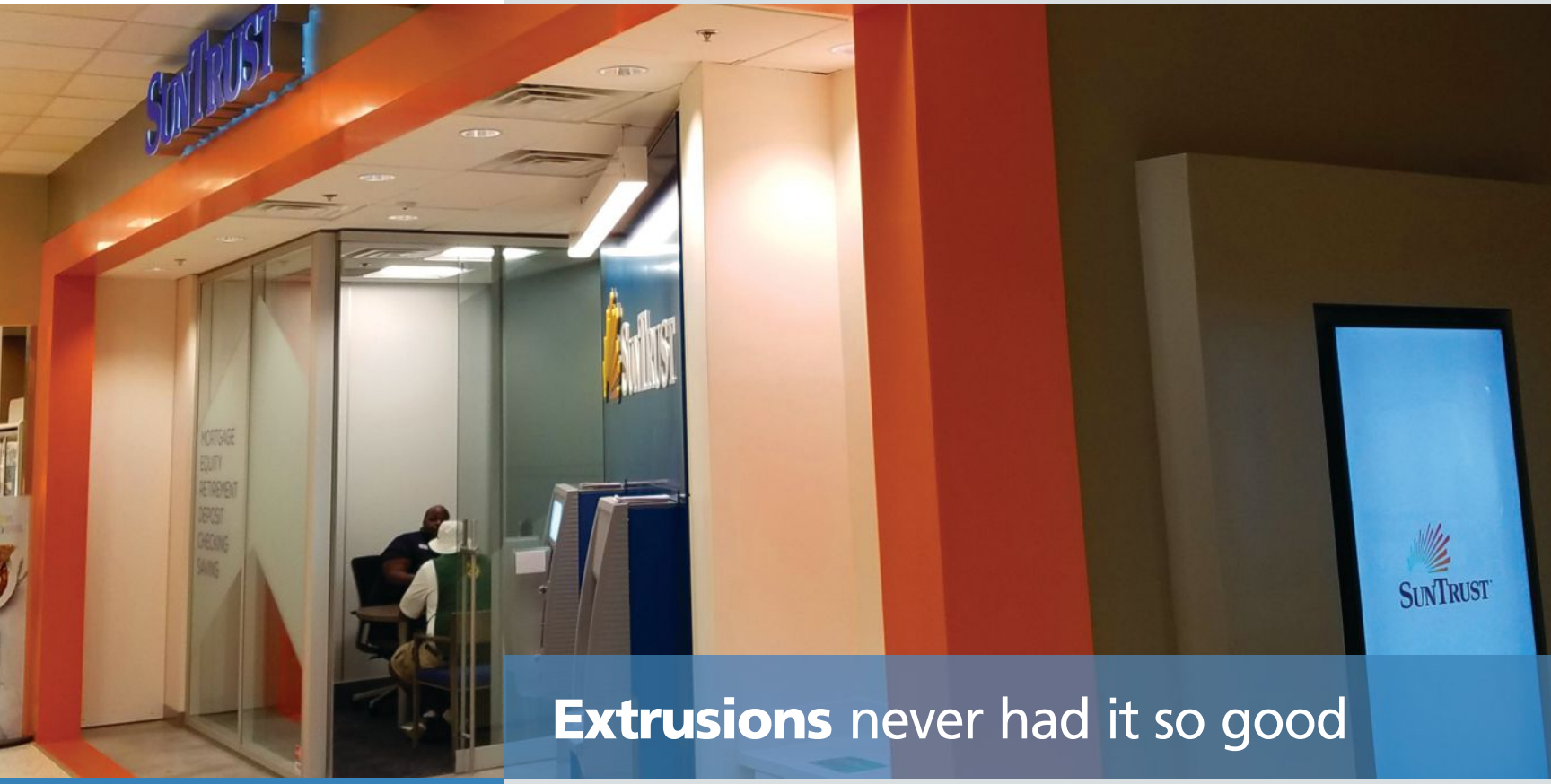

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View from Corona Plaza

Long Island. Co-executive director Javier Valdés, who originally moved to the U.S. from his native Argentina as a college student, tells me that he first saw the value in owning instead of renting in 2011 when he and some colleagues visited the headquarters of a farmworkers union in Woodburn, Ore. "They owned a radio station. They owned affordable housing. They owned a community center," he recalls. While it's simpler to amass property in Oregon than it is in New York City, the model was appealing: "They're an institution that's a little bit older than ours, and they've been able to pass this level of equity, generation to generation."

As Valdés walked me down Roosevelt Avenue in Queens, a street pulsating with the kind of vitality that lately has gone AWOL from large parts of Manhattan, he explained that gentrification has relentlessly followed the path of the 7 train deeper and deeper into Queens, gradually encroaching on MRNY's territory. "We were really concerned because of the increasing real estate pressures. What's going to happen to the future of the organization?" Owning a building would allow them "to drop an anchor in the community and say that we're here long term." Also, the current Jackson Heights facility, a warren of small- to medium-sized rooms, simply wasn't designed to house a growing community's needs.

MRNY turned to a friend of the organization, the urban planner Betsy MacLean, who, at the time, was developing affordable housing for the Cypress Hills Local Development Corp. in East New York, a stubbornly ungentrified corner of Brooklyn. From her work at Cypress Hills, MacLean understood the funding mechanisms available to New York City nonprofits. According to Valdés, "She says, 'This is actually doable. You will need to get some political support to be able to raise capital from the city of New York.'"

In 2014, MacLean took a new job, executive director of Hester Street, an organization based in New York's Chinatown that began as a modest spinoff of a small architecture firm called the Leroy Street Studio. A civic group, it helps nonprofits and community groups do urban planning and real estate development. In her new role, MacLean steered MRNY to its local city council member, Julissa Ferreras-Copeland, who had just become the council's finance chair, and the organization secured enough of a grant to pay for a feasibility study—which, of course, was conducted by Hester Street. "We did a bunch of interviews with leadership," MacLean recalls, "with staff. We did surveys. We did a couple of kind of charrette-type meetings to identify: So, what do you need? What does this look like? And then we dove into their finances to figure out what they could afford. And knowing what sources are out there for community facility development, how we could start to assemble those pieces."

MRNY secured $5.6 million through the city council and the Queens borough president's office to cover construction costs. To purchase the vacant lot they discovered, just 10 blocks up Roosevelt Avenue from their current offices, they borrowed money from the Local Initiatives Support Corp. (LISC), which is a conduit for the kind of funding that is typically generated by tax credits. All told, MacLean helped piece together a mosaic of loans, grants, and tax

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credits, funding about 75 percent of the estimated $30 million cost of the project. The other 25 percent will come from MRNY's fundraising efforts.

A Cold Call to TEN Arquitectos

Hiring the right architect was more complex than finding funding, and also part of Hester Street's job. "Our criteria were great design, experience working with government money, and working within a budget," MacLean says. She also was searching for a firm that wasn't, like much of the profession, "overwhelmingly white and male." She worked her way through a short list without nailing that "exact mix." A late night internet search lead MacLean to TEN Arquitectos. "I reached out to Andrea, cold-called her, and to her credit, she was down immediately. She was there."

"We were really intrigued by TEN Arquitectos," Valdés recalls, "primarily because they were bicultural. Most of their staff spoke Spanish. They understood our organization. They were able to do the focus groups in Spanish, which was critical."

MRNY wanted enough space and flexibility to hold two group meetings simultaneously, and enough smaller offices to offer staffers and members who'd arrived for, say, meetings with immigration lawyers, a modicum of privacy. But the main things the organization wanted from the new building

TEN Arquitectos' New York Public Library branch on 53rd Street

MICHAEL MORAN/OTTO

were increased visibility and permanence—a physical manifestation of a favorite slogan, "We're Here to Stay." Everyone I spoke with about the project called it a "beacon." Valdés: "We're hoping this will be a beacon." Steele, noting how the building will be visible to everyone riding by on the 7 train: "They really need to be a beacon for the larger community of the city." I'm guessing it's no

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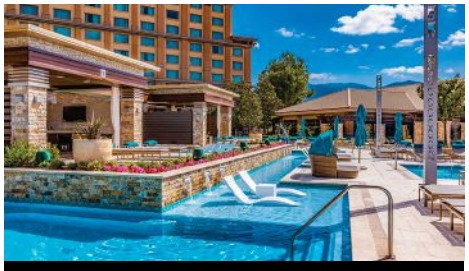

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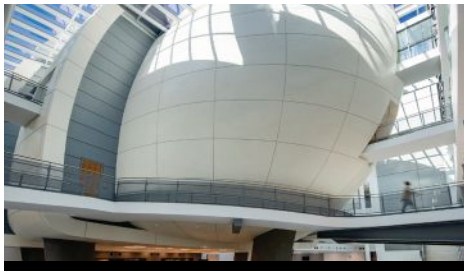

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accident that the word calls to mind the final words of the Emma Lazarus poem on Lady Liberty's torch: "I lift my lamp beside the golden door!"

The focus groups helped clarify the spirit of those aspirations. "We really wanted to understand, not just the flows through the building and the basic circulation, but how this building and how this entity changes the directions of people's lives," Steele told me. The primary thing, she determined, was giving the organization a great communal space. "They come together every night. To speak about what they've done, to speak about what they still need to do. To collectively share stories. Their strength always comes from the collective."

MRNY came across a likely architectural approach in another TEN Arquitectos project: "We visited some of the spaces they themselves had designed," Valdés says. "We were very much moved by [their] design of the New York Public Library across from MoMA." Like the library, the dominant element in MRNY's building will be a set of bleachers, clad in wood, and highly visible behind a wall of glass. This will be the community center's main space, where members will convene to hang out, to be among friends, or to discuss topics like education, environmental issues, and transgender rights.

A passageway next to the bleachers leads deeper into the building, to office space and to classrooms where English, reading, and citizenship will be taught. Adjacent to the main space is a day care center and also a dedicated space for teenagers. A series of strategically placed cutouts will bring sunlight down into the building's lower levels; there's room on the deep lot for a courtyard out back. The building has two kitchens; communal dining is a big part of MRNY culture, as is coffee. "The flavors are important," notes Valdés.

When I visited the site in March (the projected completion date is sometime next year) it was just a fenced-in patch of dirt, with the shovels from the February groundbreaking lying on a mound of earth in the center. Valdes wanted me to see the site so I could feel the energy of the surrounding neighborhood and understand how pivotal the community center will be. The new building will face Roosevelt Avenue, with the 7 train passing by one flight up every few minutes; the 103rd Street station is two short blocks away. Originally, the plan was to make the building's entire street wall out of glass, but concerns about train noise and the budget won out. Now the second-story façade will be concrete with a cutout allowing subway riders

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DEMILEC

a glimpse of a glassed-in conference room, and there'll be graphics at the level of the elevated track to catch the eye of passing commuters.

The most significant thing about the location is that directly across the street is Corona Plaza, a public space created on what was, until recently, a street. "Corona Plaza is a pure extension of their space," Steele says: A funnel of patterned pavement sends pedestrians to the perfect vantage point where, through the windows, they can see MRNY members gathering on the big steps.

"In Latin America, you usually have the main plaza, the church, and the municipality," Valdés told me. MRNY has got the plaza, and there's a post office that stands in as a symbol of municipal government. "And we want to be the church, not in the sense of a place of worship, but as a place where people gather."

The Opposite of a Wall

Hanging around on the site, watching the trains go by, I'm struck by how much optimism and courage it takes for an immigrant rights group to build a largely transparent community center in the age of Trump. As Valdés told me: "My hope is that every person that is a new migrant in the city knows that this is a place they can go to." At the same time, there's something unsettling about a building so conspicuous—new construction is a rarity on Roosevelt Avenue in Corona—and so seemingly vulnerable for a population that's on the receiving end of hateful rhetoric and overzealous enforcement. When you light a beacon you never know who or what it will attract.

According to MRNY's development director, Julie Miles, there's been an increased focus on security staff training since Trump took office. The situation in the new building, she argues, "will not be very different from our current situation—storefront buildings with lots of glass—so we have protocols in place." Valdés assured me that, whether the façade is opaque or transparent, ICE can't enter the premises without a warrant: "What we wanted to do is make sure people feel welcome when they come in, and power in masses is very important in our community—that you're not alone." He went on to quote something that Enrique Norten said to him: "'At the moment that Trump is trying to build up walls, we're trying to break down walls and invite people in.'"

Steele echoed that sentiment: "The last thing—it goes without saying—the last thing we want to do is build a wall."

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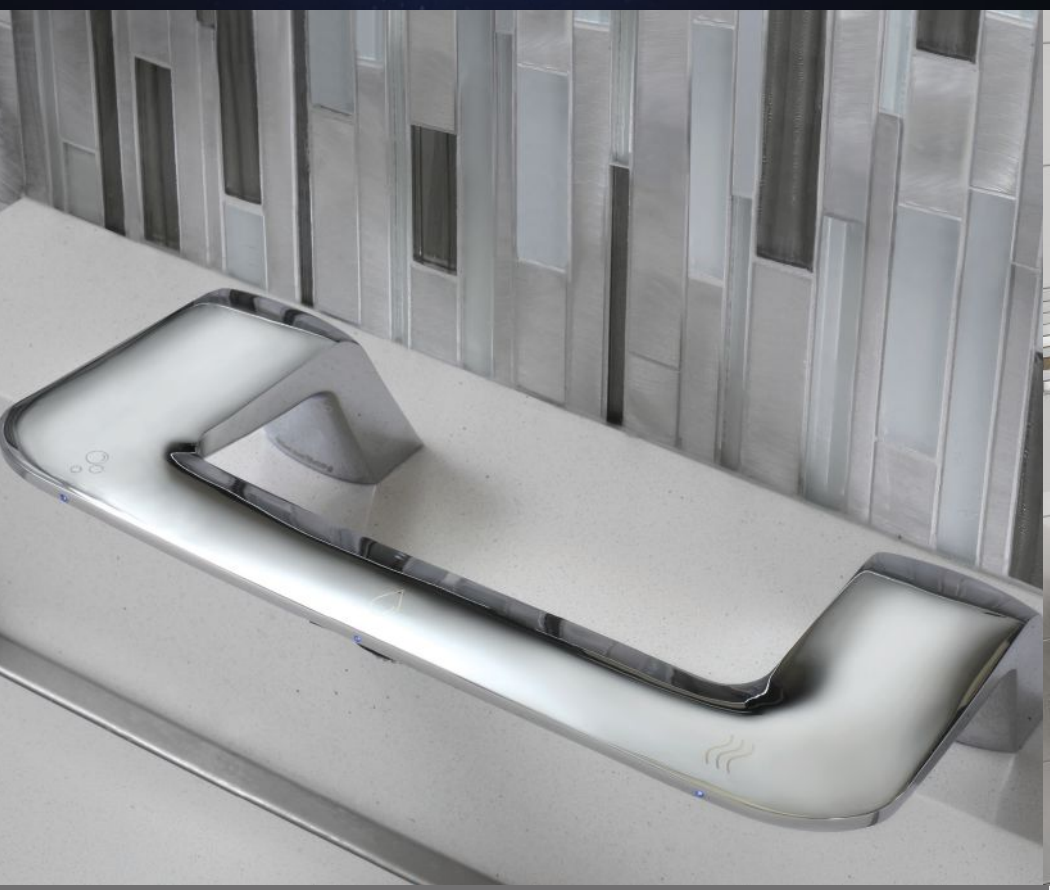

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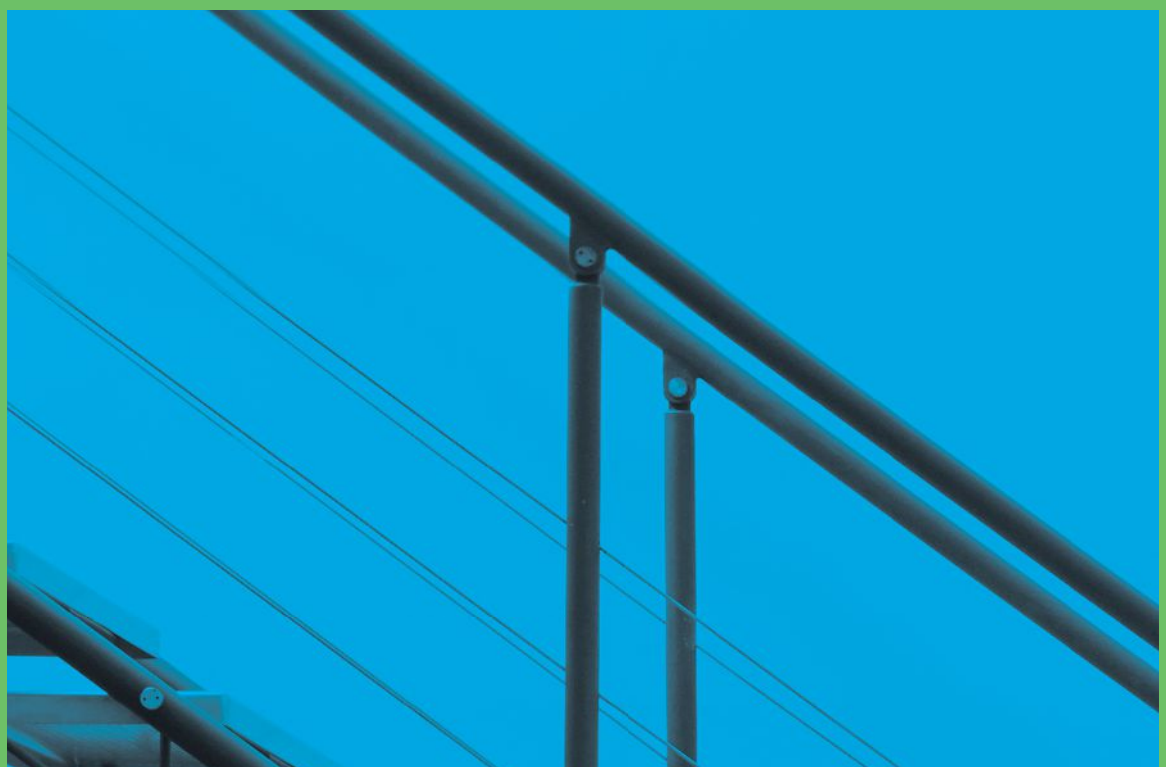


THE 2019 AIA HONOR AWARDS

This year's winners all responded to an architect's version of the Proust questionnaire. Responses have been edited for space. See the complete versions on *architectmagazine.com*.

PRODUCED BY ERIC WILLS

GOLD MEDAL

Richard Rogers

The Italian-born Rogers, HON. FAIA, winner of the Pritzker Architecture Prize (and honored with a knighthood), has now added AIA's highest award to his list of bona fides. Heralded as a high-tech iconoclast and environmentalist who embraced sustainable design before it was fashionable, Rogers partnered with both Norman Foster, HON. FAIA, and then Renzo Piano, HON. FAIA, before founding his own London-based firm, now called Rogers Stirk Harbour + Partners, in 1977.

What is your greatest achievement? Surviving school. · **What is the most memorable moment of your career?** When Renzo Piano called me to say that we had won the Pompidou Centre competition. · **What was your most rewarding collaboration?** Designing the retrospective of our work at the Pompidou in 2008 and the retrospective at the Royal Academy of Arts celebrating my 80th birthday [in 2013] with my son, the exhibition designer Ab Rogers. · **What is the greatest ambition you have yet to achieve?** The next building. · **What's one building you wish you had done?** Piazza del Campo in Siena. · **What's the one design/project that got away?** Tokyo International Forum. · **What's the best way to describe the personality of your practice?** We have a constitution. · **What is the greatest challenge facing architects today?** Sustainability. · **When did you first realize you wanted to be an architect?** When I met my Italian uncle Ernesto Rogers, BBPR architect and editor of *Domus*, who encouraged me. · **What jobs did your parents have?** My mother was a potter and my father a consultant in renal medicine. · **What would you have been if not an architect?** A landscape architect. · **What keeps you up at night?** Inequality. · **What is your most treasured possession?** I treasure people more than possessions. · **What is your greatest extravagance?** My children. · **When and where were you the happiest?** At sunset in the Val d'Orcia [in Tuscany], with my family and friends looking at the view of Monte Amiata eating zucchini flowers. · **What is your greatest fear?** That we do not do anything about climate change. · **Which talent would you most like to have?** As I love to eat, I wish I had learned how to cook, though I do live with a chef. · **What does architectural happiness mean?** Working with a great team and engaged clients. · **What's the last drawing you did?** The Photography Gallery for Château La Coste Art Gallery for my great friend Paddy McKillen. · **Which living person do you most admire?** Ruthie Rogers. · **Which book(s) are you currently reading?** I am re-reading Hemingway's *For Whom the Bell Tolls*. · **Who is your favorite hero of fiction?** Ulysses. · **What's the one question you wish we had asked (and the answer to that question)?** Do you find short questions difficult to answer, and my answer is yes. · **What does winning the Gold Medal mean to you?** More than I can say.

PHIL FISK

THOMAS JEFFERSON AWARD

James McCullar

James McCullar, FAIA, founded his New York–based firm, now called James McCullar Architecture, in 1981, focusing on affordable housing, sustainable community design, and urban revitalization. His steadfast commitment to such projects has earned him the Thomas Jefferson Award for Public Architecture.

What is your greatest achievement? Co-founding the New York–based Consortium for Sustainable Urbanization that builds bridges between the design community and the United Nations in support of the Sustainable Development Goals and the New Urban Agenda adopted at Habitat III and by AIA in 2018. · **When did you know you wanted to focus on affordable housing/public design?** After the New York City population loss and abandonment in the 1970s created a need for rebuilding the city. · **What is the biggest challenge right now in this area?** Finding consensus on how to address a continued population growth and exurban sprawl exacerbated by climate change and the lack of environmental planning. · **What was your most rewarding collaboration?** The early Byland House in Missouri, a synthesis of active and passive solar design, local influences, and octagonal solarium modeled on Jefferson's Monticello. · **What does winning the Thomas Jefferson Award mean to you?** An acknowledgment of a career in making our communities and cities more equitable and better places to live.

Founder and managing principal of Seattle-based architectural consulting firm Studio Pacifica, Karen Braitmayer, FAIA, has earned the Whitney M. Young Jr. Award for her significant contributions to accessible design.

What's the most memorable moment of your career? Receiving the call from President Elefante with the news of the Whitney M. Young Jr. Award! · **When did you first realize you wanted to specialize in accessible design?** I can't say there was a defining moment when I realized I could make this my life's work, but at each step it felt right to keep going. · **What's the greatest challenge in the field today?** The lack of research funding to enable increased anthropometric analysis of people who have disabilities—research that would create the basis for more accurate and functional dimensional criteria so that our built environment would better serve the needs of all users. · **What's the one thing you wish more people knew about accessible design?** That it's just good design—design that supports users of all abilities, ages, and cognitive and sense acuity. · **What does winning the Whitney M. Young Jr. Award mean to you?** I hope it elevates the need for accessibility in the built environment and reminds AIA members of their power to better our communities for people with disabilities.

LEFT: AUNDRE LARROW; RIGHT: PATRICK KEHOE

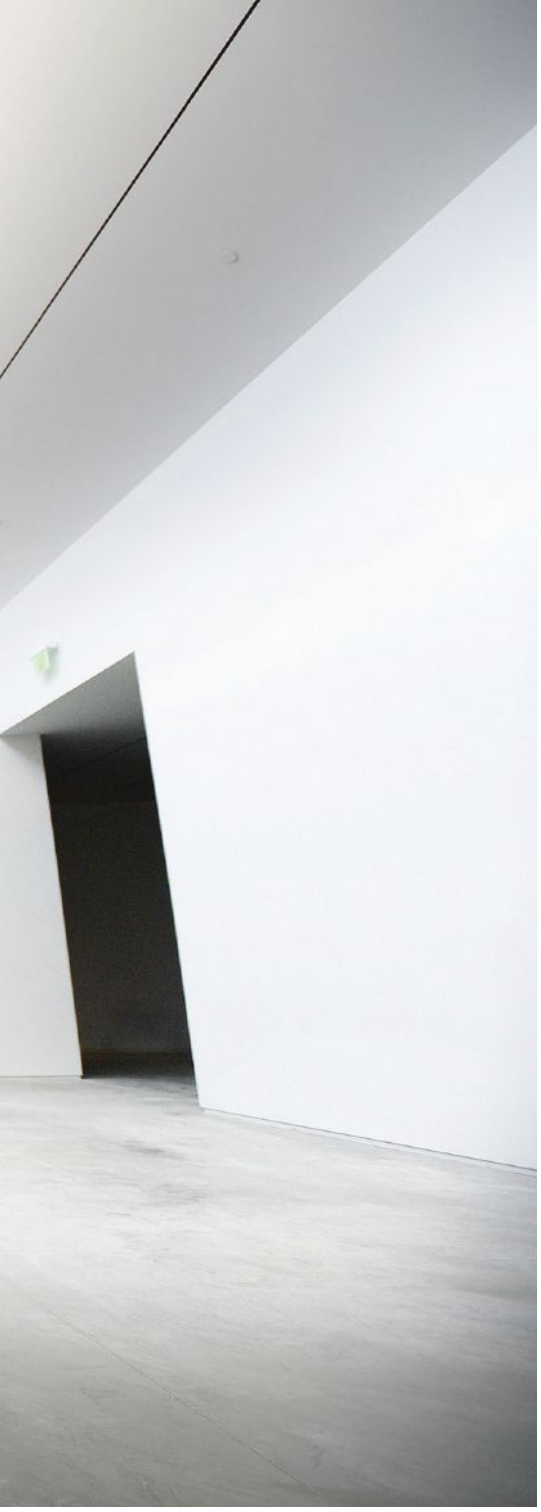
WHITNEY M. YOUNG JR. AWARD

Karen
Braitmayer

TOPAZ MEDALLION

Toshiko Mori

What is the most memorable moment of your teaching career? Each day when I see the insight and ideas of my students. · **When did you first know you wanted to teach architecture?** When I was studying at the Cooper Union under John Hejduk. · **What is your teaching style?** Observing each student to optimize his or her capacity and individual talent. · **What is the most unfortunate reality about architectural education today?** The lack of diversity in terms of gender balance and diverse cultural representation. · **What is the greatest challenge facing architects today?** Keeping up with changing technology and balancing it with a moral and ethical compass. · **When did you first realize you wanted to be an architect?** When I was a high school student studying the history of the Renaissance. · **What jobs did your parents have?** In international business. ·



SHAWN PATRICK OUELLETTE/ PORTLAND PRESS; GETTY

Toshiko Mori, FAIA, founder of New York–based Toshiko Mori Architect, has earned the Topaz Medallion for her groundbreaking contributions to architectural education. The Robert P. Hubbard professor in the practice of architecture at the Harvard Graduate School of Design, she was the first female faculty member to receive tenure there.

What would you have been if not an architect? A diplomat. · **What keeps you up at night?** The details in schedules and design. · **What is your favorite building?** Maison Louis Carré by Alvar Aalto. · **What is your most treasured possession?** My puppy, Mamenosuke. · **What is your greatest extravagance?** Personal yoga instruction. · **When and where were you the happiest?** When I am at our farm in Maine, and being on or near the sea. · **What is your greatest fear?** That we are making ourselves and the planet extinct. · **Which talent would you most like to have?** Musical talent. · **What does architectural misery mean?** Being stuck with mediocrity. · **What does architectural happiness mean?** In the state of harmony in quality, aesthetics, and function. · **What is the trait you most deplore in yourself?** I tend to take the shortcut. · **What is the trait you most deplore in others?** Laziness and not being on time. · **What's the last drawing you did?** Sketching of framing details. · **Which five architects, living or dead, would you most like to have dinner with?** John Hejduk, Kazuo Shinohara, Alvar Aalto, Lina Bo Bardi, and Carlo Scarpa · **Which living person do you most admire?** Paola Antonelli · **Which book(s) are you currently reading?** *Words Without Music*, a Philip Glass memoir; *The Library Book* by Susan Orlean · **Who is your favorite hero of fiction?** Taeko in *The Makioka Sisters* by Jun'ichirō Tanizaki · **What's the one question you wish we had asked (and the answer to that question)?** What is your favorite sport? Skiing and swimming · **What do you hope your legacy will be?** That my work survives beyond myself. · **What does winning the Topaz Medallion mean to you?** Teaching is invisible; one cannot measure the impacts, and one teaches continually for years with generosity, passion, and empathy. So, when such an effort is valued in visible terms, it is incredible.

ARCHITECTURE FIRM AWARD

Payette

Boston-based Payette, founded in 1932, has built a reputation for bringing innovative technological solutions to its projects without sacrificing design in the process.

What is the firm's greatest achievement? We don't think we've accomplished it yet; we truly believe the best has yet to come! However, our greatest achievement to date has been innovation in our core typologies—our work has shaped how buildings for science and healthcare are designed across the globe. · **What's the best way to describe the personality of your practice?** Collaborative, open, and rigorous. We are not a practice driven by personalities; we are a practice driven by the strength of the collective. · **What project best reflects your firm's ethos?** The ISEC at Northeastern University is a visible manifestation of the firm's commitment to the fusion of design and performance. Just this January, it was awarded the 2018 Harleston Parker Medal, which recognizes the most beautiful building in Boston annually. · **What is the greatest ambition the firm has yet to achieve?** While we do specialize in buildings for science and healthcare, our ambition is for the firm to be known for great design work first and our expertise second. · **What's one building you wish you had done?** We've never designed a skyscraper; however, we've been close a few times. · **What's one building you wish you hadn't done?** We have a few, but they are all from the 1980s. I think almost everyone feels the same way. · **What's the one design/project that got away?** The Engineering Quad at Princeton University—we felt we had the perfect team at the perfect time to do something incredibly special and innovative. · **What's the firm's favorite type of project to work on?** We love to solve puzzles—complex projects that seem almost unsolvable, with incredible programmatic and logistical complexity—that in the end if they are well-done, look effortless. · **What is the firm's biggest extravagance?** We invest heavily in our resources like our Fabrication Lab, our Building Science Group, and our research at a level that is quite unusual for a firm of our size. · **What is the biggest change coming to the firm in the next year?** As our practice grows—in staff and projects—we're also expanding our relationship with the academy in new and exciting ways. · **What does winning the Architecture Firm Award mean to you?** It's a recognition from our peers of the practice we've built—a standard to which we've held ourselves for many, many years, and while recognition once seemed elusive, it is so much sweeter now.

COURTESY PAYETTE

COLLABORATIVE ACHIEVEMENT

Anne Taylor

Anne Taylor, HON. AIA, president of Albuquerque, N.M.–based School Zone Institute, and a professor emerita at the University of New Mexico's School of Architecture and Planning, has advocated for design education as a requirement for every child.

What's your vision for pre-college architectural education? Elementary, middle, and high schools need to integrate design thinking and design education as a required subject in all subjects. This will demand that colleges of education partner with schools of design to give professional development in design thinking to teachers and pre-service teachers. · **What is the greatest ambition you have yet to achieve?** The establishment of a Design Center at the University of New Mexico or elsewhere to foster research and furtherance of design education for the schools of America and globally. · **What does winning the Collaborative Achievement Award mean to you?** I am humble about the award, but very proud of the collaborative work as a contribution and legacy by a woman (and others) for all children P-K through 12-plus worldwide. The question is, "Will the world of educators listen?"

STEVEN ST. JOHN

Michael Sorkin

Michael Sorkin is the founding principal of New York–based Michael Sorkin Studio. As the architecture critic for *The Nation*, and the author and editor of countless books, he has served as an abiding conscience to the profession.

What's your favorite essay/book/piece of criticism that you've written? *20 Minutes in Manhattan* or *Local Code* or … When I look back at my writing, all I can see are the infelicities and unmade arguments. I'm also a publisher [urpub.org] and those children all give me much joy. · **What was your most rewarding collaboration?** With [my wife] Joan. Ongoing for almost 40 years. · **What is the greatest challenge facing architects today?** Fascism. · **What would you have been if not an architect?** Less broke. · **What is your greatest extravagance?** My practice. · **Which talent would you most like to have?** Playing the piano like Horowitz. · **What does architectural misery mean?** Working for the man! · **What does architectural happiness mean?** The good transmuted into the beautiful. · **What does this award mean to you?** Honor. Joy. Vegas.

Jan Gehl

For the last half-century, Jan Gehl, HON. FAIA, the founder and senior adviser at Copenhagen-based urban research and design consulting firm Gehl, and author of the seminal book *Life Between Buildings: Using Public Space*, has championed livable, well-designed cities.

What is your greatest achievement? What has been accomplished in Copenhagen in terms of making it one of the most livable, people-friendly cities in the world. · **What is the most memorable moment of your career?** To see my closest collaborator (and old student) Camilla van Deurs becoming the new city architect of Copenhagen in February 2019. · **What is your greatest regret?** We did a big study with recommendations for London in 2004 for [then] Mayor Ken Livingstone. Then Mayor Boris Johnson took over! · **What is the greatest challenge facing architects today?** I am increasingly frustrated to see the lack of human quality in the many new towns of our time. No more Dubais please. · **What do you hope your legacy will be?** To be remembered as one of the architects who brought back concern for people, after the many years of technocratic Modernism.

LEFT: AUNDRE LARROW; RIGHT: SANDRA HENNINGSSON

TWENTY-FIVE YEAR AWARD

The Sainsbury Wing at the National Gallery

Designed by Venturi, Scott Brown and Associates, the Sainsbury Wing at the National Gallery in London divided opinions even before opening in 1991. Denise Scott Brown, HON. FAIA, recalls how the project became a cherished landmark.

What was the greatest achievement in the design of the Sainsbury Wing? It houses some of the world's most precious art and sits at the center of Western culture, peered at by Lord Nelson at the center of Trafalgar Square. It was a very tender project. · **What problem/brief was the project attempting to solve?** Opening the paintings to a wide world of people, helping each person to have an I-thou relationship with at least a few paintings, and protecting all the paintings from physical harm and the sun's rays. · **What attracted you to the project?** The National Gallery's Sainsbury Wing is a modern building, but it is also part of the intertwined paths of classical architecture between Italy and the Anglo-Saxon world. Palladio is an English and American hero with a greater importance here than in Italy. His pediments, columns, and famous window passed first to England then to America, where they adorned plantations, mansions, and, via Mount Vernon and Monticello, made their way into the vernacular. Palladianism is as American as Levittown. The gallery's design embodies our own sorties down classical paths. In responding to architectural ancestors ancient and modern, we played with cross-cultural traditions and meanings and defined context as more than the physical environment. And of course we were attracted to a project with so much potential for rule-breaking, modern and of the Sir John Soane kind. And we agree that this building was a love letter to London building culture, especially as defined by John Summerson. · **What was the public reception like to your proposal?** Few architects in England liked it, but people stopped us on the streets around it, and on the Charles Bridge in Prague, to thank us for designing it. · **What was your most memorable moment of the project?** One was when we left London for Pakistan and Bob sat scribbling overnight on a British Airways menu, and as we landed showed me ballpoint sketches summarizing weeks of our thinking and research that led to the design competition parti that the client eventually chose. · **What was the most rewarding part?** As always, struggling with the design. One of the most rewarding was ensuring that direct light did not touch the paintings, but that the galleries would still receive needed light. · **What turned out better than expected?** As a result of connecting Trafalgar Square, Leicester Square, the existing galleries, and our extension, we found we had created a welcoming setting for the several million visitors to the gallery each year. But also, to our surprise, a setting that welcomes and protects protests and assemblies. If you saw the recent protest at the visit of President Trump, you saw our façade hanging over it. The frontage of the Sainsbury Wing is our Peace Park. ·

PETER COOK/VIEW PICTURES; GETTY

TWENTY-FIVE YEAR AWARD

What didn't work out exactly as planned? Some things the client wouldn't allow—a window at the end of the main gallery was the greatest loss. From it, the vista of Pall Mall, set in the art, would have seemed like fairyland. · **What's the best description of the finished building?** Charles Holland called it "a love letter to London." We would add "a mannerist love letter," with nods to Soane, Lutyens, Summerson, and the clubland Classicism of Pall Mall. · **What is the greatest ambition you have yet to achieve?** In pushing ourselves to widen the view from architecture's window, Bob and I have understood that there's more to functionalism than merely relating the bathroom to the bedroom; and as well, that communication is a function of architecture. I work now to show that functionalism doesn't end with the front door. What happens from across the porch, and across the street, and all the way to China? Many architects, quoting Le Corbusier, define the outside as an aesthetic problem only. When we take this approach to work in the city, we share a responsibility for urban mistakes that cities make worldwide. I am still trying to find, through architecture, photography, and planning, ways to reach architects who have great reluctance to see urban relationships as part of their concern for function, and as a means of helping architectural relationships to work. · **What's one building you wish you had done?** Philadelphia Orchestra Hall. · **What's the one design/project that got away?** The Transportation Square Office Building in Washington, D.C. We won it in a Redevelopment Land Agency competition, but it was turned down by the Washington Fine Arts Commission headed by Gordon Bunshaft, who hated our scheme. It would have been one of our most challenging projects and an early boost to our career. · **What is the greatest challenge facing architects today?** The challenges that face the world: sustainability, climate change, and meeting the needs of poverty-stricken populations. · **When did you first realize you wanted to be an architect?** I became a modernist at the age of two when my parents built an early Modern house and I saw the plans, blue prints with white lines. In kindergarten, I decided that I too would be an architect like my mother. But in first grade I wanted to be a teacher. Then to study language, to work in a library, to do research, travel, and write, all those things. I wanted to be all sorts of things depending on whom I admired. From four years old, people said I asked too many questions, and a perceptive teacher friend of our said that I might eventually be a researcher. At about 14 I reverted to architecture, and at 40, I realized that everything I wanted to do I had done—through architecture. · **What jobs did your parents have?** My mother studied architecture but could not continue with it. She also lived in the wilderness and worked as a miner. My father dropped out of college at 18 and went north, learning to be storekeeper in Zambia. Returning to South Africa with a family, he worked with a cousin who was a stock broker and became involved with development. As a developer he built apartment buildings, office buildings, and movie houses. · **What would you have been if not an architect?** A maker of some sort, a designer, researcher, and teacher. But one of my joys is seeing an emanation from my mind physically on a site. · **What keeps you up at night?** What is Philadelphia going to do for work? How to help designers take logical steps from doorsteps to the world. This is urgent. We can't say yes to Herbert Gans and Jane Jacobs and no to the social relationships they ask us to understand and protect. · **What is your favorite building?** Which is your favorite child? · **What is your most treasured possession?** My family, dog, home and yard, iPhone; and four nearly written books. ·

When and where were you the happiest? The loss of many hoped for things: both my husbands—one while very young and the other while very old—have shown me the complexity of loss. How can I look back on the times when I was enormously sorrowful, and find myself thinking of them now as times when I was also in some respects happy? I did not recognize it at the time, but now, life is again like that. Though I've lost my dear husband, there is much that contributes to happiness in my old age: for instance, the Pritzker petition, which I see as my Pritzker Prize. Especially being able to work with and welcome people who want to talk with me. · **What is your greatest fear?** That I will not complete the books I have underway. · **What does architectural misery mean?** Designers of buildings that ignore everything modernism stands for, don't want to know about the forces at work, and confuse urban renewal with human removal. · **What is the trait you most deplore in yourself?** Bloody-mindedness · **What is the trait you most deplore in others?** Believing that context is a sheet of white paper. · **Which artists do you most admire?** Some samples: Bach, Scott Joplin, John Donne, Klezmer, Ruscha, Lichtenstein, Braque, Feininger, and Cartier-Bresson. · **What's the last drawing you did?** The relation of the Gill Precinct, Scripps House, Prospect Ave, and the San Diego Museum of Contemporary Art on a map of La Jolla. · **Which architects, living or dead, would you most like to have dinner with?** Benjamin Franklin, Robert Venturi, John Soane, Mary McLeod, Robin Middleton, Josef Frank, and Julian Levi. · **Which living person do you most admire?** Who is the nearest to Nelson Mandela? · **Which books are you currently reading?** I'm currently writing. · **What do you hope the Sainsbury Wing's legacy is?** Historic England has named it an archetypal postmodern building and in its listings placed it with England's most-loved cathedrals. I hope this will help to preserve it—perhaps even return some changed items and add some we recommended without success. And in propelling this art toward a wider world, we wish for it a future of understanding and relating cultures more than providing symbols of national power. I hope people will leave it with warm hearts.

Sketch of the Sainsbury Wing from 1986

TOP: UNIVERSITY OF PENNSYLVANIA, ARCHITECTURAL ARCHIVES

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THE 2019 AIA INSTITUTE HONOR AWARDS

TEXT BY IAN VOLNER
EDITED BY KATIE GERFEN

ARCHITECTURE

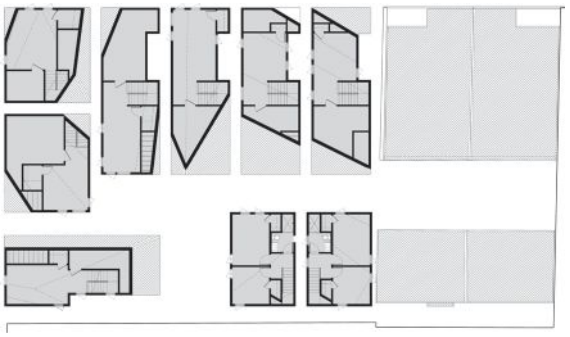
Starter Home* No. 4-15, Saint Thomas/Ninth New Orleans OJT

A housing complex increases density in urban New Orleans, fitting a dozen units where three were zoned.

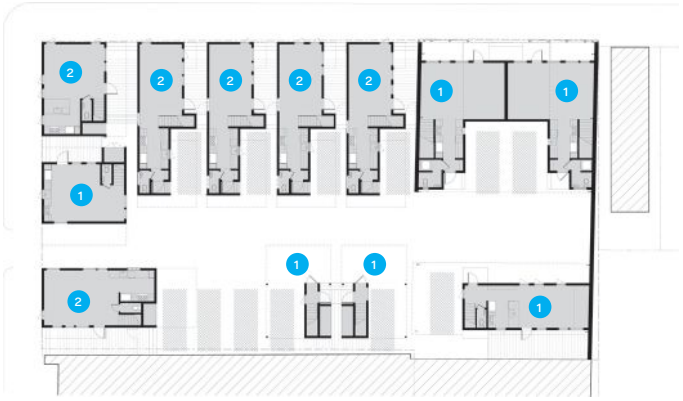
PHOTOS BY WILL CROCKER

Second-Floor Plan

Third-Floor Plan



Ground-Floor Plan



New Orleans–based OJT (Office of Jonathan Tate) has developed a laser-focused urbanist practice, capable of taking on challenging sites, byzantine code processes, and lean budgetary conditions, and transforming all of these seeming obstacles into positive advantages by dint of incisive form-making. How it does this is borne out in its No. 4-15, Saint Thomas/Ninth development in New Orleans' Irish Channel neighborhood: Hard by the banks of the Mississippi River, in a residential area interspersed with light industrial buildings, the project is an attempt to build affordable housing that breaks the mold—without breaking the bank.

OJT began with the regulatory givens of the site—in a low-density area, largely zoned for single-family homes on big lots—and then turned those rules upside down, exploiting multifamily zoning allowances while still opting for detached houses. The result is a series of 11 structures—all but one is single-family—packed remarkably close together, making for a distinctly communal environment that still preserves individual ownership and a degree of privacy for all inhabitants.

The formal device that helps to facilitate this is a continuously shifting roofline, jumping from house to house and giving the whole block a zigzag profile, with each unit distinct yet part of a cogent visual whole. Combined with the buildings' ribbed-siding-clad exteriors and relative height (at three stories, they are taller than most houses in the area), the rooflines help establish a relationship between the complex and the nearby warehouses, creating a silhouette that seems a perfect mix of the customary domestic and industrial typologies.

The product of intense study into local history, demographics, and economics, the Saint Thomas/Ninth project marks yet another step forward in OJT's ongoing Starter Home initiative, a promising new model for residential construction that's as practical as it is ambitious.

Top, Left: Aerial view of site from southwest

Previous Spread: Path through complex, looking west

Top, Right: North façade of duplex at northwest corner of site

Above: Single-family units along site's northern edge

TOP, LEFT: CAVU MEDIA

ARCHITECTURE

Restoration of the Rotunda at the University of Virginia Charlottesville, Va. John G. Waite Associates

The centerpiece of Thomas Jefferson's Academical Village gets a refresh for the 21st century.

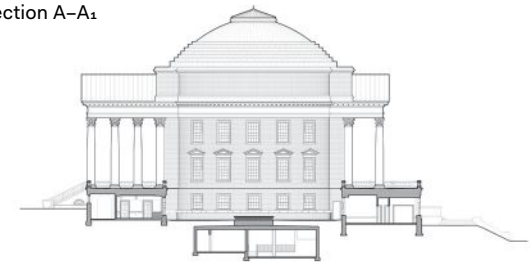
PHOTOS BY ANNA WESOLOWSKA

Rarely has the combined weight of history, technical risk, and public expectation been borne so lightly as by New York's John G. Waite Associates (JGWA) in its restoration of the University of Virginia's famed Rotunda—the centerpiece of its Charlottesville, Va., campus. Designed by Thomas Jefferson and completed in 1826, the building—formerly the university library, and now an events and exhibition space and home to a few much-envied classrooms—is a keystone of American design, and one of only three U.S. buildings to be named a UNESCO World Heritage site. It is a sophisticated, if flawed, piece of architectural craftsmanship—it was the victim first of a fire in the 19th century and then of a problematic renovation in the 1970s. The use of slave labor for its original construction also makes it a lightning rod for controversy.

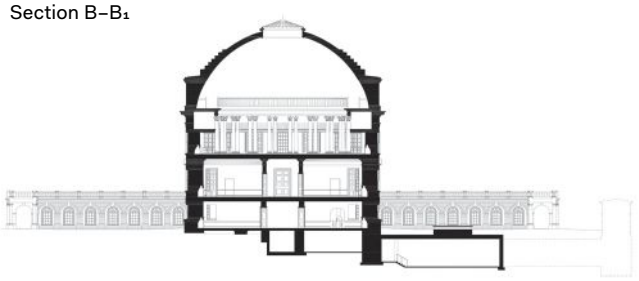
Following a thorough two-year research endeavor, JGWA embarked on a multi-pronged process that included strengthening, cleaning, and enhancing the building, as well as returning it, as much as possible, to Jefferson's original vision. From repointing the brick, to building an underground mechanical plant, to putting in new marble columns, new moldings, and a new roof, the designers have pulled off an act that almost amounts to an architectural resurrection, leaving the building sturdier and safer for future generations of students and teachers. Future restorers will be grateful as well, thanks to the team's scrupulous documentation of their interventions.

So careful were the restorers that their project ended up being in itself an act of archaeology, with the construction process unearthing tools that have provided specialists with invaluable new insights into the men who built the campus and the means they used. A few of these finds have even been exhibited inside the Rotunda itself, making the newly refurbished building a true testament—inside and out—to its own varied and complex history.

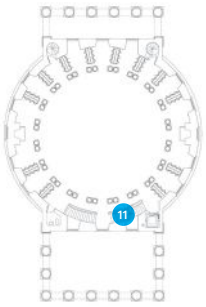
Section A–A₁



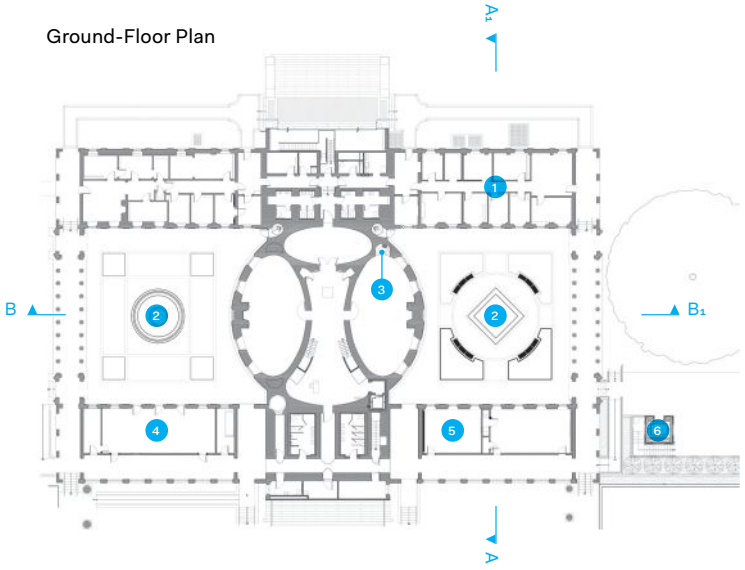
Section B–B₁



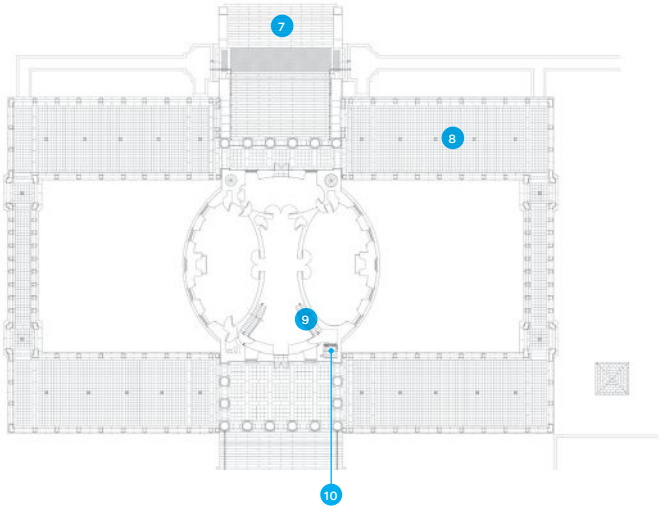
Dome-Room-Floor Plan



Ground-Floor Plan



Second-Floor Plan



1. Renovated offices
2. Newly designed courtyard
3. Newly discovered 1820s chemical hearth/exhibition space
4. New media/event room
5. New classroom
6. New service elevator and stair
7. Restored stairs
8. Restored terraces
9. New stairs
10. New passenger elevator
11. New stair access to intermediate gallery

0 20 40 N

Previous Spread: Renewed east courtyard with ground-floor exhibition space at center and classrooms at left

Opposite, Left: East courtyard during renovation and restoration

Opposite, Right: Dome Room with new wooden capitals (replacing plaster), acoustic plaster ceiling (replacing 1970s aluminum), and oculus based on Jefferson's design

INTERIOR
ARCHITECTURE

Hyundai Capital Convention Hall
Seoul, South Korea
Gensler

An events space for a Korean automaker signals its commitment to design innovation.

PHOTOS BY NACASA & PARTNERS

Section A–A₁

1. Stage
2. Event space
3. Staging/prefunction
4. Deployed risers
5. Screening/seminar room

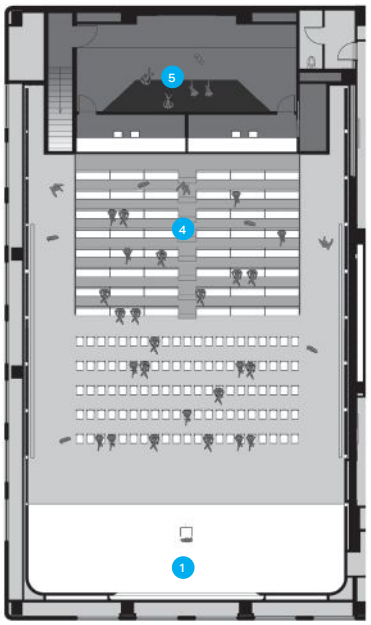
0 10 20

Take one part James Turrell installation, two parts science-fiction blockbuster, sprinkle with a dash of glamour, and serve with copious technical aplomb—this is the approximate recipe for Gensler's Hyundai Capital Convention Hall, an all-purpose events space inside the international automaker's headquarters in Seoul, South Korea. Located on the top floor of a large corporate complex, the new interior immediately marks a stirring break from Hyundai employees' typical workaday environment. The space's walls and lofty ceiling are entirely covered in an unearthly, luminous white material, while a similar treatment, only more lustrous, continues across the floor, giving the interior almost the appearance of a top-secret laboratory.

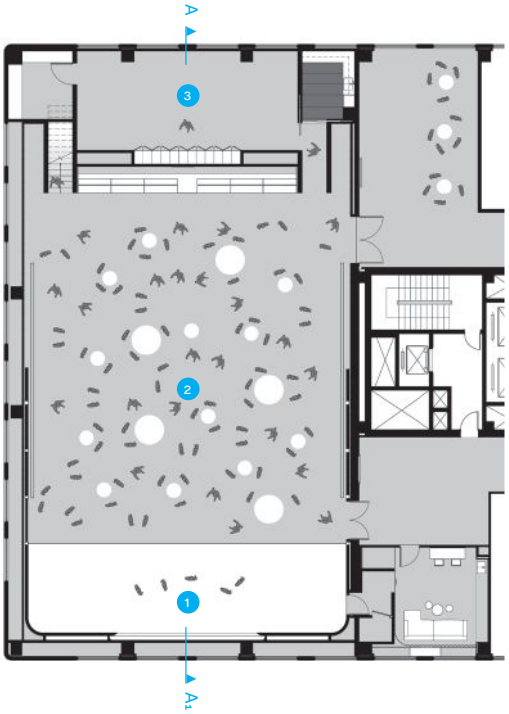
Once the eyes adjust to the gleaming, white-on-white interior, the space is revealed to be gently sculpted, with the ceiling separated into individual banded sections with lighting embedded between them; the strips step higher as they move toward the front of the room, forming something like a proscenium that outlines a stage at the far end. With a large bank of black risers (augmented by chairs for larger functions) to the rear of the space, this theatrical setup can be used for conventional presentations, but also adapted to any event of the client's choosing, thanks to a retractable system that folds the riser seating neatly away and into a black case against wall.

The same riser case hides a complex mechanical suite as well as a secondary meeting room, making the Convention Hall an all-purpose venue for myriad company functions—one that projects to visitors and workers alike an image of Hyundai as a forward-thinking innovator with a focus on high design. That message is driven home through a subtle bit of branding, arguably the design's most crafty feature, as the arches framing the space each make an H-like shape reminiscent of the insignia seen on millions of hubcaps and grilles the world over.

Floor Plan—Lecture Layout



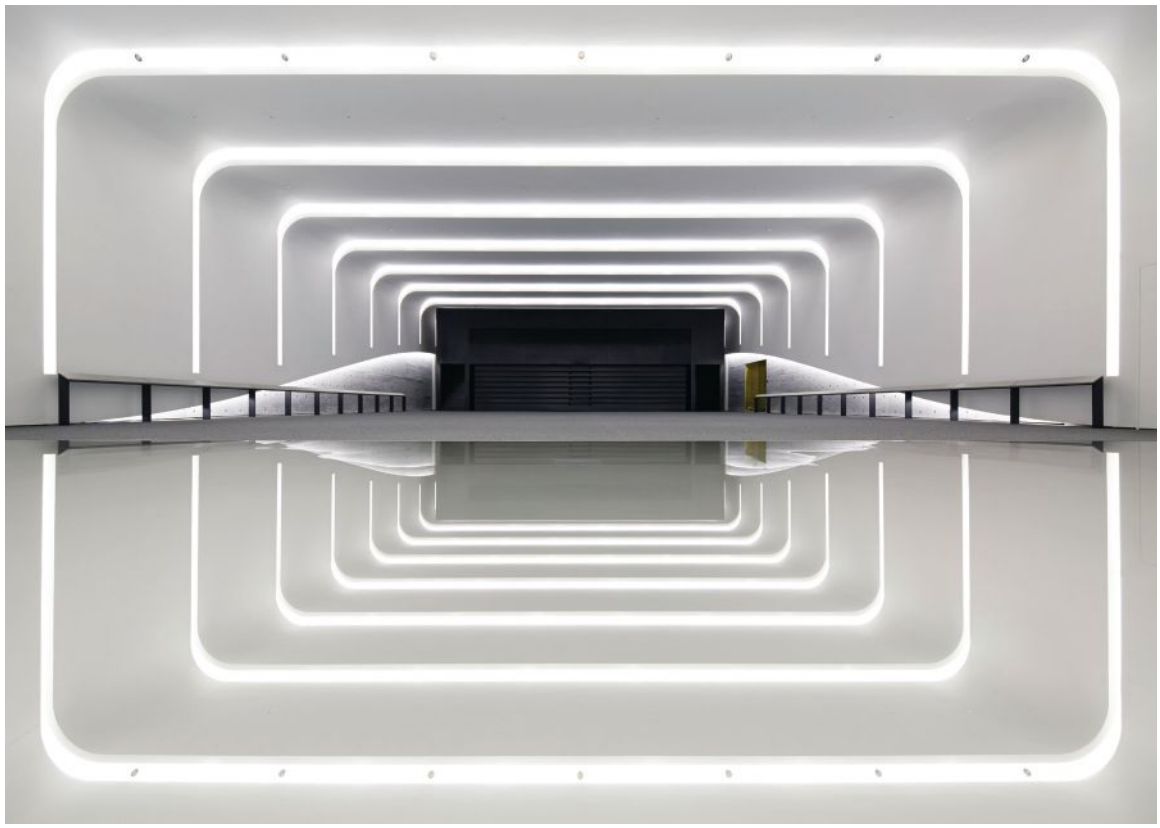
Floor Plan—Event Layout



Previous Spread: Stage (at left)

Opposite, Top: Riser case and enclosed screening room as seen from stage

Opposite, Bottom: Stage as seen from seating



Regional & Urban Design

Detroit East Riverfront Framework Plan
Detroit
Skidmore, Owings & Merrill

A master plan brings active public space to Detroit's waterfront and, in doing so, reconnects downtown to the river.

RENDERINGS COURTESY SKIDMORE, OWINGS & MERRILL

MIR

Site Plan

As Detroit strives to recover from years of disinvestment and depopulation, one of the key challenges has been to identify potential assets upon which the city can capitalize in order to position itself once more as an economic and cultural hub. One such locus for rebirth is Motown's long-neglected waterfront, and it is here that a team headed by Chicago office of Skidmore, Owings & Merrill (SOM) has stepped in with a scheme to turn the former industrial zone into a standout urban amenity.

The Detroit East Riverfront Framework Plan envisions a process unfolding over the next decade-plus, as ecological remediation efforts are carried out simultaneously with the construction and enhancement of parks, tree-lined thoroughfares, and other armatures stretching well beyond the river, connecting it with the historic city core and nearby residential neighborhoods. Facets of the scheme have already been put into place, with improvements to nearby streets that have rendered them more attractive as well as safer for foot traffic; landscaped corridors with ample bike lanes are in the works as well, integrating the city's recreational and commercial spheres while providing healthy alternatives to automobile transit.

For a city long synonymous with the motor vehicle, the focus on walking and cycling may seem like a break from form—yet SOM's approach has ensured that the changes currently underway were not merely imposed upon Detroiters: Extensive dialogue with citizens from all walks of life preceded the primary planning stage, and has remained ongoing as implementation has marched forward. Moreover, the plan seems firmly rooted in the city's cultural and architectural identity, with targeted interventions that will spur development around classic Detroit icons like the Renaissance Center and the Guardian Building, filling in the critically under-built urban fabric while preserving the best of the city as it now stands.

Previous Spread: Riverfront pedestrian and bicycle path with seating and retail

Top, Left: Riverfront pathway with terraced seating

Top, Right: Streetscape with widened pedestrian zones and seating

Above, Left: Activated streetscape with sidewalk cafés

Above, Right: Bike lane integrated into city street

Right: Landscaped path through park near river

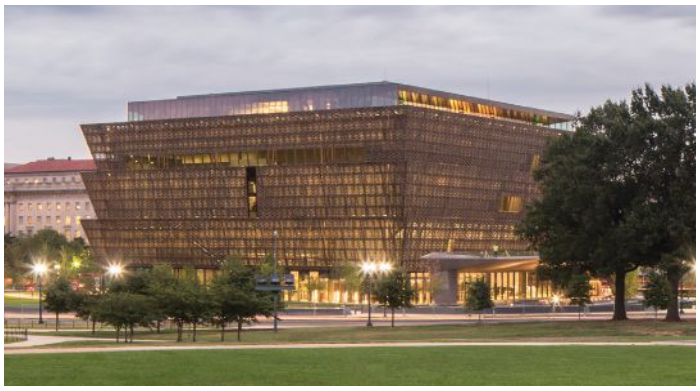
TOP, LEFT: MDP-IHA; TOP, RIGHT, ABOVE, LEFT: MIR; ABOVE, RIGHT: COURTESY SKIDMORE, OWINGS & MERRILL

ARCHITECTURE

Smithsonian Institution, National Museum of African American History and Culture
Washington, D.C.
Freelon Adjaye Bond/SmithGroup

A new museum brings complex cultural and historic references to the National Mall.

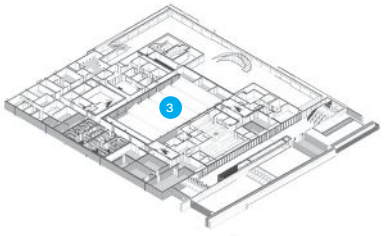
PHOTOS BY BRAD FEINKNOPF/OTTO



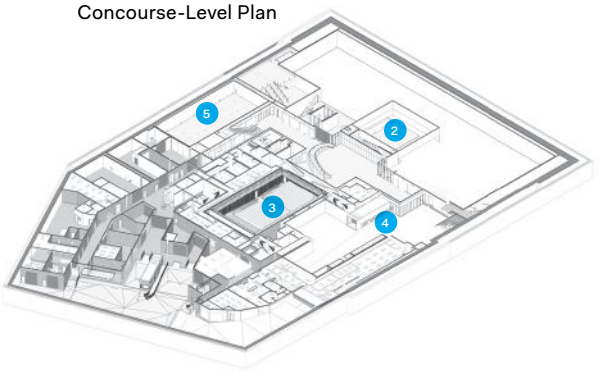
Walking at dusk down the National Mall in Washington, D.C., in winter especially, one can encounter a startling architectural mirage, appearing for the all the world like a grid of flame. But there's nothing to fear: It's only the sun striking the façade of the National Museum of African American History and Culture (NMAAHC)—the long-awaited Smithsonian Institution affiliate showcasing art, artifacts, and more dating back four centuries, from the arrival of the first slaves, to the Civil War, to the Black Lives Matter movement. As befits an institution dedicated to collective culture and remembrance, the building that houses these gems was created through a unique collaborative endeavor, comprising London-based Adjaye Associates; Research Triangle Park, N.C.–based Freelon Group (now part of Perkins+Will); New York–based Davis Brody Bond; and Detroit-based SmithGroup. Having so many hands at work could have led to a diluted, impersonal design solution, yet the final result here boasts an expressiveness that is rare in a government-funded project.

This is due in large measure to the scrim that gives the building its magic-hour effulgence: Made of aluminum coated in a reflective polymer, the disengaged screen is based on the decorative grilles that adorn the houses of some African American families in the south, and its external effect is no less striking than the lacework shadows it casts in the interior throughout the day. The screens rise in a triad of raked tiers to form a crown-like form—inspired by, according to David Adjaye, HON. FAIA, a piece of traditional African sculpture—while inside a highly theatrical circulation system (characterized by a sequence of escalators to the upper galleries and concrete ramps descending to the lower ones) and subdued finishes (especially in the downstairs Contemplative Court) give the museum spaces a decidedly contemporary feel. Mixing eras and cultures, the building is more than the sum of its parts, and it is a bold new addition to the capital's monumental core.

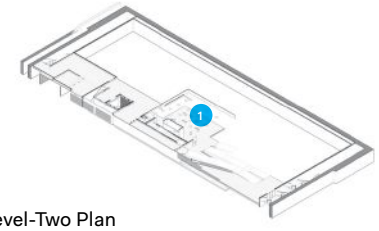
Mezzanine-Level Plan



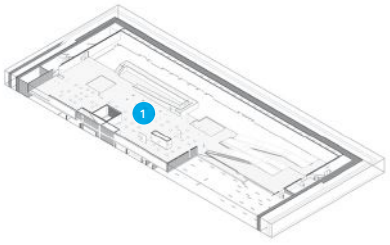
Concourse-Level Plan



Concourse-Level-One Plan



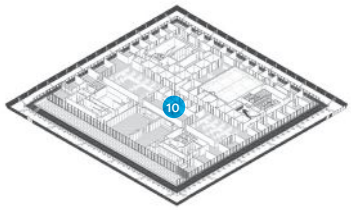
Concourse-Level-Two Plan



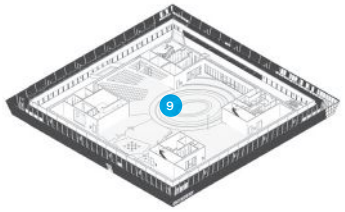
Concourse-Level-Three Plan

Roof Plan

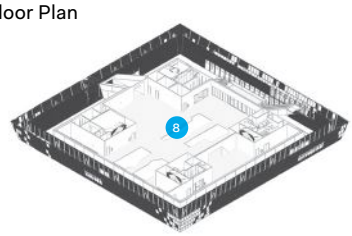
Fifth-Floor Plan



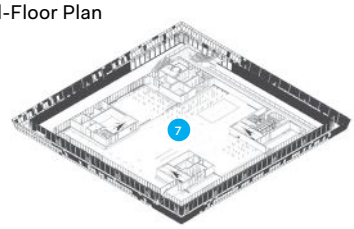
Fourth-Floor Plan



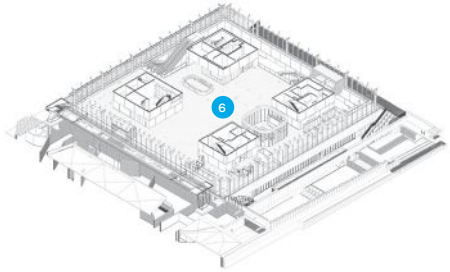
Third-Floor Plan

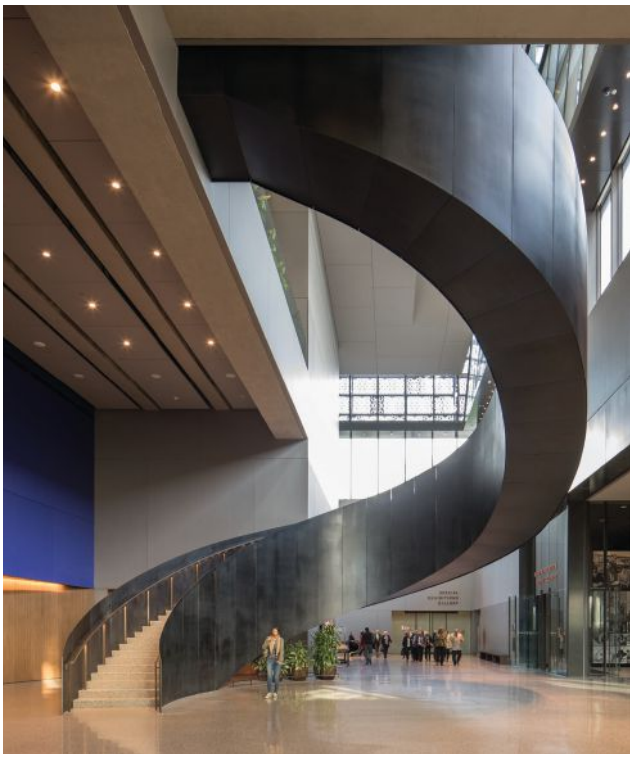


Second-Floor Plan



Ground-Floor Plan





1. History gallery
2. Contemplative court
3. Theater
4. Café
5. Changing exhibition gallery
6. Lobby/Heritage Hall
7. Interactive galleries
8. Community galleries
9. Culture galleries
10. Administrative offices and support
11. Photovoltaic panels

Previous Spread: Façade panels and curtainwall as seen from fourth floor

Opposite: Exterior as seen from southwest

Top: Elliptical spiral stair leading from lobby to concourse level below

Above: History galleries on below-grade concourse levels

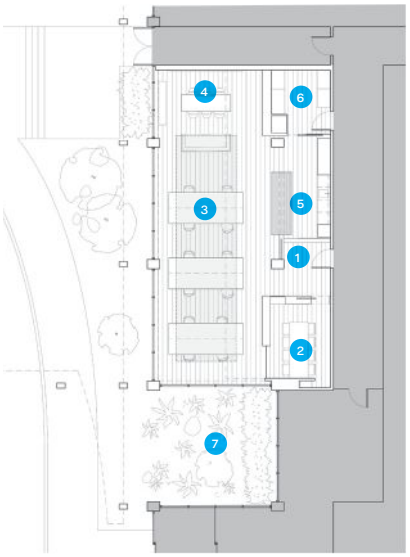
INTERIOR ARCHITECTURE

Design Office
Austin, Texas
Alterstudio Architecture

In the design for its new office, Alterstudio balances a public façade with quiet, open workspaces.

PHOTOS BY CASEY DUNN

Floor Plan



1. Entrance
2. Conference room
3. Open office
4. Pinup space
5. Kitchen
6. Storage
7. Garden

Designers designing for themselves often push the envelope in the direction of formal expression and technical experiment. But for Alterstudio Architecture, creating a new office space in its hometown of Austin, Texas, afforded a different kind of opportunity: a chance to show their capacity for restraint, quietude, and lyricism.

Located inside Cambridge Tower—a mid-1960s landmark—the first-floor studio space does proper homage to its high-modernist setting, boasting a material palette of lightly grained wood fixtures and floors alongside bare concrete columns. Even the drop ceiling, a frequent staple of midcentury interiors, is celebrated here, using fibrous acoustical panels with an unusually thick, woolly tactility. That treatment actually only covers one side of the space; the other side has more exposed concrete, and the change helps establish two distinct zones across the length of the office—one hushed and intimate, the other airy and luminous.

Across the latter stretch are large window bays, spanning the entire length and height of the space and running beside a row of task tables, interrupted only by more concrete piers and with a planted landscape beyond, bringing in still more light and giving the desk workers something to look at. The glass front (like the piers, part of the original structure) enfolds the office at the far end nearest the entrance, becoming a connective tissue between the two interior zones while also allowing the office to address the visitor—creating a public face for this otherwise very private office environment.

More than the sum of its parts, the design creates an effect especially evident from that first entry encounter, in which all of its disparate elements, each articulated in its own materiality, appears to float in space like forms in an abstract collage. It's a nod to the building's International Style heritage that also demonstrates Alterstudio's own special variety of spatial poetics.

Previous Spread: Open office (at right) and kitchen (beyond bar at left)

Opposite: West façade

Above: Entrance detail, with view to kitchen bar beyond

ARCHITECTURE

Arlington Elementary School
Tacoma, Wash.
Mahlum Architects

A new elementary school trades dedicated classrooms for flexible learning environments.

PHOTOS BY BENJAMIN BENSCHNEIDER

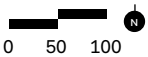
At the heart of Seattle-based Mahlum Architects' Arlington Elementary is a pedagogical provocation: "What if a school had no classrooms?" As eccentric as it sounds, the architect's solution proves so effective as to make one wonder why schools ever had classrooms to begin with. In Tacoma, Wash.—as in school districts around the country—graduation rates have been declining at a worrisome rate. Looking to reverse the trend, local officials were open to radical new ideas, and the designers responded by casting out the conventional gridiron of discrete learning spaces.

In its stead, they have created an entirely open plan of movable partitions, unfixed furniture that can be readily put aside and stored, and floating teaching platforms that allow staff to drift from area to area as the day progresses. Walls can be written on, a hallway/cubby zone doubles as a kind of mini-lounge, and even the recreation spaces are adaptable, with an indoor/outdoor playground separated from the surrounding grounds by a perforated, operable metal door.

For all the novelty of the interior scheme, the envelope is reassuringly close to the typological norm: A long, low mass of brick and glass set off with colorful doors and window frames, its only truly unusual feature is a series of protruding sawtooth skylights breaking through the roofline. Those, along with the innovative program, signal the designers' commitment to forging a unique conceptual hybrid—the silhouette hearkens back to industrial buildings of the last century, while the open floor plan recalls the anti-cubicle tendency of Silicon Valley offices—as though the school were positioning itself as a factory for learning and innovation. For a city (and a country) looking to break out of a long-running educational rut, the design represents a promising line of flight.

Floor Plan

1. Entrance
2. Community gathering space/dining
3. Library
4. Shared learning
5. Core learning
6. Outdoor learning
7. Gymnasium/performance space
8. Outdoor play area



Previous Spread: South façade with outdoor play area in foreground

Opposite, Left: Covered outdoor play area

Opposite, Right: Library

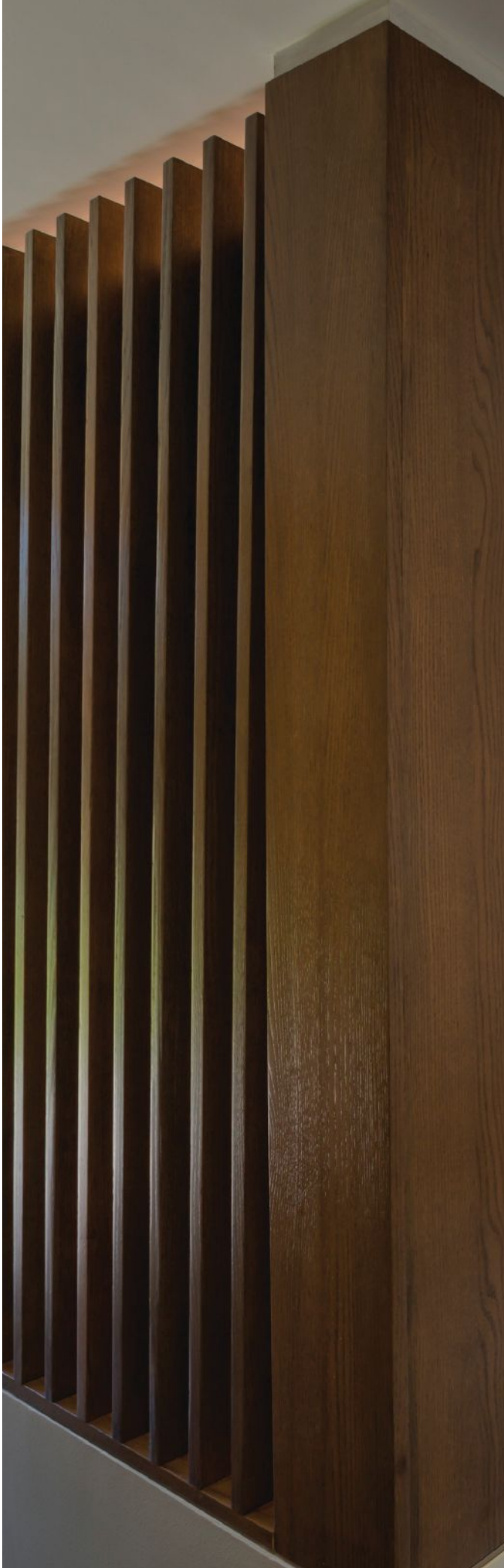
Above: Core learning area

INTERIOR
ARCHITECTURE

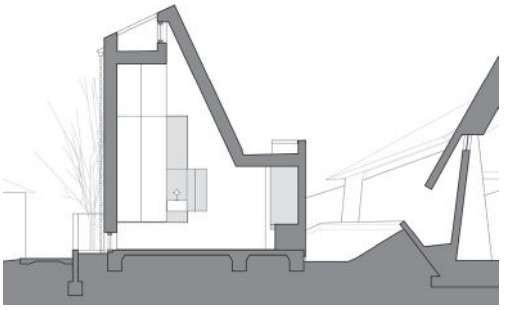
St. Pius Chapel and Prayer Garden
New Orleans
Eskew+Dumez+Ripple

A small adoration chapel and garden rendered in simple materials allow for quiet contemplation.

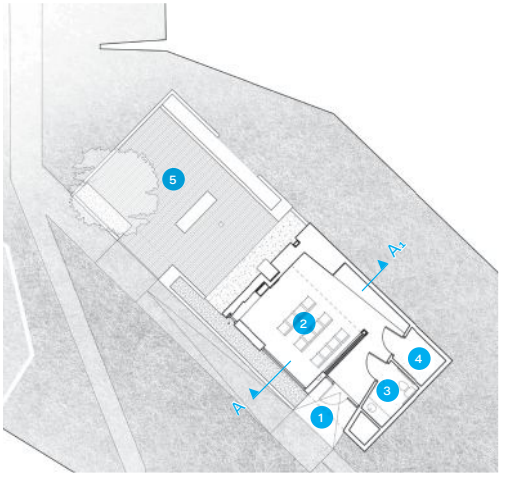
PHOTOS BY WILL CROCKER



Section A–A1



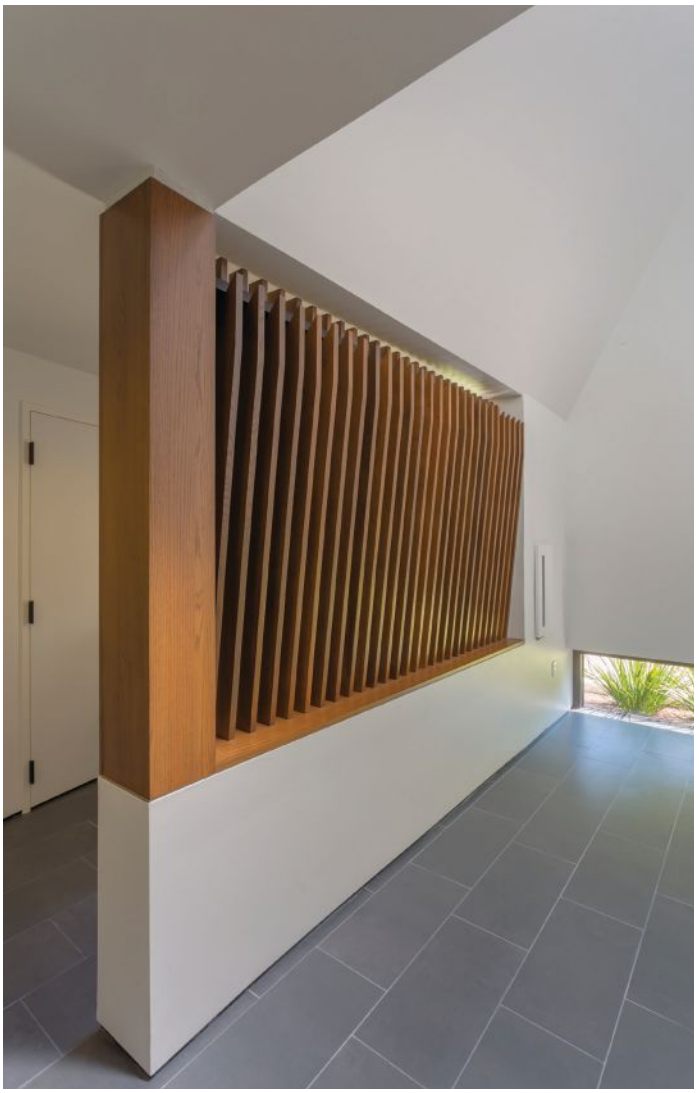
Floor Plan



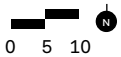
New Orleans–based Eskew+Dumez+Ripple (EDR) has added a new dimension to modern ecclesiastical architecture with its St. Pius Chapel and Prayer Garden, an intimate space for worship and contemplation in New Orleans' Lakeshore/Lake Vista neighborhood. Mere steps (as the area's name suggests) from Lake Pontchartrain, the existing church was designed by local architect James Lamantia in 1966, and is a reserved but accomplished modernist affair of sloping angular roofs. Adapting this midcentury idiom to a more modest scale, EDR's building is a small volume at only 571 square feet, and is situated directly beside the main structure, its jagged silhouette making it appear like a small shard chipped from its larger neighbor.

Its greatest appeal becomes evident within: At less than 600 square feet, the space is as intimate as any apsidal chapel in an old European cathedral, but its layered materiality of wood fixtures, white walls, and stone floors gives it a crisp contemporaneity. Entirely free of ornament, the design nonetheless hews to customary Christian symbology with a cross-shaped window inscribed in the southeast-facing wall. That aperture is complemented by another thin, floor-to-ceiling window and an additional glazed clerestory, allowing sunshine to creep in from odd angles and pervade the space with a numinous glow.

The deft handling of light is further accentuated by a processional order that has visitors enter by way of a low, 8-foot-tall foyer, which is wedged narrowly alongside a bathroom and service closet, before proceeding into the square-planned, 18-foot-tall main chapel—a shift from the dark and confined into the lofty and radiant, intimating the transition from the secular to the sacred realm. Rich in metaphor, deferential in context, EDR's chapel is also a shared space for a community very much in need of one, making the case for a religious architecture that reclaims the word "religion" in its original sense, meaning "to bind together."



1. Entrance
2. Chapel
3. Bathroom
4. Mechanical
5. Prayer Garden



Previous Spread: Chapel interior

Opposite: Exterior from southwest, showing entrance

Above, Left: Altar, with wooden cabinet concealing tabernacle at right

Above, Right: Wooden screen at entrance

REGIONAL & URBAN DESIGN

Shelby Farms Park
Memphis, Tenn.
James Corner Field Operations with Marlon Blackwell Architects

A large-scale park brings programmed public space to Memphis while connecting residents to nature.

PHOTOS BY TIMOTHY HURSLEY

Two outstanding design practices—one specialized in landscape and the other in architecture—have come together to produce a new public space of exceptional ambition and ingenuity. Located just east of Memphis, Tenn., Shelby Farms Park is the work of New York's James Corner Field Operations (JCFO). At work on the project for nearly a decade, the firm tackled a truly mammoth site: about 4,500 acres total on both sides of the Wolf River.

Once a work farm for state prison convicts, the sprawling campus was first divided by the designers into manageable chunks, with a central swath—while still vast, at 275 acres, it's only about 5.5 percent of the whole—earmarked for the first phase of redevelopment spearheaded by Shelby Farms Park Conservancy to bring public space to the area. JCFO paired with Fayetteville, Ark.'s Marlon Blackwell Architects (MBA) for this initial segment: Featuring a half-dozen new buildings from MBA, the area now plays host to structures for eating, meeting, and entertainment. It serves as an activation zone for the park as a whole, funneling visitors to the center and then channeling them out again to the extremities.

To help draw people in to circulate around and throughout the environment, JCFO (which also conceived the overall master plan) has fashioned miles of gently undulating paths, which wind past lushly planted fields and alongside the banks of a newly expanded lake—even crossing the water at one narrow inlet via a scenic wooden footbridge. Scattered throughout this idyllic setting, additional facilities—including a farmhouse, boathouses, bike rental, and horse stables—provide still more ways to get close to nature, as well as generate revenue for the park, which will help keep up the momentum of its redevelopment so that it can eventually realize its full potential.

Unified Park Diagram

New Tree Planting Diagram

Multiple Landscape Diagram

Site Plan

1. Visitor center
2. Forest walk
3. Event stage
4. Restaurant
5. Boathouse
6. Lakeside pavilion
7. Water playground
8. Kayak launch
9. Boat launch

0 500 1,000

Previous Spread: Aerial view from west, with visitor center at center, boathouse at right, and lakeside pavilion at lower left

Opposite: Boathouse

Above: Forest walk in bloom with event stage at left and visitor center in distance at right

COURTESY JAMES CORNER FIELD OPERATIONS

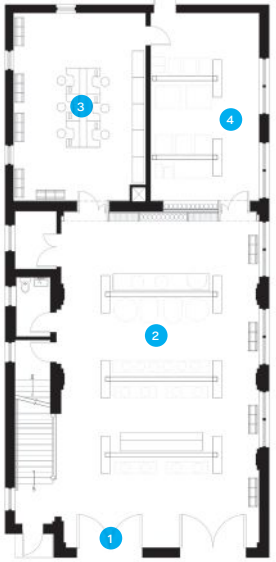
INTERIOR
ARCHITECTURE

Optimo Hat Co.
Chicago
Skidmore, Owings & Merrill

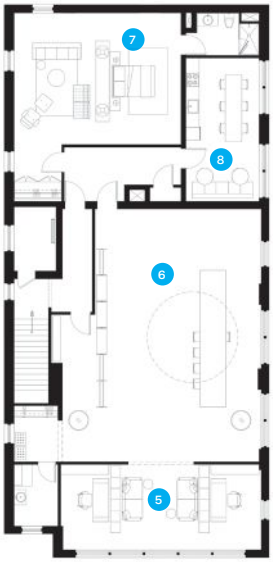
An abandoned firehouse is transformed into a fashionable factory for men's hats.

PHOTOS BY TOM ROSSITER

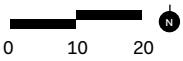
Ground-Floor Plan



Second-Floor Plan



1. Entrance
2. Production floor
3. Sewing room
4. Surface finishing room
5. Office
6. Design studio
7. Kitchen
8. Office retreat



Renowned for its large-scale commercial and institutional projects and master plans—see the New U.S. Courthouse in Los Angeles (page 292) and the Detroit East Riverfront Framework Plan (page 244)—Skidmore Owings & Merrill (SOM) takes home a third award this year for an interior almost diametrically opposite in dimensions, purpose, and character. Chicago-based Optimo is a maker of traditional men's hats, manufactured the old-fashioned way on an artisanal scale by a team of dedicated craftsman. Its new headquarters and factory, located in the South Side neighborhood of Beverly, is in a long-abandoned firehouse, acquired essentially gratis from the city as a bare shell with the requirement that it be rehabilitated.

The architects began by dividing up the program: On the ground floor, they placed the manufacturing and display functions, an eye-catching spectacle visible through the wide glass front through which fire engines once passed; above, on the upper two levels, private offices and a creative atelier afford the employees room to think, meet, and experiment out of the public eye. As one might expect from a firm with SOM's engineering pedigree, the entire scheme is a wonder of mechanical organization, with all the implements and power systems of the hatmakers' trade (steam for pressing the fabric, compressed air for molding it, electrical tools for cutting) organized for optimal efficiency, as well as safety.

What truly impresses, however, is the material splendor and spatial elegance in which all this action unfolds. It is a romantic environment of richly patterned wood and exposed metal members with traces of the old building still visible, including the now-empty apertures for the fireman's pole of old which punch through every floor, creating peekaboo portals between them. Intimate, nostalgic, and chic, the design could easily pass for the work of a small boutique interiors practice, rather than one of America's best known and most venerable global architecture firms.

Top: Production floor

Previous Spread: Second-floor design studio, with view into office beyond

Opposite: Historic south façade

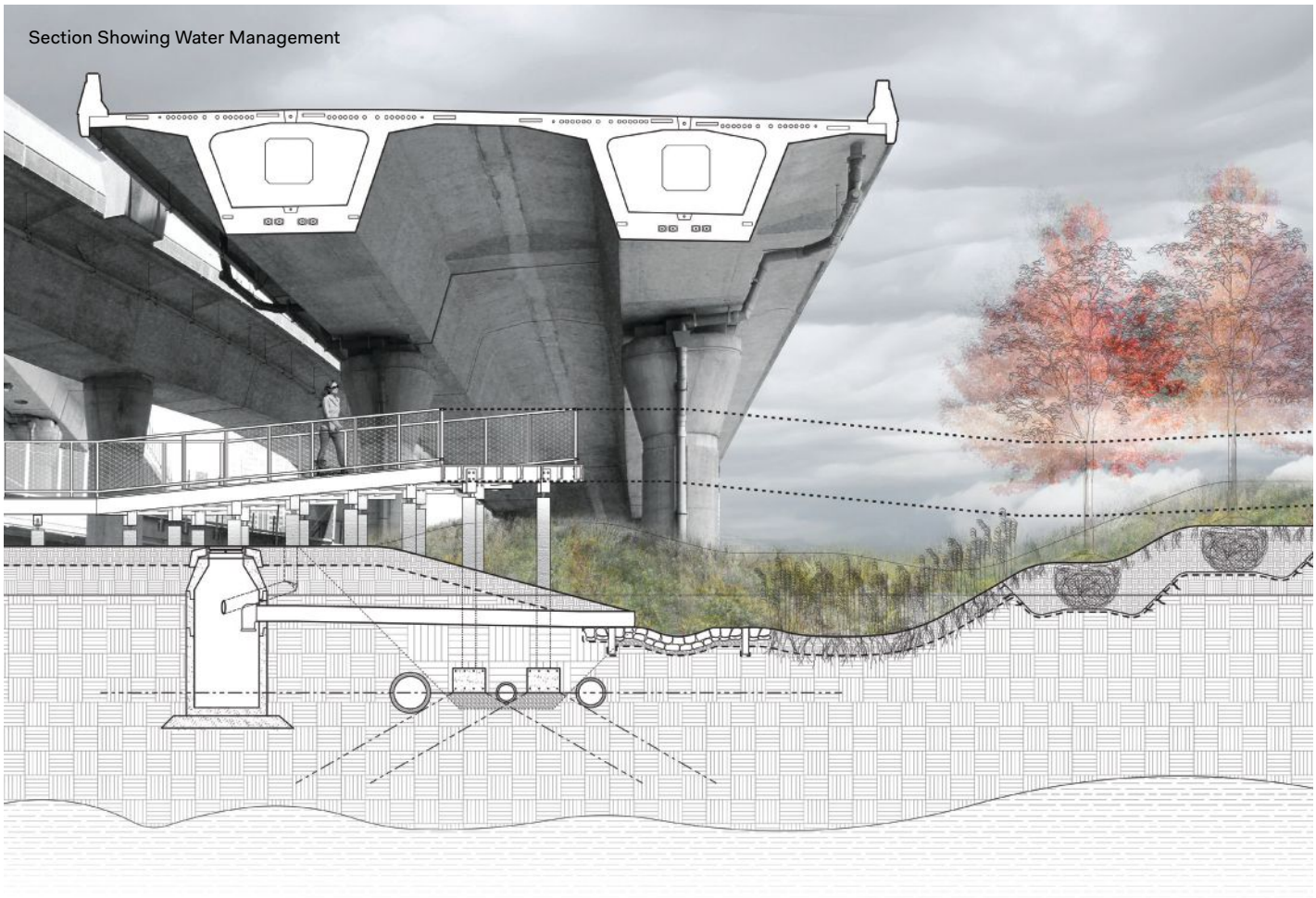
Above: First-floor sewing room, with production floor beyond

REGIONAL & URBAN DESIGN

Infra-Space Initiative
Boston
Landing Studio

An underhighway landscape reclaims long-disused space, and offers better water management, for Bostonians.

PHOTOS COURTESY LANDING STUDIO



Section Showing Water Management

Throughout the United States, countless acres of urban, suburban, and even rural land are effectively cut off from public use—highway infrastructure, with its diverse ribbons of overpasses and on-ramps, creates marginal zones that could be made accessible to pedestrians but are almost invariably left to languish. But in Massachusetts, a recently unveiled initiative is seeking to reclaim territory that cars have taken away: Under the auspices of the Massachusetts Department of Transportation, the Infra-Space Initiative program has undertaken a comprehensive study of the disused fringes of the state's freeway system. To prove the potential of these neglected peripheries, Somerville, Mass.–based architecture practice Landing Studio was engaged to reinvent one such underpass as a new public space, dubbed Infra-Space 1, a viable park environment reconnected to the adjacent urban fabric.

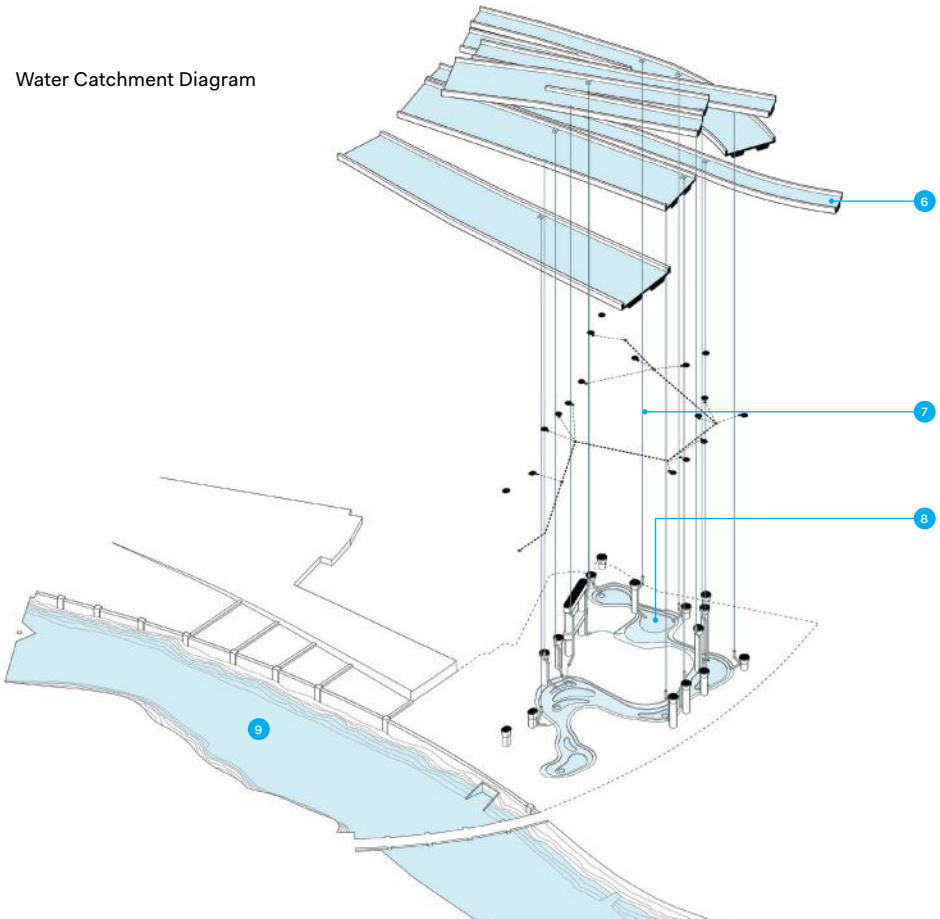
Located in Boston's South End, the pilot project sits directly under a tangle of concrete of Interstate 93, not far from the segment similarly transformed into parkland by the famous Big Dig. Unlike that grandiose engineering enterprise, which relocated the highway underground, Landing Studio's design takes the tangle of ramps as a given, carving out a people-friendly space from the car-centric corridor using only the simplest of means, with plantings, paths, and terraces threading through the site. The designers' opportunistic approach found functionality in almost every square foot, projecting lighting on the underside of the elevated highway, turning storm drainage into a rock-lined creek bed, and preserving (though not enlarging) an existing private parking facility to help fund the improvement. Unseen interventions—in particular an extensive soil remediation process—have helped to yield a manifestly visible result. With its piers looming like vast tree trunks, and the ramps curling into a sort of forest canopy overhead, the Infra-Space 1 is an improbably attractive and even cozy oasis secreted away in the concrete jungle, a perfect model for the program's future efforts.

Site Plan

1. Parking
2. Art installation
3. Basketball court
4. Seating area
5. Retention pond
6. Highway catchment area
7. Former underground pipe network
8. Surface-level stormwater treatment landscape
9. River

0 40 80 N

Water Catchment Diagram



Previous Spread: Underhighway walkways with view of art installation in foreground and to landscaped areas beyond

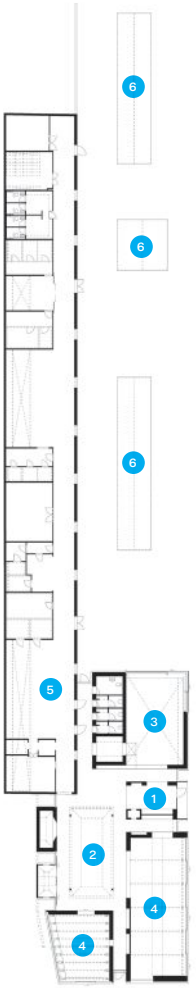
INTERIOR ARCHITECTURE

Noma 2.0
Copenhagen, Denmark
Bjarke Ingels Group and Studio David Thulstrup

A new home for one of the world's top restaurants creates intimate and varied dining experiences.

PHOTOS BY RASMUS HJORTSHØJ

Floor Plan



1. Entrance
2. Service kitchen
3. Lounge
4. Dining
5. Back of house
6. Greenhouse

Culinary adventurers everywhere know of Noma: The eatery in Copenhagen, Denmark, sports two Michelin stars, has garnered countless other awards, and is regularly named the best restaurant in the world. So when the establishment announced it was moving to a new home, it seemed only fitting that it would turn to celebrated Danish firm Bjarke Ingels Group (BIG)—a fellow Scandinavian giant with a global reputation for invention—to design it for them. The outcome is a space that engages all the senses and abounds with visual and haptic delights that should pair perfectly with the restaurant's classic-contemporary fare.

Surrounded by water, and on the site of a former military installation in the neighborhood of Christiania, the new location is housed in a series of pavilions backed up by an existing shed-like structure, which is partially colonized by back-of-house facilities and surrounded by an all-weather vegetable garden housed in several greenhouses. Each of the new spaces (the interiors of which were developed in collaboration with Copenhagen-based Studio David Thulstrup) is distinguished by its own ambiance, with floor plans, skylights, sliding doors, and picture windows all alternating in configuration and scale from room to room. Ceilings range from simple A-frame gables, to overlapping planks, to a ribbed sequence of beams that vary in angle and height to create a gratifying, upside-down topography.

Unifying this ever-shifting interior landscape is a material palette of wood, brick, and glass, brought together with a Nordic flare that feels both homey and urbane, as well as an ingenious overall planning scheme that allows the main kitchen to be visible from every dining area. The chefs, conversely, enjoy a view outward that reaches every single seat in the restaurant, ensuring an organic connection between staff and clientele that promises to make Noma's new location as much of a pilgrimage site as its old one.

Top, Left: Greenhouse interior

Top, Right: Entrance

Above: Lounge

Previous Spread: Open service kitchen with sight lines into all dining areas

Opposite: Aerial view from east, with existing structure at rear

INTERIOR
ARCHITECTURE

Shirley Ryan AbilityLab
Chicago
HDR|Gensler, Clive Wilkinson Architects, and EGG Office

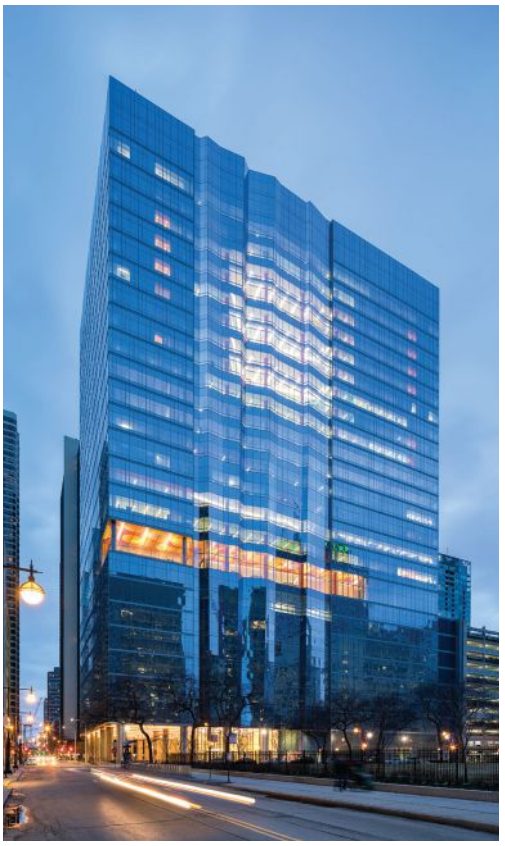
By combining patient care with research, a lab helps adults and children regain mobility.

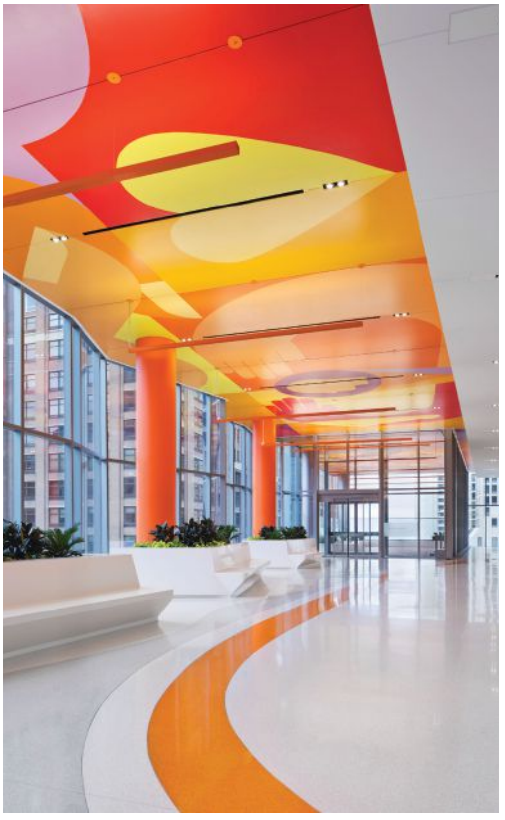
PHOTOS BY MICHAEL MORAN/OTTO

Previous Spread: Double-height adult ability lab for rehabilitation

Top: Exterior as seen from northwest

Bottom: Tenth-floor sky lobby





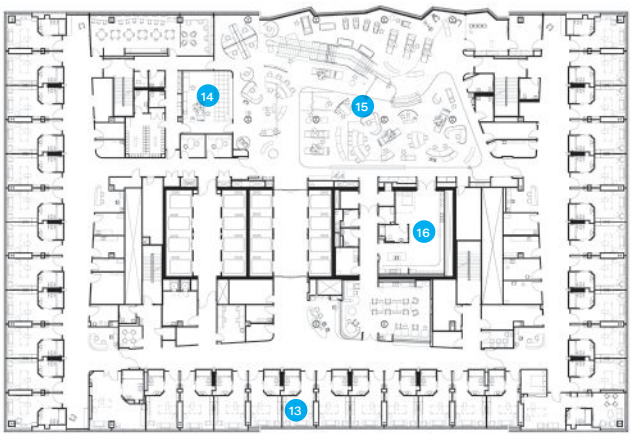
Can a place for healing also be a workshop for innovation? At the Shirley Ryan AbilityLab in Chicago, a unique team of designers has answered with an emphatic "yes." The facility is a bold new effort aimed at simultaneously providing therapeutic services to the severely disabled, while also serving as a research center that brings together doctors, specialists, and patient-care professionals to discover new solutions and treatments that can be applied elsewhere. To make real this hybrid program, a diverse cast of players was brought on board—Omaha, Neb.'s HDR; the Chicago office of Gensler; Culver City, Calif.'s Clive Wilkinson Architects; and Los Angeles' EGG Office—each bringing its particular competency to bear on the diverse clinical, medical, and human problems that the space needs to address.

The last of these was the most essential: Flowing and intricate in plan, and bright and colorful in expression, the space lacks most of the typical institutional trappings—the double-loaded corridors, the spinach-green walls—of the healthcare industry, and includes multiple features aimed at improving the experience of all users. For workers, the plan fulfills the lab's double mandate by affording both secluded "back stage" spaces for study and dialogue, as well as exposed "front stage" spaces for monitoring and interacting with patients. Patients, in turn, can enjoy the swirling decorative schemes that run across the walls and continue onto the ceilings, ensuring that even those on gurneys and hospital beds can still enjoy the view. Double-height windows look out onto a lushly landscaped roof terrace or the city beyond—a rare connection to an outside world from which the chronically ill are so often made to feel cut off.

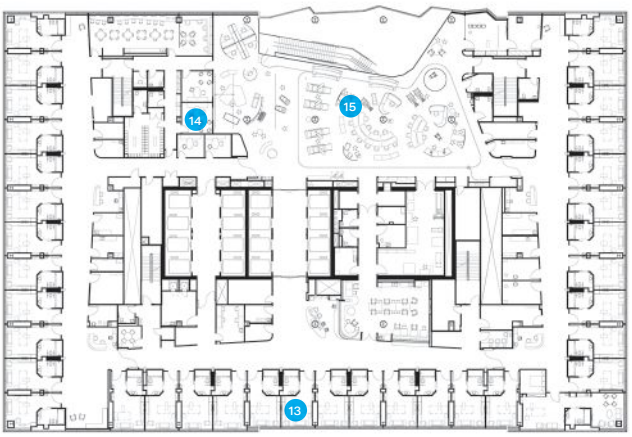
The design is the work of many hands, but it displays a laudable unity nonetheless, and the collaborative design process that engendered it seems only suitable to the lab's own collaboration-focused approach to recovery and wellness.

TOP: DAN SCHWALM

23rd-Floor Plan

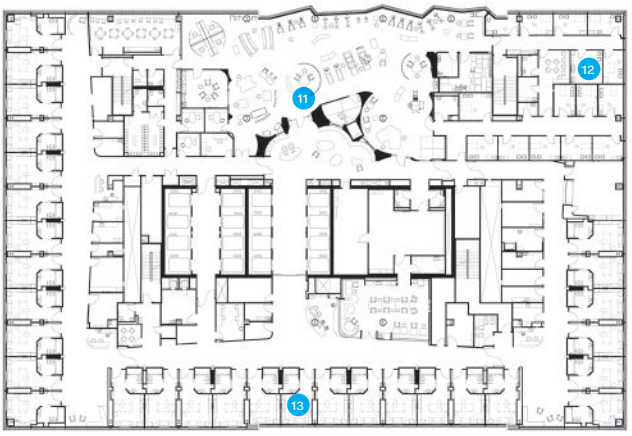


24th-Floor Plan

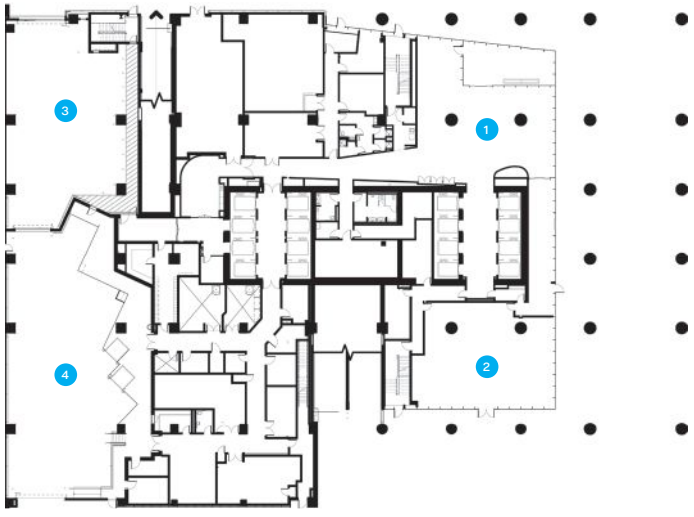


10th-Floor Plan

18th-Floor Plan



Ground-Floor Plan



1. Lobby
2. Retail
3. Ambulance bay
4. Loading dock
5. Sky lobby
6. Nancy's garden
7. Administration
8. Conference center
9. Chapel
10. Garden terrace
11. Pediatrics ability lab
12. Outpatient physician clinic
13. Patient rooms
14. Research
15. Adult ability lab
16. Home therapy facility

ARCHITECTURE

Confluence Park
San Antonio
Lake|Flato Architects with Matsys

A park brings ecological education and community engagement to the edges of San Antonio's riverfront.

PHOTOS BY CASEY DUNN

Site Section

0 10 20

Site Plan

1. Main pavilion
2. Education center
3. Live oak savannah
4. Grassland
5. Ecosystem restoration
6. Parking

0 50 100 N

For far too long, the southern reaches of the San Antonio River have been overshadowed by the more famous, and more intensely trafficked, stretch that winds through the center city—the famed River Walk created in the 1930s by the Works Progress Administration. Now, finally, a project has taken shape that should start luring some of those crowds out of downtown and into the wilder, less-well-known parts of the waterway: Confluence Park, at the point where the San Antonio meets San Pedro Creek, is a multipurpose public facility activated by a sequence of remarkable structures, designed as a collaboration between local firm Lake|Flato Architects and Oakland, Calif.–based Matsys.

The team placed a series of arching concrete forms—elongated hyperbolic paraboloids that the designers liken to flower petals—on the site of a former open-air storage lot. These shade structures are complemented by a sparely and crisply articulated low-rise education center, with classrooms and events spaces that have proven in high demand since the project's completion.

Altogether, the scheme satisfies a challenging triple brief, with stakeholders that included the adjacent community (concerned, at first, that the park might compromise their security), the conservators of the river system (who wanted to attract attention to their restoration efforts, without trampling on the delicate ecosystem), and the rest of San Antonio (a city with a diverse social fabric but a paucity of social spaces outside the tourist-clogged core).

In the end, the designers succeeded in catering to all constituencies: Their lofty, elegant, concrete stems act as a portal to the 8-mile natural corridor that runs alongside the site, while the park as a whole furnishes a much-needed amenity to a neighborhood previously cut off by both freeways and the waterways themselves, which are now transformed from barriers into scenic fixtures accessible to all San Antonians.

Previous Spread: Eastern-most entry pavilion, with view southwest to main pavilion structure beyond

Above, Left: Main pavilion with education center at rear

Top, Right: Education center entrance

Bottom, Right: Classroom

ARCHITECTURE

Casey House
Toronto
Hariri Pontarini Architects

This care facility for HIV- and AIDS-related illnesses blends contemporary and historic architecture in one program-filled package.

PHOTOS BY DOUBLESPACE PHOTOGRAPHY

Ground-Floor Plan

1. Entrance
2. Living room
3. Therapy room
4. Office
5. Meeting room
6. Community kitchen
7. Interactive space
8. Courtyard
9. Kitchen
10. Dining
11. Crisis room
12. Assessment room

0 10 20

The problem of surface receives a bracingly new and surprisingly poignant treatment in Toronto-based Hariri Pontarini Architects' (HPA) addition to Casey House, a special care facility for HIV- and AIDS-related illnesses in the designers' hometown. Located in the city's historic Upper Jarvis district, the building comprises three distinct parts: the renovated 1875 William R. Johnston House, a stately Victorian mansion (nicknamed "the Grey Lady" by locals), that faces the main thoroughfare; a towering glass atrium, the first component of the HPA intervention, to the rear; and another extension still further to the east along a side street, this one clad in alternating swatches of brick, stone, and glass.

The hierarchy between these three elements is remarkably legible: The central volume, the tallest and most transparent of the three, clearly establishes itself as the main point of entry and public space, while the flanking structures in their subdued masonry cladding announce themselves as support spaces for staff and patients. What makes the façade such a deft bit of sleight-of-hand is in the easternmost wing, which effectively mediates between the ultra-contemporary atrium and the 19th-century house by dint of its blended materiality, with rustic slabs of ashlar and multihued brickwork shifting around strips of glass to create a perfect collage of new and old.

But this clever instance of contextual double-coding also encloses a deeper meaning—its patchwork aesthetic is a subtle reference to the famed AIDS Memorial Quilt, the massive collective art project that tells the story of the epidemic and its victims through 54 tons of fabric. Symbolic significance lies in the building's plan as well, with the addition enfolding the original house in a literal "embrace," its north and south wings reaching out to the Grey Lady and forming an inner courtyard that gives all the patient rooms a glimpse of green.

Previous Spread: North façade, with entry at middle

Above Left: Living room, looking south

Above Right: Historic interior, with stair leading to patient rooms and view into dining area beyond

Right: Courtyard, looking east

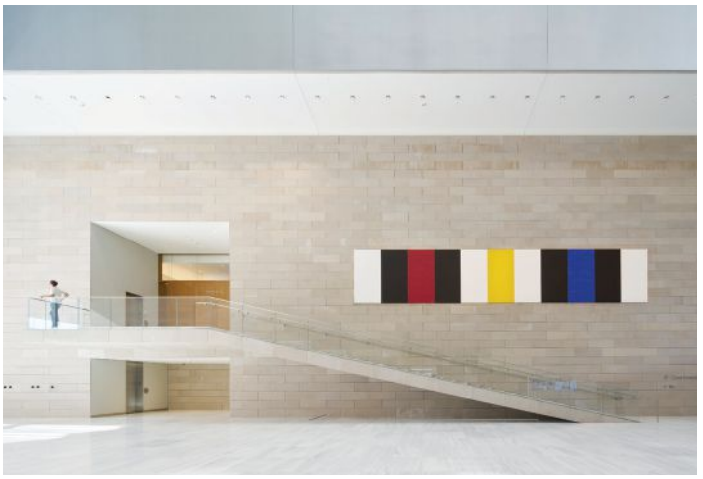
INTERIOR
ARCHITECTURE

New United States Courthouse
Los Angeles
Skidmore, Owings & Merrill

Los Angeles' new federal courthouse signals values of lightness and transparency for the American justice system.

PHOTOS BY BRUCE DAMONTE

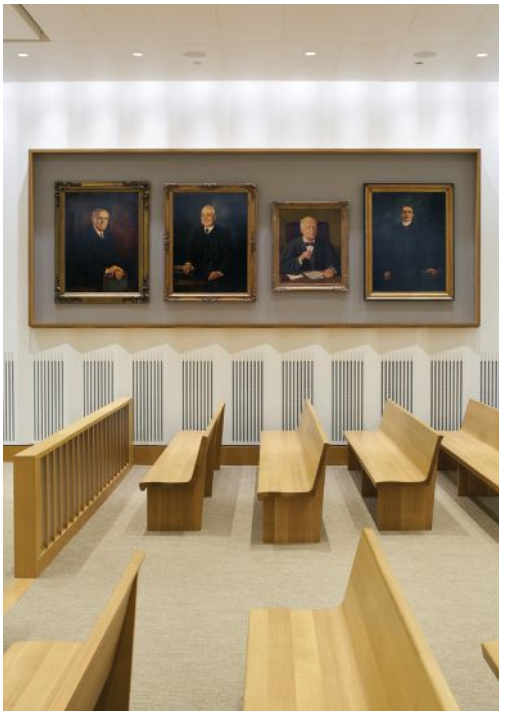
DAVID LENA



There is new kind of public architecture in America, and it's exemplified by Skidmore, Owings & Merrill (SOM)'s New United States Courthouse in downtown Los Angeles. With its judicial projects in particular, the U.S. General Services Administration (GSA), which is responsible for most major federal construction projects, has put renewed emphasis on high design, with a set of aesthetic preferences that SOM—long a standard-bearer for modernist clarity and refinement—was especially well-poised to deliver on. In place of the heavy, masonry-bound courthouses of old, the GSA has sought a lighter, brighter look, but one that still projects an air of dignity and gravitas.

In LA, SOM came through with an interior that met that standard and then some—a municipal facility with a forthrightly civic expression that feels more like a public plaza than a bureaucratic building. Arranging two dozen courtrooms (as well as judges' chambers and other support spaces) around a central atrium, the designers created an entry-level *rez-de-chaussée* that flows directly through the site under nine levels of dramatically crisscrossing concourses. All of this is topped off by a jagged glass roof that allows natural light to permeate the whole structure, illuminating even the enclosed rooms by way of glazed ceiling-level apertures. Giving the building its signature spiky crown, the roof system also helps mitigate glare from the Southern California sun, and works in tandem with similarly pleated vertical windows and invisible mechanical systems on every floor to reduce the building's energy consumption by nearly half.

Most important, perhaps, for the people who must use the building, is its subdued, organic atmosphere, which begins in the stone-lined lobby and carries through to every wood- and marble-lined courtroom, conjuring an image of a justice system in which the emphasis is less on system and more on justice.



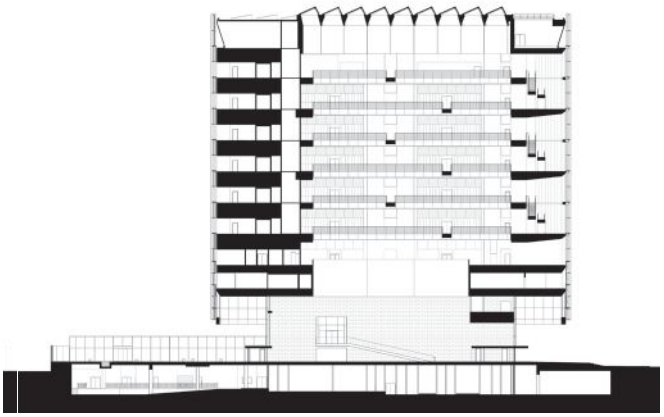
Previous Spread: Central atrium, looking west

Top, Left: Pleated façade, as seen from the east

Top, Right: Lobby

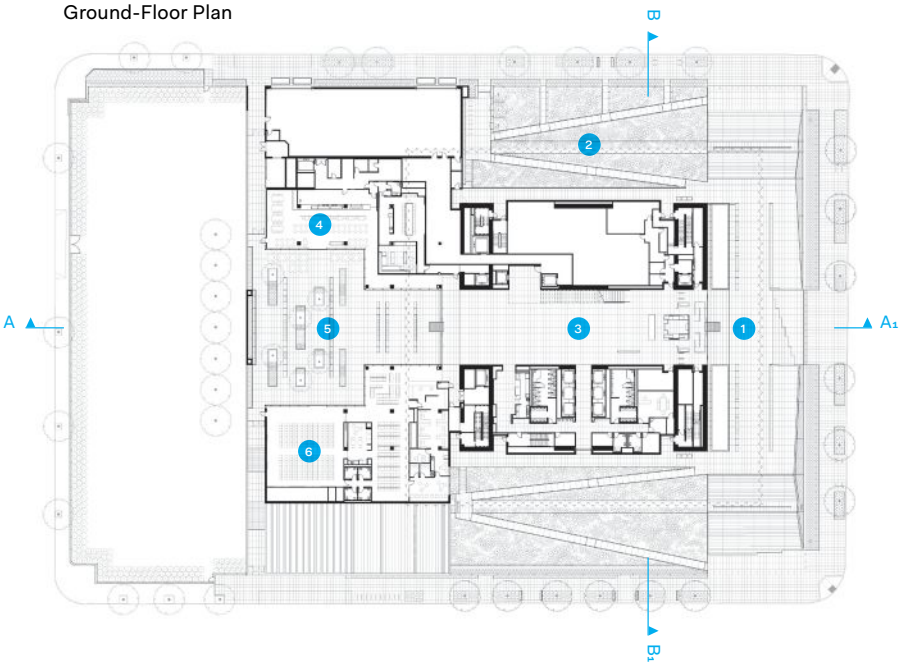
Above: Courtroom interior

Section A–A₁



Section B–B₁

Ground-Floor Plan



Typical-Floor Plan

1. Entry
2. Garden
3. Atrium
4. Café
5. Terrace
6. Jury assembly room
7. Courtroom

0 50 100

REGIONAL & URBAN DESIGN

Pike Place MarketFront
Seattle
The Miller Hull Partnership

A new mixed-use complex connects Seattle's Pike Place with adjacent Elliott Bay.

PHOTOS BY LARA SWIMMER


EXIT
ORDER
here

Every great city deserves a great marketplace: Barcelona has its public Boqueria, Tokyo its Tsukiji fish mart, and Seattle has Pike Place, a 20-odd block agglomeration of food and beverage vendors including seafood mongers, produce hawkers, and coffee dealers. (Most notably, it's the flagship location of a certain coffee brand with a green mermaid logo.) Teaming up with a host of engineers and consultants, local practice the Miller Hull Partnership has fashioned a new armature to serve the market district while increasing its accessibility to Seattleites and tourists alike.

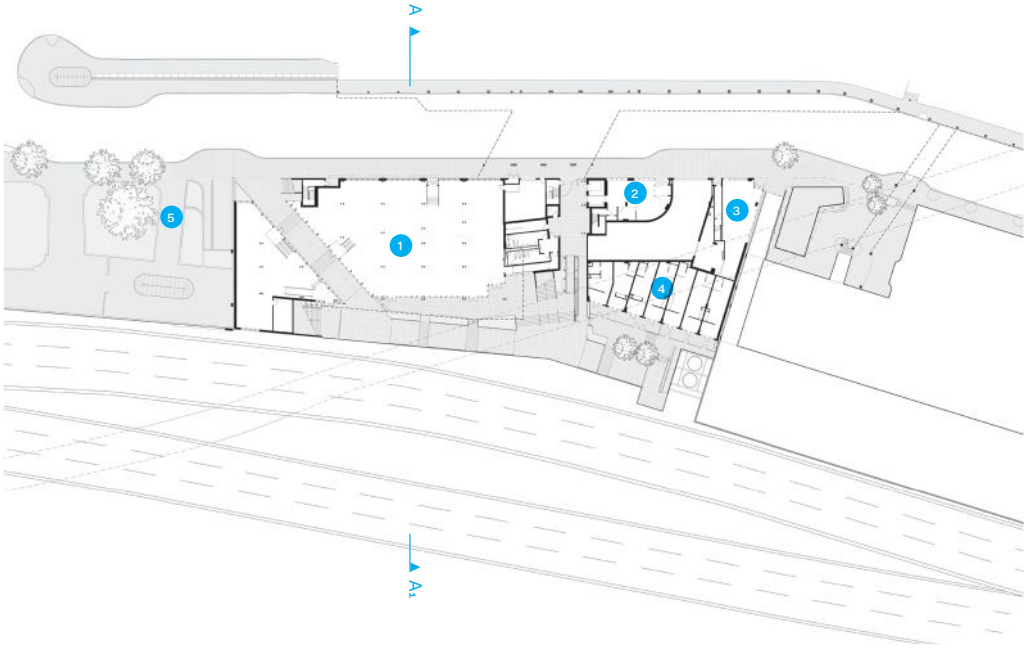
On a long narrow wedge of a lot in the dead center of the market district, the new Pike Place MarketFront is a kind of neighborhood-within-the-neighborhood, a multi-use hub that features commercial facilities, public space, and even housing within a single rambling structure of steel and concrete. The primary urbanistic objective of the facility is to mediate between the bustling shopping corridor and the nearby Elliott Bay waterfront, which has been long cut off from the city proper by the Alaskan Way Viaduct, a large elevated auto route that closed this year and is presently undergoing demolition.

Just to the east of the defunct freeway, the complex straddles a steep grade, level with Pike Place on its upper tier and then descending toward the shore via a sequence of outdoor and indoor ramps and staircases. As visitors tramp downward, they pass dozens of new stalls and other public amenities, including open terraces with sweeping views of the mountain-ringed bay. Not content just to reconnect the celebrated neighborhood with its western perimeter, the Miller Hull Partnership has succeeded in reshaping the very character of Pike Place by adding affordable housing to the terraced complex aimed at older residents, ensuring that the city's best-known retail zone will also be a diverse 24-hour community—a place not just to shop but to live.

NAVID BARATY

Section A–A1

Waterfront-Level Plan



1. Producer's hall
2. Senior housing lobby
3. Neighborhood center
4. Senior housing
5. Park

Previous Spread: Producer's hall interior, looking northwest

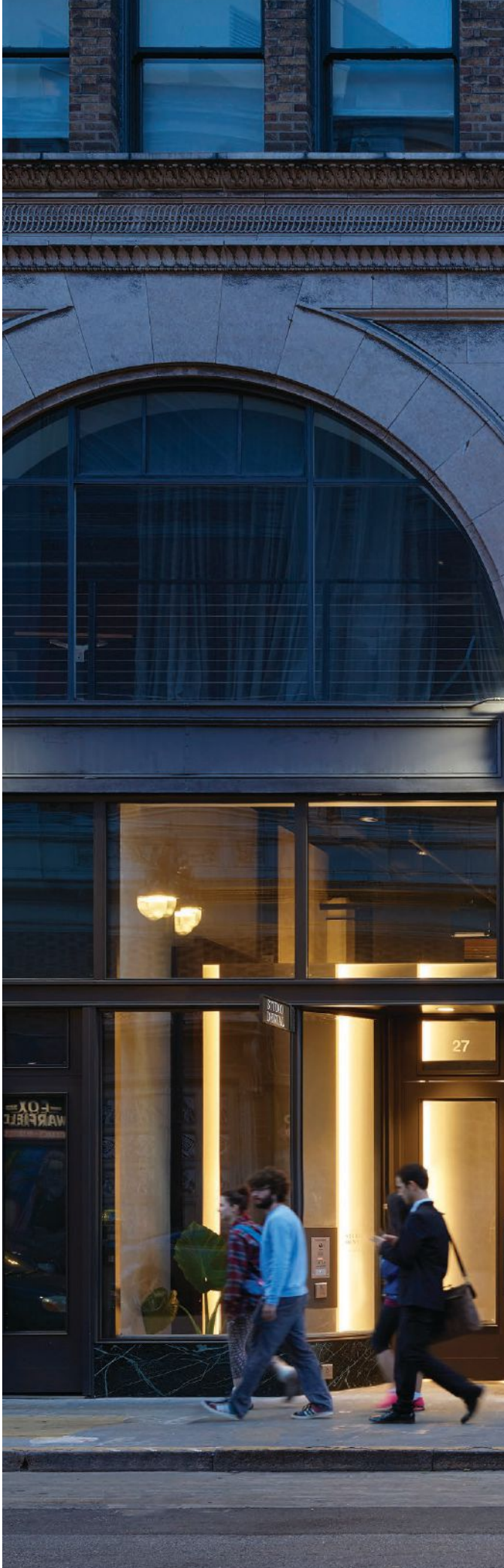
Opposite: View to northwest with market front plaza above producer's hall at left and vendor pavilion at right

INTERIOR ARCHITECTURE

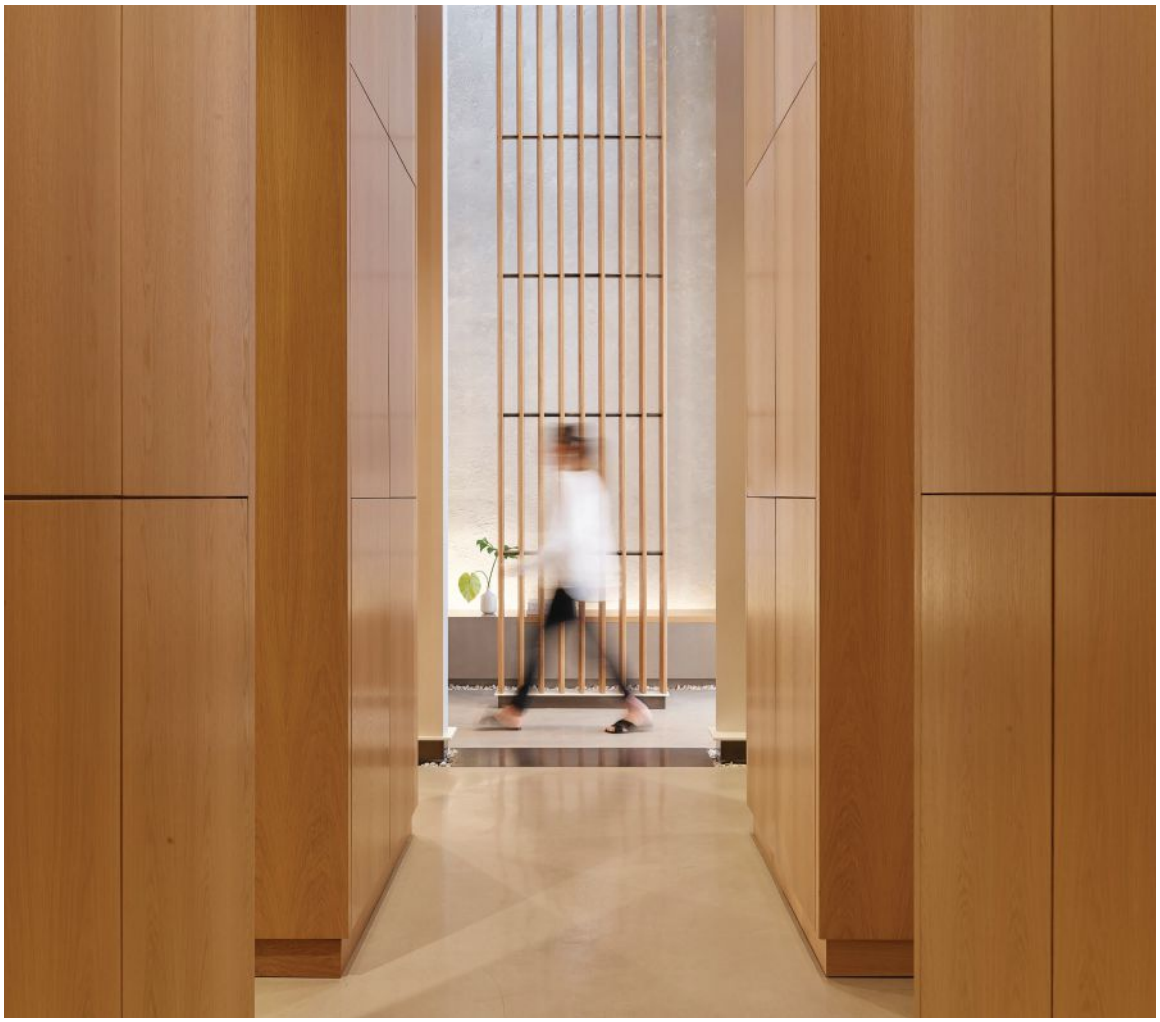
Studio Dental II
San Francisco
Montalba Architects

A new storefront for a forward-thinking dental practice provides a spa-like atmosphere for oral health.

PHOTOS BY KEVIN SCOTT




FDC
STUDIO
DENTAL

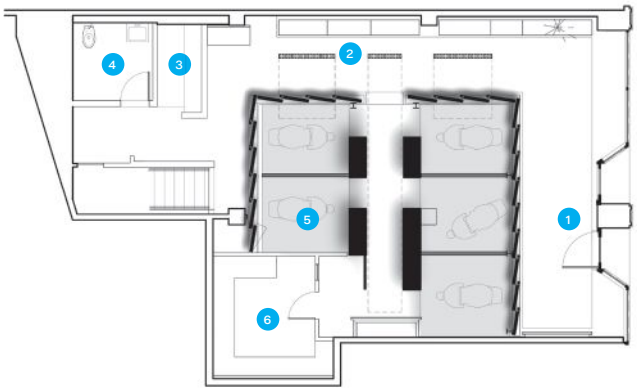


Discussion of San Francisco's rapid gentrification over the last two decades usually revolves around high-tech innovation, but Studio Dental proves that the culture of disruption can also be applied to oral health. To start, the company eliminated excuses for not going to the dentist by debuting a mobile clinic that can bring on-demand dental services to your office door. Now Studio Dental can also provide more regularized care for denizens of the city's Twitter-anchored Mid-Market district, courtesy of a new permanent storefront designed by Santa Monica, Calif.– and Lausanne, Switzerland–based Montalba Architects.

Taking the client out of a truck and putting them into a Corinthian-columned Beaux-Arts beauty, the designers have nonetheless succeeded in creating an interior that seems a far cry from the drear and formality of the archetypical dentist's office: Through the restored glass-fronted façade, passersby see a gleaming white screen standing just a few feet beyond the door that is composed of slanted panels with fluorescent bulbs tucked beneath them. Entering the space, visitors find a modest foyer trimmed with a miniature rock garden along the street-facing side; patients are then conducted along a stone-floored passage past built-in stone benches—one of them running clear into the heart of the office—marked off from the corridor by slender wooden slats and backed up by additional concealed lighting that enhances the space's Zen-like tranquility. Exam rooms are discreetly tucked away inside wood-lined compartments, suggestive of a luxury day spa, while the warren-like plan is lent a beguiling amplitude by way of mirrors that make the narrow hallways seem to go on forever.

The client's enterprising mission and Montalba Architects' tasteful reserve have come together to create a valuable local amenity—one that doesn't sacrifice style for service, but that brings both together to form an unusually harmonious synthesis.

Floor Plan



1. Entrance
2. Waiting
3. Reception
4. Bathroom
5. Operating room
6. Equipment lab

0 5 10

Previous Spread: Light wall in lobby, as seen through historic façade

Opposite: Wood-lined hallway flanked by exam rooms

Above, Left: Lobby

Above, Right: Exam room

INTERIOR ARCHITECTURE

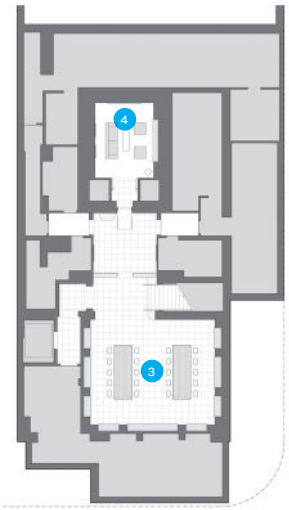
Apple Store, Upper East Side
New York
Bohlin Cywinski Jackson

A historic bank building in Manhattan accommodates a high-tech retail showcase.

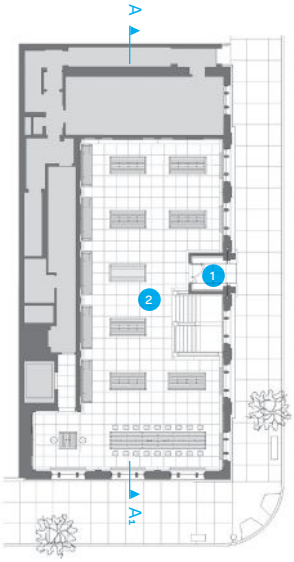
PHOTOS BY PETER AARON/OTTO


EXIT

Lower-Level Plan



Ground-Floor Plan



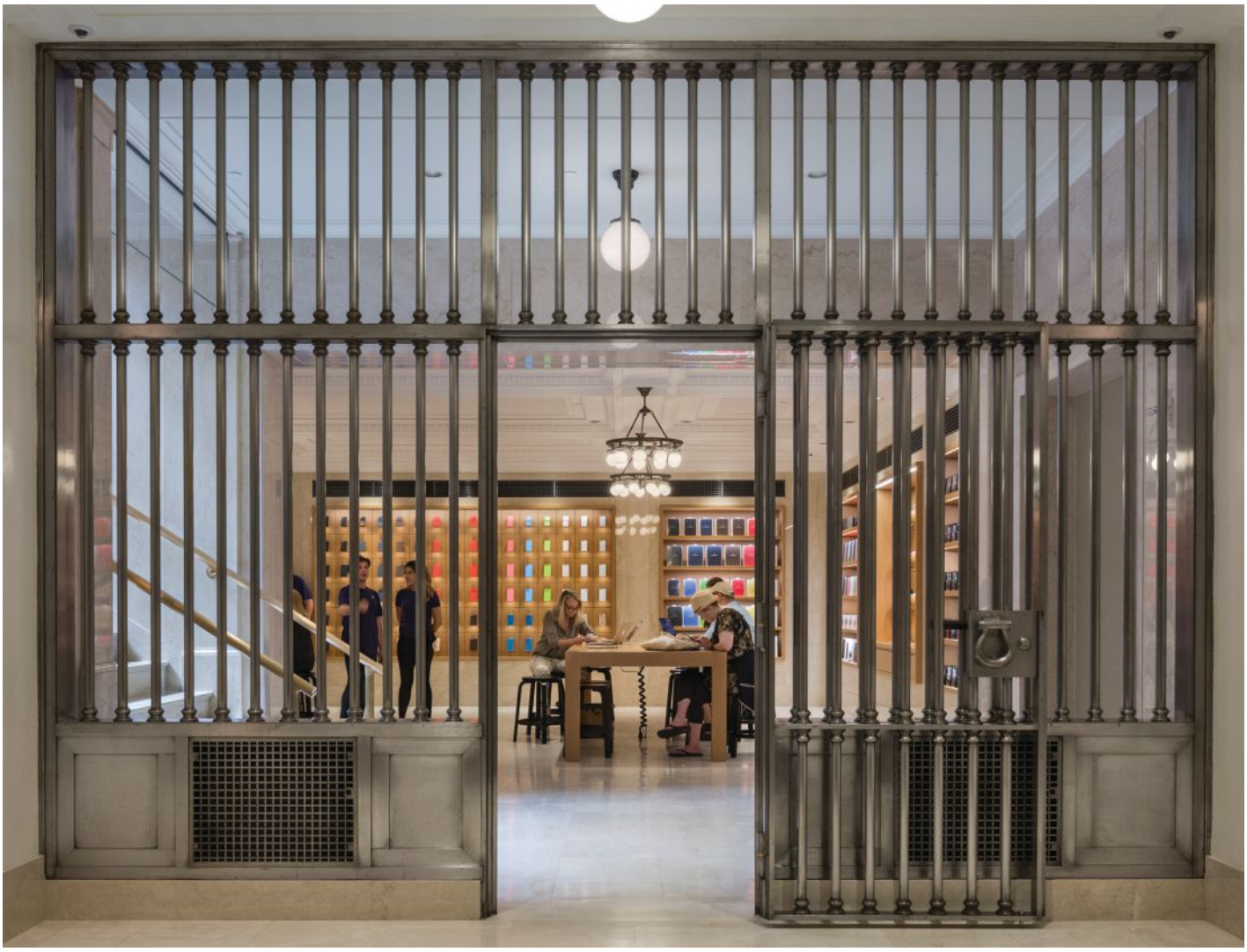
Section A-A1

1. Entrance
2. Retail
3. Accessories retail
4. Presentation space

Griping about new architecture in New York is a beloved local pastime, but in the last decade one company—and one design firm—have given citizens little reason to complain: Apple's string of gem-like spaces, all crafted by Bohlin Cywinski Jackson (BCJ) of Wilkes-Barre, Pa. The tech company's new location on the Upper East Side builds on the successful formula from previous efforts, winning over hard-hearted Gothamites by giving them not just a glassy piece of contemporary design, but a new way to see a historic building—in this case the unjustly overlooked U.S. Mortgage and Trust Co. building.

Originally the work of architect Henry Otis Chapman, the two-story masonry structure on Madison Avenue is a 1920s take on late-18th-century French Neo-Classicism, replete inside and out with moldings, and capitals, and other decorative details. In addition to these surface effects, the ground level (once the main banking concourse) had immense spatial potential, what with its near-ceiling-height windows and column-free floor spanning nearly half a block. The architects set about restoring the elaborate ornamental scheme, devoting intense research to Chapman's work and to the period in order to craft faithful re-creations of long-lost features. In the basement, while the century-old partitions were cleared, the vault door was preserved, maintaining a little historical flair while giving buyers the feeling of pulling off a heist.

Not just a sensitive restoration, BCJ's design is very much of the 21st century, with a subtle handling of such technical elements as lighting, HVAC, and retail fixtures that allows the space to come alive with activity without disturbing its Beaux-Arts grandeur. Fresh and luminous, the architect capitalizes on the visual identity of the brand-name client to create an interior that feels pitch perfect, and that gives New York back yet another architectural treasure it had previously thought lost.



Previous Spread: Ground-floor retail showroom

Above: Lower-level accessories retail

Left: Historic east façade

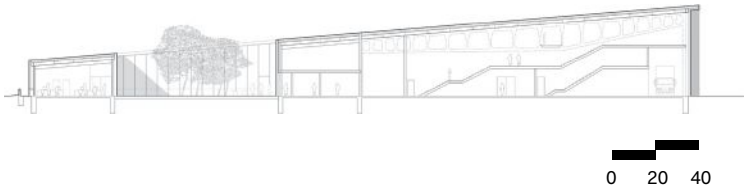
ARCHITECTURE

Trumpf Smart Factory Chicago
Hoffman Estates, Ill.
Barkow Leibinger Architekten

An industrial showcase outside Chicago marries high design with precision manufacturing.

PHOTOS BY SIMON MENGES

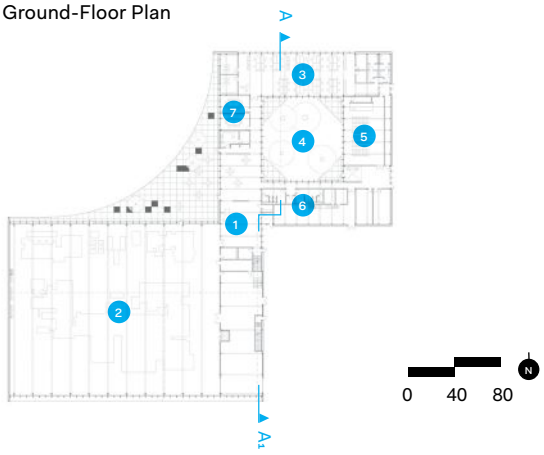
Section A–A₁



Second-Floor Plan

Mezzanine Plan

Ground-Floor Plan

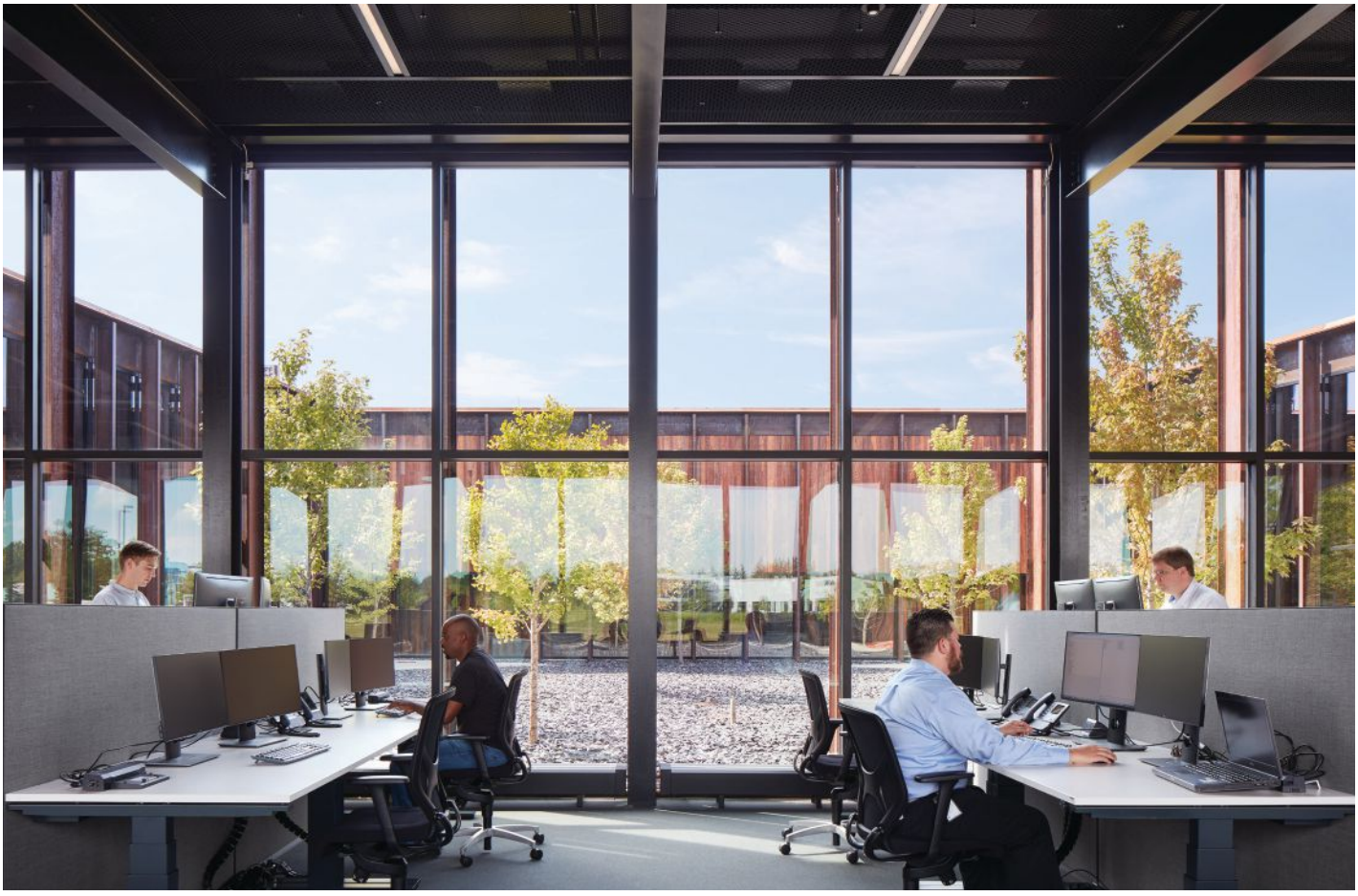


Trumpf is one of the most trusted names in the construction business, a German manufacturer of precision machine tools with a good reputation that spans the globe. For its new facility outside Chicago, the company turned to another German outfit known for innovative material and fabrication techniques: long-time collaborator Berlin-based Barkow Leibinger Architekten (BLA). (Partner Regine Leibinger is a part-owner of Trumpf—her late father headed the company.) Together, the two companies have created an industrial showpiece unlike any other in the U.S.

The new Trumpf Smart Factory sits about 20 minutes from O'Hare International Airport on a somewhat unpromising stretch of interstate: Surrounded by big-box locations and corporate campuses, the building sits on part of a former AT&T office park—a relative advantage site-wise as the landscaping includes a scenic natural water feature.

Availing itself of the immediate surroundings, while keeping in view the no-nonsense commercial character of the brief, BLA created a building that's equal parts serene and hard-edged, earthy and fastidious. Its two volumes—each square in plan and meeting at a 90-degree angle—are clad in Cor-Ten steel offset with touches of burnt wood and broad faces of glass. The largest transparent façade is on the bigger of the two volumes—the main showroom where clients winging in to the area can see a suite of Trumpf's latest products in a light-suffused space, unencumbered by columns thanks to a sweeping truss roof whose steel members were shaped by Trumpf machinery.

After taking in the spectacle of the company's wares, visitors are ushered into meeting and conference rooms in the adjoining structure, which are arrayed around a central courtyard that complements other social spaces including a rooftop viewing platform. Bristling with function and seductive in form, the Smart Factory seems a perfect architectural counterpart to the tools that helped build it.



1. Lobby
2. Machine showroom
3. Office
4. Courtyard
5. Auditorium
6. M/E/P room
7. Conference room
8. Control center
9. Lounge
10. Skywalk

Previous Spread: South façade, with view into machine showroom at night

Opposite: Corrugated Cor-Ten cladding

Top: North façade showing main entry plaza at center

Above: Open office looking onto central courtyard in eastern volume

STEVE HALL/HALL + MERRICK PHOTOGRAPHERS

ARCHITECTURE

Crosstown Concourse
Memphis, Tenn.
Looney Ricks Kiss in association with Dialog

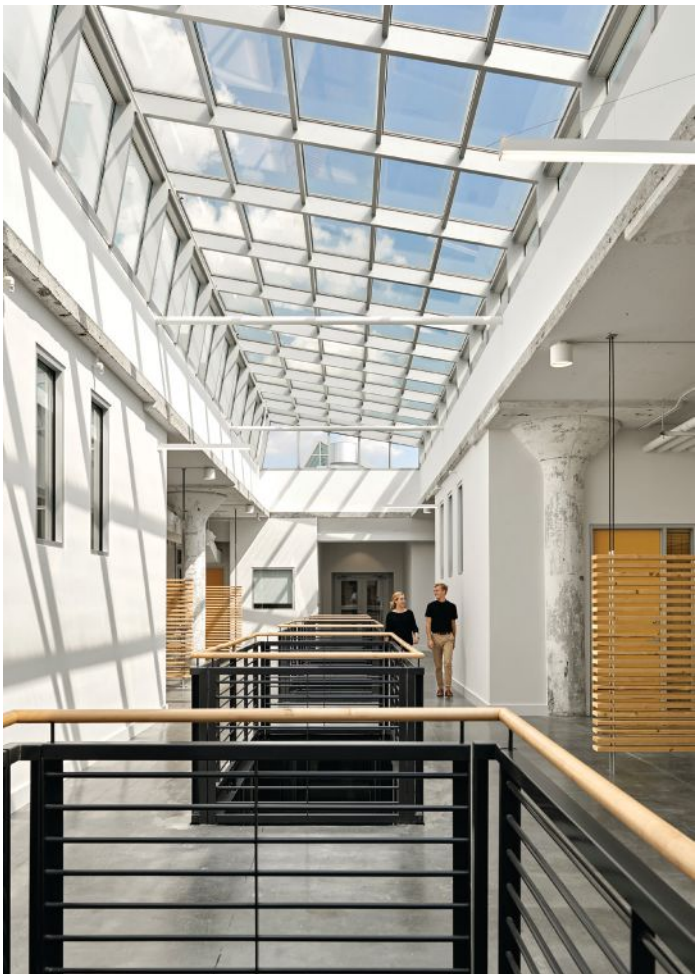
A massive Sears warehouse gains new life as a mixed-use hub, organized around light-filled atria.

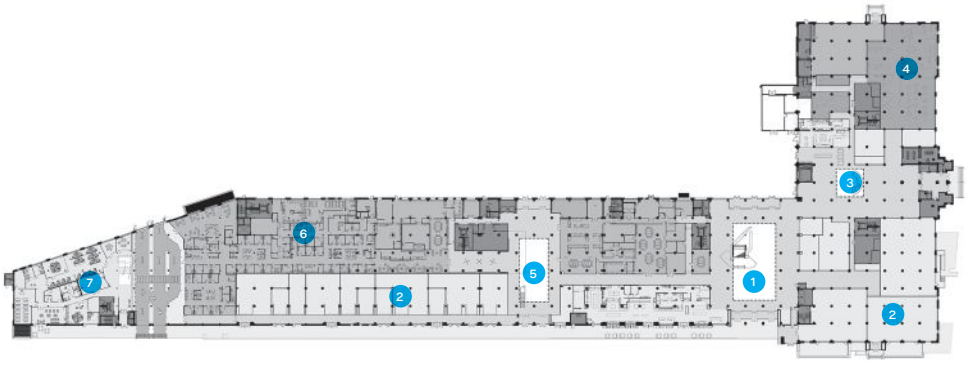
PHOTOS BY NICK MCGINN

Sears was once the nation's largest department store chain, and its decline in recent decades has left the American landscape littered with massive retail and storage structures, some of them outstanding specimens of bygone architectural styles. Such was the case with a 1.5 million-square-foot location in Memphis, Tenn., which was recently transformed by hometown firm Looney Ricks Kiss (LRK)—in association with Canadian firm Dialog—into Crosstown Concourse, a mixed-use complex that brings the long-neglected building up to date while keeping intact its nostalgic Art Deco appeal.

After lying vacant for 20 years, the 1927 structure was initially seen as being of limited interest to prospective tenants, with only one company on tap to take up occupancy after the renovation. Within a year of completion, however, a dazzling array of end users had arrived—among them a health center, a YMCA, a high school, and a theater company, not to mention a residential component comprising 300 units. All of this was made possible through LRK and Dialog's inventive scheme: Reimagining the building as what they refer to as a "vertical village," the designers inserted a sequence of three atria that open up the vast interior and break it down into apprehensible parts. The apartments clustered around the westernmost shaft, and the floor-to-floor sight lines across atria on the commercial levels create a sense of continuity and spectacle. In the central atrium, a 10-story-tall central skylight arcs over a grand staircase whose landing functions as a social theater—a communal space visible from all around the concourse.

All of this has been achieved while preserving the spectacular patterned brick-and-stone of the original Sears (as well as an adjoining Googie-ish 1960s garage, which was previously slated for demolition). And more than preserving it—at night, the illuminated interior shines behind the vast grid of industrial windows, turning the hulking complex into a dazzling light box and a beacon for a revitalized Memphis.





1. Central atrium
2. Retail
3. East atrium
4. Arts space
5. West atrium
6. Medical clinic
5. Office

0 50 100

Previous Spread: West atrium

Opposite: Exterior from southeast

Above, Left: Central atrium

Above, Right: Residential hallway

ARCHITECTURE

Tirpitz Museum
Blåvand, Denmark
Bjarke Ingels Group

A regional museum with a diverse mission disappears into the protected landscape around it.

PHOTOS BY RASMUS HJORTSHØJ

Never afraid of making a bold statement, Copenhagen- and New York–based Bjarke Ingels Group (BIG) seems determined to prove itself equally capable of poetic understatement with its design for the Tirpitz Museum on the Danish coast. The context certainly demands a light touch: During WWII, the German war machine constructed a vast system of defenses along the northern European seaboard—mostly concrete pillboxes. The museum, which is partially dedicated to exploring the Nazi occupation of Denmark, is located both adjacent to and inside one of those empty bunkers. Separate accommodations had to be incorporated for displays on local history, an extensive collection of amber, and a rotating exhibition space. And to further complicate the already complex brief, the site is located within a major ecological park, making the museum a de facto interpretive center for the preserve.

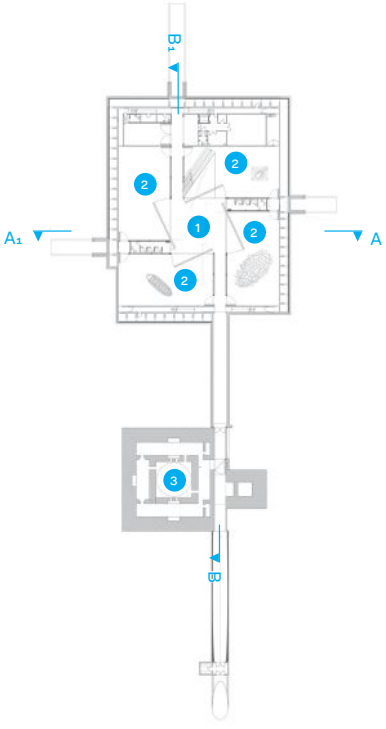
BIG's solution manages to answer all points through a kind of archaeological maneuver—slicing into the sandy soil, the designers created a solemn yet scenic procession that has visitors descend into the coastal dune itself, with the semi-buried museum nestled into it like a piece of the topography (or, even more appropriately, like a defensive earthwork). Cross-like in plan, the cuts meet in a central plaza with the exhibition areas surrounding it, the separate volumes making up an improbable subterranean village.

Side-stepping a common hazard of underground architecture, the glazed flanks of the four structures allow for a surprising amount of natural light inside. Any sense of claustrophobia is completely dispelled by a spatial flow that carries museum-goers through the rooms, via another buried passage, and up into the decades-old concrete blockhouse. Robustly contemporary when seen from below, yet barely visible from surface level, the Tirpitz Museum leaves the landscape almost untouched, becoming a living part of its environment—showing just how much BIG can really do with almost nothing.

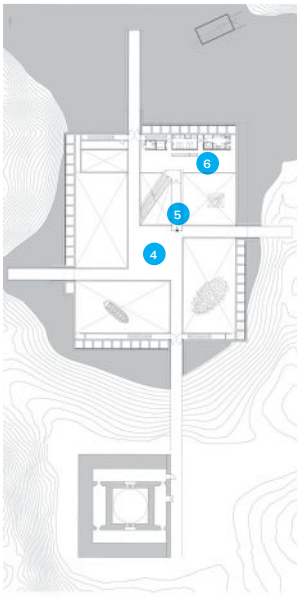
Section A–A₁

Section B–B₁

Exhibit-Level Plan



Entry-Level Plan



1. Central room
2. Gallery
3. Bunker
4. Courtyard
5. Entrance
6. Ticketing/retail

0 40 80

Previous Spread: Courtyard on upper, entry level

Opposite: Aerial view from south

Top: Lower-level gallery

Above: Stair from entry level to central room on lower, exhibit level, with view to gallery beyond

CREDITS

The 2019 AIA Institute Honor Awards

Architecture Jury
Jeanne Chen, AIA, Moore Ruble Yudell Architects & Planners (chair)
Rania Alomar, AIA, RA-DA
Alicia Berg, University of Chicago
Raymond M. Bowman, ASSOC. AIA
Katherine K. Chia, FAIA, Desai Chia Architecture
Shannon R. Christensen, AIA, CTA Architects Engineers
Eugene C. Dunwody Jr., AIA, Dunwody/Beeland Architects
Henry Moss, AIA, Bruner/Cott & Associates
David Rosa-Rivera, Savannah College of Art and Design

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Cornell Anderson, AIA, Fieldwork Design & Architecture
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William T. Eberhard, AIA, Eberhard Architects
Peter MacKeith, ASSOC. AIA, University of Arkansas, Fay Jones School of Architecture

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Lance Hosey, FAIA, Gensler (chair)
Jonah Cohen, FAIA, Hacker
Jeffrey Huber, AIA, Brooks + Scarpa Architects
Marcel Quimby, FAIA, Gensler
Claudia Herasme, New York City Department of City Planning

Starter Home* No. 4-15, Saint Thomas & Ninth, page 232

Project: Starter Home* No. 4-15, Saint Thomas & Ninth, New Orleans
Client: St. Thomas
Development Partners: Jonathan Tate (OJT); Charles Rutledge, Pierre Stouse (Edifice Builders)
Architect: Office of Jonathan Tate (OJT), New Orleans · Jonathan Tate, Lauren Hickman, Sabeen Hasan, Rob Baddour, Jess O'Dell (design Team)
Structural Engineer: Walter Zehner & Associates
General Contractor: Edifice Builders
Landscape Architect: Spackman Mossop Michaels
Size: 12,800 square feet (site); units range from 919 square feet to 1,538 square feet
Cost: $2.5 million

Restoration of the Rotunda at the University of Virginia, page 236

Project: The Rotunda at the University of Virginia, Charlottesville, Va.
Client: Office of the Architect, University of Virginia (UVa) · David J. Neuman, FAIA, Alice J. Raucher, AIA, (architects for the university), Brian Hogg (senior historic preservation planner); Facilities Planning and Construction, Facilities Management, UVa · Donald E. Sundgren (associate vice president and chief facilities officer), Jody Lahendro, FAIA (supervisory historic preservation architect), Stephen Ratliff (supervisory senior construction administration manager), James Zehmer, Sarita Herman (historic preservation project managers), Mark Kutney (architectural conservator)
Architect/Interior Designer: John G. Waite Associates, Architects, New York, and Albany, N.Y. · John G. Waite, FAIA (senior principal); Clay S. Palazzo, AIA (principal-in-charge); Matthew K. Scheidt, AIA (project manager); William Brandow, Shannon Brown, AIA, Douglas Bucher, Stephanie Campbell, Chelle Jenkins, Jessica Lankston, AIA, Meghan Lauver, Amanda Lewkowicz, Aaron Opalka, Katherine Onufer, AIA, Matson Roberts, Edward Sehl, Amanda Villela, David Weirick, AIA (project team)
Acoustician: Cerami & Associates
Archaeologist: Rivanna Archaeological Services
Architectural Historian: Mount Ida Press
Civil Engineer: Dewberry
Cost Estimator: Nasco Construction Services
Elevator Consultant: Van Deusen & Associates
Exhibit Design: Riggs Ward Design
Fire Protection/Building Code Consultant: Jensen Hughes
Furnishings Consultant: Glavé & Holmes Architecture
Geotechnical Engineer: Froehling & Robertson
Land Surveyor: Lincoln Surveying
Landscape Architect: Olin
Lighting Design: Available Light
Masonry Conservation Consultant: Frances Gale
M/E/P/FP Engineer: Kohler Ronan
Metal Conservation Consultant: Andrew Lins
Plaster Conservation Consultant: Conservation Solutions
Structural Engineer: 1200 Architectural Engineers; Robert Silman Associates
Construction Manager: Whiting-Turner Contracting Co.
Clock Restoration Consultant: Bob Desrochers
Electrician: IES Commercial & Industrial
Lighting Restoration: Crenshaw Lighting
Mechanical Contractor: Riddleberger Brothers
Plaster Conservation: John Canning & Co.

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Roofing: W.A. Lynch Roofing Co.
Sheet Metal Restoration: American Stripping Co.
Stone Installation: Rugo Stone
Stone Sculpture Studio: Pedrini Mario & Co.
Window and Masonry Restoration: Centennial Preservation Group
Wood Carving and Capital Fabrication: Tektonics Design Group
Size: 35,805 square feet
Cost: $50 million

Hyundai Capital Convention Hall, page 240

Project: Hyundai Capital Convention Hall, Seoul, South Korea
Client: Hyundai Capital
Architect/Interior Designer: Gensler, Los Angeles · Philippe Paré, AIA (principal and design director); Mirko Wanders, AIA (associate and senior designer); Joanne Chan (job captain); Tina Rothermund, AIA (project architect); Amy Pokawatana, Marissa Tan-Gatue (project managers); Shawn Shin, Julia Park, Fernando Flores, Shun Nagasaka (project staff)
Lighting Designer: Kaplan Gehring McCarroll Architectural
Acoustician: Veneklasen & Associates
Size: 6,250 square feet
Cost: Withheld

Detroit East Riverfront Framework Plan, page 244

Project: Detroit East Riverfront Framework Plan, Detroit
Client: Detroit Riverfront Conservancy
Architect: Skidmore, Owings & Merrill, Chicago · Philip J. Enquist, FAIA (Chicago consulting partner); Douglas J. Voigt, AIA (urban design & planning partner); Aaron May (project manager); Dawveed Scully, ASSOC. AIA (senior urban designer); Rachel Momenee (senior urban designer and architectural professional)
Civil Engineer: Giffels Webster
Landscape Architect: Michel Desvigne Paysagiste; Inessa Hansch Architecte
Consultant: McIntosh Poris Architecture
Economics and Development Advisory Consultant: HR&A Advisors
Community Facilitation Consultant: E. Austell Associates
Transportation Planning Consultant: Giffels Webster
Historic Assets Evaluation Consultant: Kraemer Design Group
Environmental Assessment/Local Incentives and Tax Mechanisms: AKT Peerless Environmental Services
Size: 480 acres
Cost: Withheld

Smithsonian Institution, National Museum of African American History and Culture, page 248

Project: Smithsonian Institution, National Museum of African American History and Culture, Washington, D.C.
Client: Smithsonian Institution
Architecture and Interior Design: Freelon Adjaye Bond/SmithGroup, Durham, N.C., London, Washington, D.C., and Washington, D.C. · Philip Freelon, FAIA (The Freelon Group, now part of Perkins+Will, lead architect) Zena Howard, FAIA (The Freelon Group, now part of Perkins+Will, senior project manager); David Adjaye, HON. FAIA (Adjaye Associates, lead designer); Rob Anderson (Davis Brody Bond, architecture); Hal Davis, FAIA (SmithGroup, architecture) (project leads)
Architect of Record: The Freelon Group (now part of Perkins+Will)
Contractor: Clark/Smoot/Russell, a Joint Venture
Exhibit Design: Ralph Appelbaum Associates
Exhibit Fabrication: Design and Production
Lighting: Fisher Marantz Stone
Food Service: Hopkins Foodservice Specialists
Landscape: Gustafson Guthrie Nichol
Acoustician: Shen Milsom & Wilke
Sustainability Consultant: Rocky Mountain Institute
M/E/P/FP Engineer: WSP Flack + Kurtz
Structural Engineer: Robert Silman Associates; Guy Nordenson and Associates
Geotechnical and Environmental Engineer: Froehling & Robertson
Civil Engineer: Rummel Klepper & Kahl
Traffic Studies: Gorove-Slade Associates
Surveying/Subsurface Utility Investigation: A. Morton Thomas & Associates
Tier II: AECOM
Security: Arup
Specifications: Construction Specifications
Retail Design: Doyle & Associates
Hardware: Erbschloe Consulting Services
Cost Estimating: Faithful+Gould
Theaters/Multimedia Performance Space Design: Fisher Dachs Associates
Vertical Transportation: Lerch Bates
Wayfinding: Poulin+Morris
Historic Resource Protection: Robinson & Associates
Life Safety Code Consultant: Rolf Jensen & Associates (now Jensen Hughes)
Façade Consultant: Heintges Consulting Architects & Engineers
Threat Protection/Blast: Weidlinger Associates (now Thornton Tomasetti)
Size: 397,000 square feet (total floor area)
Cost: $397 million

Design Office, page 252

Project: Design Office, Austin, Texas
Client: Alterstudio Architecture
Architect/Interior Designer: Alterstudio Architecture, Austin · Kevin Alter, Ernesto Cragnolino, FAIA, Tim Whitehill (partners)
General Contractor: Risinger & Co.
Size: 1,500 square feet
Cost: Withheld

Arlington Elementary School, page 256

Project: Arlington Elementary School, Tacoma, Wash.
Client: Tacoma Public Schools
Architect: Mahlum Architects · David Mount, AIA (principal-in-charge); JoAnn Hindmarsh Wilcox, AIA (project designer); Corrie Rosen, AIA (project manager); Karen Wood, AIA (project architect); Royce Bixby, AIA, Laura Poulin, AIA (architectural staff); Dwayne Epp, AIA (quality assurance)
Interior Designer: Mahlum Architects
M/P Engineer: Metrix Engineers
Structural Engineer: Coughlin Porter Lundeen
Electrical Engineer: BCE Engineers
Landscape Architect/Civil Engineer: AHBL
Geotechnical Engineer: Migizi Group
Construction Manager: Greene Gasaway Architects
General Contractor: Neeley Construction
Cost Estimator: The Robinson Co.
Food Service: Halliday Associates
Acoustical: A3 Acoustics
Hardware Consultant: Adams Consulting Group
Size: 54,000 square feet
Cost: $27 million (total project cost)

St. Pius Chapel and Prayer Garden, page 260

Project: St. Pius Chapel and Prayer Garden, New Orleans
Client: Archdiocese of New Orleans
Architect: Eskew+Dumez+Ripple, New Orleans · Mark Ripple, FAIA (principal); Christian Rodriguez, AIA (project architect); Robert Kleinpeter, Lynn Ostenson, Aseem Deshpande, AIA (project team)
Mechanical/Electrical Engineer: Mazzetti
Structural/Civil Engineer: Robert Bouchon Consulting Engineer
Geotechncial Engineer: Gillen Engineering
General Contractor: Voelkel McWilliams Construction
Size: 571 square feet (chapel); 1,258 square feet (including prayer garden)
Cost: $458,000 (including site work)

Shelby Farms Park, page 264

Project: Shelby Farms Park, Memphis, Tenn.
Client: Shelby Farms Park Conservancy
Prime Firm/Master Planner/Landscape Architect/Urban Designer/Public Engagement/Project Manager: James Corner Field Operations, New York · James Corner, Richard Kennedy, Tsutomu Bessho, Megan Born, Kim Cooper, Sanjukta Sen, Baewon Suh, Doug Meehan, Donghyouk Ahn (project team)
Architect: Marlon Blackwell Architects, Fayetteville, Ark. · Marlon Blackwell, FAIA, Meryati Johari Blackwell, AIA, Jonathan Boelkins, AIA, David Jaehning, AIA, Kertis Weatherby, AIA, William Burks, Stephen Reyenga, Justin Hershberger, AIA, Bradford Payne, AIA, Stephen Kesel, AIA, Spencer Curtis, ASSOC. AIA (project team)
Interior Designer: Marlon Blackwell Architects; Semple Brown (restaurant and café design)
Civil/M/E/P/Structural Engineer (Site): Pickering Firm
M/P Engineer (Buildings): Halton Engineering
Electrical (Buildings): Canup Engineering
Structural Engineer (Buildings): Engineering Consultants; Guy Nordenson & Associates
Local Landscape Architecture: JPA
Ecologists/Water Quality Engineers: FTN Associates
Water Feature Engineer: Fluidity Design Consultants
Irrigation Consultant: Northern Designs
Cost Estimating: Faithful+Gould
Lighting Design: Renfro Design Group
Furnishings: Fleming Architects
General Contractor: Montgomery Martin Contractors
Size: 275 acres (Heart of the Park); 34,978 square feet (total buildings)
Cost: $52 million (Heart of the Park); $8.35 million (total buildings)

Optimo Hat Co., page 268

Project: Optimo Hat Co., Chicago
Client: Optimo Hat Co.
Architect: Skidmore, Owings & Merrill, Chicago · Brian Lee, FAIA (design partner); Daniel Bell (senior technical designer); Dennis Milam, AIA (technical designer); Dickson Whitney III, AIA (project manager)
Interior Designer: Skidmore, Owings & Merrill, Chicago · Jaime Velez (director of interior design); Jeremy Bouck (senior interior designer); Michelle Mirrielees (materials specialist)
Mechanical Engineer: Rebecca Delaney (team leader)
General Contractor: Helios Construction

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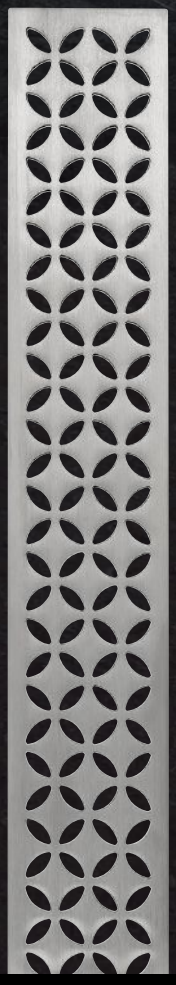

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Creative Consultant to Optimo: Richard F. Tomlinson II
Project and Process Management: Cotter Consulting
Record Collection: Edward Steed
Radiant Heating Consultant: GRYF-Radiant Floor Heating Systems
Project/Design Assistance: Bureau of Architecture and Design
LEED Certification Specialist: Joseph Clair
Demo/Maintenance/White Glove Detailing: Omar Navar
John Lee Hooker Photograph: Paul Natkin
Trim and Woodwork: Carpenter Corey
Size: 7,770 square feet
Cost: Withheld

Infra-Space Initiative, page 272

Project: Infra-Space Initiative, Boston
Client: Massachusetts Department of Transportation (MassDOT), National Development (lessee)
Architect: Landing Studio, Boston · Marie Law Adams, AIA, Daniel Adams, Alysoun Wright (project team)
Structural Engineer: BuroHappold Engineering
Electrical Engineer: RS&H
Civil Engineer: Vanasse Hangen Brustlin
Geotechnical Engineer: Geocomp
General Contractor: A.A. Will Corp.
Landscape Architect: Vanasse Hangen Brustlin
Lighting Designer: Landing Studio
Graphic Designer: Visual Dialogue
Size: 8 acres
Cost: $8.5 million

Noma 2.0, page 276

Project: Noma 2.0, Copenhagen, Denmark
Client: Noma
Architect: Bjarke Ingels Group, Copenhagen, Denmark, and New York · Bjarke Ingels, Finn Nørkjær (partners-in-charge); Ole Elkjær-Larsen, Tobias Hjortdal (project managers); Frederik Lyng (project leader); Olga Litwa, Lasse-Lyhne-Hansen, Athena Morella, Enea Michelesio, Jonas Aarsø Larsen, Eskild Schack Pedersen, Claus Rytter Bruun de Neergaard, Hessam Dadkhah, Allen Dennis Shakir, Göcke Günbulut, Michael Kepke, Stefan Plugaru, Borko Nikolic, Dag Præstegaard, Timo Harboe Nielsen, Margarita Nutfulina, Nanna Gyldholm Møller, Joos Jerne, Kim Christensen, Tore Banke, Kristoffer Negendahl, Jakob Lange, Hugo Yun Tong Soo, Morten Roar Berg, Yan Ma, Tiago Sá, Ryohei Koike, Yoko Gotoh, Kyle Thomas David Tousant, Geoffrey Eberle, Jonseok Hang, Ren Yang Tan, Nina Vuga, Giedrius Mamavicius, Yehezkiel Wiliardy, Simona Reiciunaite, Yunyoung Choi, Vilius Linge, Tomas Karl Ramstrand, Aleksander Wadas, Andreas Mullertz, Angelos Siampakoulis, Manon Otto, Carlos Soriah (project team)
Interior Designer: Studio David Thulstrup
Electrical Engineer: Helden
Ventilation/Water/Plumbing Engineer: LuVa Consult
Construction Engineer: BIG Engineering
Wind Consultant: BIG Ideas
Landscape Architect Consultant: Thing Brandt Landskab
Lighting Consultant: Anker & Co.
Listed Building Adviser: Elgaard Architecture
Site/Project Manager: NT Consulting
Fire Consultant: COWI
Size: 1,290 square meters (13,885 square feet)
Cost: Withheld

Shirley Ryan AbilityLab, page 280

Project: Shirley Ryan AbilityLab, Chicago
Client: Shirley Ryan AbilityLab
Architect: HDR|Gensler, Omaha, Neb., and Chicago, in association with Clive Wilkinson Architects, Los Angeles · Tom Trenolone, AIA (HDR, design director); Jon Crane, FAIA (HDR, director of translational health sciences); William DeRoin, AIA (HDR, associate, project design architect); Michael McGinn (HDR, senior design architect); Karl Lust, AIA (HDR, senior project architect); Jeffrey Fahs (HDR, senior landscape architect); Jennifer Bradley (HDR, senior architectural project coordinator); Lance Thies (HDR, lead landscape architect); Clare Swanson, AIA (HDR, principal planner); Randy Niehaus (HDR, senior lighting designer and electrical engineer); Abigail Clary (HDR, vice president and director, health); Todd Eicken, AIA (HDR, project principal/manager); Steve Weindel, AIA (Gensler, managing director, office buildings leader, principal); Brian Vitale, AIA (Gensler, managing director, principal); Linda Mysliwiec, AIA (Gensler, design manager, studio director); Aleksandar Sasha Zeljic, AIA (Gensler, design director, principal); Scott Hurst (Gensler, design director); Chris Grosse, AIA (Gensler associate project architect); Nila Leiserowitz (Gensler, regional managing principal); Grant Uhlir, FAIA (Gensler, regional managing principal)
Interior Designer: HDR|Gensler in association with Clive Wilkinson Architects and EGG Studio · Tom Trenolone, AIA (HDR, design director); Krysia Lynch (HDR, senior interior designer); Kevin Augustyn, AIA (HDR, design architect); Trevor Hollins (HDR, lighting design studio lead); Anne Gibson (Gensler, design director, principal); Carlos Martínez, AIA, Lena Kitson (Gensler, principals); Lindsey Feola (Gensler, architect); Rachel Sears (Gensler, interior designer); Daniel Krause (Gensler, regional resource librarian); Clive Wilkinson, FAIA (Clive Wilkinson Architects, president and design director); Chester Nielsen, AIA (Clive Wilkinson Architects, project director); Amber Wernick (Clive Wilkinson Architects, associate, and interior designer); Humberto Arreola, INTL. ASSOC. AIA (Clive Wilkinson Architects, associate and project architect); Ben Kalenik, Jesse Madrid (Clive Wilkinson Architects, project coordinators); Evan Bliss (Clive Wilkinson Architects, architectural assistant I); Christian Daniels (EGG Studio, principal); Kate Tews (EGG Studio project director); Mary Kim Harmon (EGG Studio, design director); Amy Owen (EGG Studio, environmental design director); Andrea Lee, Stephanie Wilson (EGG Studio, graphic designers)
Mechanical Engineer: Environmental Systems Design
Structural Engineer: Thornton Tomasetti
Civil Engineer: V3 International
General Contractor: Power Construction
Program Manager: Arcadis
Life Safety: Jensen Hughes
Landscape Architect: HDR
Parking Garage Consultant: Desman
Commissioning: Ecube
Vibration/Acoustical Consultant: Shen Milsom & Wilke
Size: 1.2 million square feet
Cost: $407 million (construction); $550 million (project cost)

Confluence Park, page 284

Project: Confluence Park, San Antonio, Texas
Client: San Antonio River Foundation
Architect: Lake|Flato Architects, San Antonio, and Matsys, Los Angeles · Bob Harris, FAIA (Lake|Flato, partner); Tenna Florian, AIA (Lake|Flato, associate partner); Sunnie Diaz, ASSOC. AIA (Lake|Flato, project designer); Jordan Tsai (Lake|Flato, intern); Corey Squire, AIA (Lake|Flato, sustainability manager); Andrew Kudless (Matsys, project team)
M/E/P Engineer: CNG Engineering
Structural Engineer: Architectural Engineers Collaborative
General Contractor: SpawGlass
Landscape Architect: Rialto Studio
Lighting Designer: Mazzetti
Petal Formwork: Kreysler & Associates
Size: 2,000 square feet (education center); 6,000 square feet (pavilion)
Cost: $12.8 million

Casey House, page 288

Project: Casey House, Toronto
Client: Casey House
Architect: Hariri Pontarini Architects, Toronto · Siamak Hariri, (partner-in-charge); Jeff Strauss, Edward Joseph, Michael Boxer, Howard Wong, Cara Kedzior, Rico Law, Andria Fong, John Cook (project team)
Interior Designer: Hariri Pontarini Architects; IBI Group
Structural Engineer: Entuitive
M/E/P/Civil Engineer: WSP Global
Geotechnical Engineer: Coffey
Construction Manager: BTY Group
General Contractor: Bird Construction
Landscape Architect: Mark Hartley Landscape Architects
Lighting Designer: WSP Global
Heritage Consultant: ERA Architects
Size: 59,000 square feet
Cost: $40 million Canadian (approximately $29.91 million)

New United States Courthouse—Los Angeles, page 292

Project: New United States Courthouse—Los Angeles, Los Angeles
Client: U.S. General Services Administration
Architect: Skidmore, Owings & Merrill, Los Angeles and San Francisco · Gene Schnair, FAIA (managing partner); Michael Mann, FAIA (managing director, project manager); Craig Hartman, FAIA (design partner); Jose Palacios, AIA, Paul Danna, FAIA (design directors); Mark Sarkisian (structural partner); Keith Boswell (technical partner); Susan Bartley, AIA (project manager); Naomi Asai (senior design architect), Bita Salamat, AIA (senior interior design architect); Garth Ramsey (senior technical coordinator); Eric Long (senior structural engineer); Andrew Krebs (senior structural engineer); Steven Zimmerman, AIA (technical architect); Lonny Israel (graphic designer)
Interior Designer: Skidmore, Owings & Merrill
M/E Engineer: Syska Hennessy Group
Structural Engineer: Skidmore, Owings & Merrill
Plumbing Engineer: South Coast Engineering Group
Civil Engineer: Psomas
Geotechnical Engineer: Haley & Aldrich
Construction Manager/General Contractor: Clark Construction Group
Landscape Architect: Mia Lehrer + Associates
Lighting Designer: HLB Lighting Design
Graphics: Skidmore, Owings & Merrill
Branding/Graphics: Page/Dyal
Acoustical Consultant: Newson Brown Acoustics
Fire Life Safety: Jensen Hughes
Food Service Consultant: Cini-Little

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Elevators: Lerch Bates
Blast Consultant: Applied Research Associates
Size: 633,000 square feet
Cost: $326 million

Pike Place MarketFront, page 296

Project: Pike Place MarketFront, Seattle
Client: Pike Place Market Preservation and Development Authority
Architect: The Miller Hull Partnership, Seattle · Sian Roberts, FAIA (partner-in-charge); David Miller, FAIA, Brian Court, AIA (lead designers); Steve Doub, AIA, Wojtek Szczerba (project managers); Becky Roberts, AIA, Peipei Sun, Sean Waldron, AIA, Eugene Lau, AIA, Casey Riske, AIA, Ryan Drake, Cory Mattheis, AIA, Rohit Eustace, AIA, Grace Leong, David Cinamon, Janet Bean, Ryan Rideout (project team)
Structural/Civil Engineer: Magnusson Klemencic Associates
M/E/P Engineer: Arup
Construction Manager: Garrett Condell; Sellen Construction
General Contractor: Sellen Construction
Landscape Architect: Berger Partnership
Lighting Designer: Dark | Light Design
Acoustical Engineer: The Greenbusch Group
Building Envelope Consultant: Wetherholt and Associates
Door Hardware Consultant: Adams Consulting and Estimating
Elevator Consultant: Elevator Consulting Services
ADA Consultant: Karen Braitmayer, FAIA
Code Consultant: Tom Kinsman
Archaeological Services: ESA
Wayfinding: RMB Vivid
Traffic Consultant: Heffron Transportation
Mass Excavation: Ceccanti
Piling: Malcolm Drilling Co.
Shoring: Condon Johnson
Utilities: Gary Merlino Construction
Mechanical/Plumbing Consultant: Auburn Mechanical
Landscape Consultant: T Yorozu Gardening Co.
Size: 39,600 square feet (site area); 210,000 square feet (project area)
Cost: Withheld

Studio Dental II, page 300

Project: Studio Dental II, San Francisco
Client: Studio Dental
Architect: Montalba Architects, Los Angeles and Lausanne, Switzerland · David Montalba, FAIA (founding principal); Michael Knopoff, AIA (principal); Akiko Suzuki (associate principal); Jen Loesche (associate); Vicente Shum (designer)
M/E/P Engineer: Acies Engineering
Structural Engineer: Julia Y. Chen Design
General Contractor: Build Group
Lighting Designer: Sean O'Connor Lighting
Size: 1,400 square feet
Cost: Withheld

Apple Store, Upper East Side, page 304

Project: Apple Store, Upper East Side, New York
Client: Apple
Architect: Bohlin Cywinski Jackson, Wilkes-Barre, Pa. · Karl A. Backus, FAIA, David Murray, AIA, Peter Q. Bohlin, FAIA (principals); David Andreini, AIA (associate principal, project director); Brigham Keehner, AIA, Jeffrey Lew, AIA (senior associates); Carson Davis, Sarah Estephan, Sarah Harkins, Corey Schnobrich, AIA, Megan Strenski, Chenglong Tsai (project team)
Structural Engineer: Eckersley O'Callaghan
M/E/P Engineer: WSP Global
Civil Engineer: Langan Engineering and Environmental Services
General Contractor: Shawmut Design and Construction
Lighting Designer: ISP Design
Acoustical: Arup
Historic Preservation: Higgins Quasebarth & Partners
Conservator: Jablonski Building Conservation
Elevator: Edgett Williams Consulting Group
Size: 10,730 square feet
Cost: Withheld

Trumpf Smart Factory Chicago, page 308

Project: Trumpf Smart Factory Chicago, Hoffman Estates, Ill.
Client: Trumpf
Design Architect: Barkow Leibinger, Berlin · Frank Barkow, Regine Leibinger (principals); Heiko Krech (project architect); Johannes Beck, Jordan Berta, Carles Figueras, Cecilia Fossati, Andreas Moling, Antje Steckhan, Daniel Toole, Alexa Tsien-Shiang, Annette Wagner, Jens Wessel (project team)
Architect of Record: Heitman Architects, Itasca, Ill.
General Contractor: McShane Construction Co.
Project Management: Lendlease
Structural Engineer: Knippers Helbig Advanced Engineering (design), IMEG Corp. (of record)
Climate/Energy Design/Mechanical/Electrical Engineer/HVAC: IMEG Corp.
Façade Consultant: Knippers Helbig Advanced Engineering
Lighting Design: Licht Licht
Landscape Architect: Capatti Staubach (design), Gary R. Weber Associates (of record)
Size: 57,000 square feet
Cost: Withheld

Crosstown Concourse, page 312

Project: Crosstown Concourse, Memphis, Tenn.
Client: Crosstown
Architect: Looney Ricks Kiss, Memphis, in association with Dialog, Toronto · Anthony E. Pellicciotti, AIA, Rebecca Courtney, Frank Ricks, FAIA, Lauren R. B. Tolbert, Meredy Dahlgren, Krissy Buck Flickinger, Lauren M. Ricks, AIA, Alan Boniface, INTL. ASSOC. AIA, Marion LaRue, AIA, Jennifer Cutbill (project team)
Interior Designer: Looney Ricks Kiss in association with Dialog
M/E/P Engineer: OGCB
Structural Engineer: Structural Design Group
Civil Engineer: SR Consulting
Geotechnical Engineer: Professional Services Industries
Construction Manager/General Contractor: Grinder, Taber & Grinder (Construction Manager at Risk)
Landscape Architect: Hood Design Studio
Lighting Designer: Arup
Preliminary Design Consultant: Spatial Affairs Bureau
Sustainable Site/Civil Concepts and Daylight Modeling Consultant: Arup
Mechanical/Smoke Evacuation Consultant: Newcomb & Boyd
Code Consultant: Code Solutions Group
Signage/Branding/Wayfinding: Loaded For Bear
Exterior Envelope Restoration Consultant: Wiss, Janney, Elstner Associates
Surveyor: Pickering Firm
Furniture/Fixtures: Carkuff Interior Design
Historic Preservation Tax Credit Consultant/Heritage/Historic Consultant: Looney Ricks Kiss
Residential Architect: Looney Ricks Kiss
Sustainability Consultant: Looney Ricks Kiss
Building Management: Commercial Advisors
Size: 1.3 million square feet
Cost: $135 million (construction cost)

Tirpitz Museum, page 316

Project: Tirpitz Museum, Blåvand, Denmark
Client: Vardemuseerne
Architect: Bjarke Ingels Group, Copenhagen, Denmark, and New York · Bjarke Ingels, Finn Norkjaer (partners-in-charge); Brian Yang (project leader, concept); Frederik Lyng (project leader, detailed design); Ole Elkjær-Larsen (project manager); David Zahle, Andreas K. Pedersen, Snorre Emanuel Nash Jørgensen, Michael Andersen, Hugo Soo, Marcella Martinez, Geoffrey Eberle, Adam Busko, Hanna Johansson, Jakob Andreassen, Charlotte Cocco, Mikkel Marcker Stubgaard, Michael Schønemann Jensen, Alejandro Mata Gonzales, Kyle Thomas, David Tousant, Jesper Boye Andersen, Alberte Danvig, Jan Magasanik, Enea Michelesio, Alina Tamosiunaite, Ryohei Koike, Brigitta Gulyás, Katarzyna Krystyna Siedlecka, Andrea Scalco, Tobias Hjortdal, Maria Teresa Fernandez Rojo (project team); Jakob Lange, Tore Banke, Yehezkiel Wiliardy, Kristoffer Negendahl (BIG Ideas)
Structural Engineer: AKT; Lüchinger+Meyer Bauingenieure
Exhibition Design Consultant: Tinker Imagineers; Kloosterboer Décor
Contractor: Kloosterboer Décor
Sustainability Consultant: BIG Ideas
M/E/P/Civil Engineering Consultant: Fuldendt
Fire Safety Code Consultant: COWI
Wind Consultant: Svend Ole Hansen
Acoustics Consultant: Gade & Mortensen Akustik
Landscape Architect: Bach Landskab
Lighting Consultant: Ingeniørgruppen Syd
Client Adviser: Kjæhr & Trillingsgaard Enterprise
Consultant: Pelcon Materials & Testing
Size: 2,850 square meters (30,677 square feet)
Cost: Withheld

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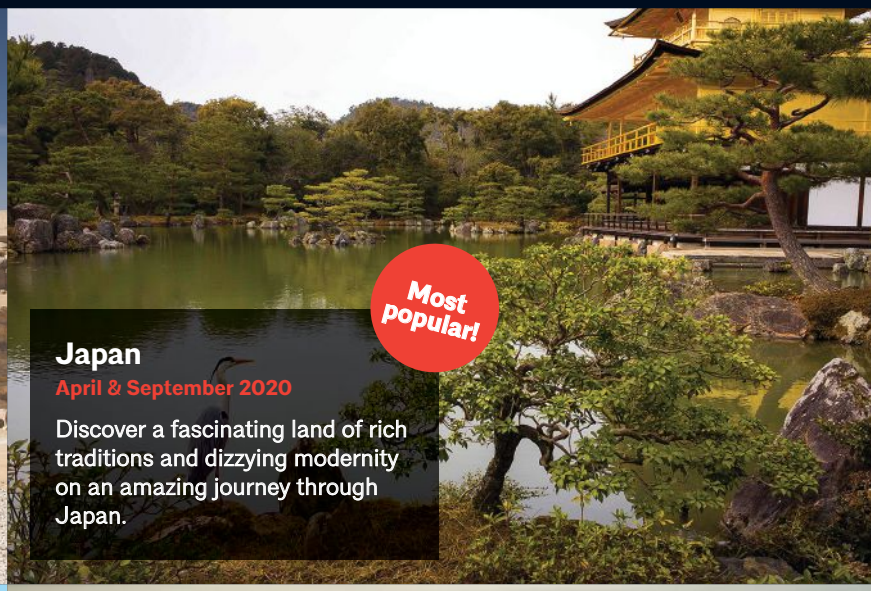

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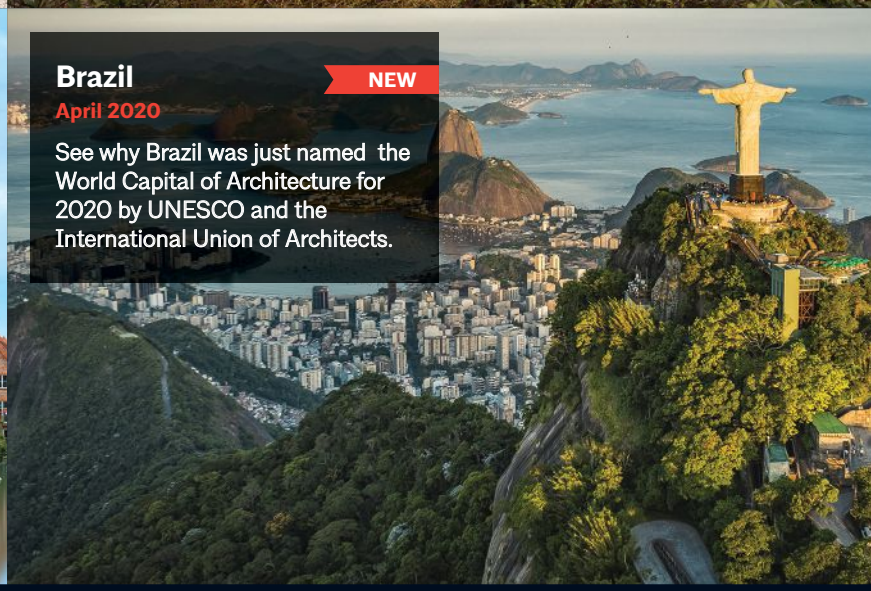

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Editorial: Victor Hugo Was Wrong

There's a particularly strange chapter in Victor Hugo's strange and wonderful novel, *Notre-Dame de Paris*, titled "This Will Kill That." In it, the author digresses from the Gothic tale of a gypsy girl and the hunchback who loves her to expound a pet cultural theory: "*Le livre tuera l'édifice.*" "The book will kill the building." That simple sentence—subject, verb, object—defines an epochal moment, when the book usurped architecture as humanity's chief mode of expression. (Hugo put those words in the mouth of a medieval character, the cathedral's archdeacon, which explains his use of the future tense, in 1831, to refer to an event that had occurred in the 15th century.)

"The invention of the printing press is the greatest event in history," Hugo wrote in the novel, and he's right. (Or, at least, he *was* right, until the internet came along.) But Hugo is also wrong: The printing press may have taken architecture's place as the medium of choice, but it didn't *kill* architecture, or even mute it. For proof, look no further than the great outpouring of sorrow when Notre Dame was ravaged by fire on April 15. Clearly, that 800-year-old church embodies the spirit of a city, a nation, and, arguably, a civilization.

Hugo's dead-architecture thesis depends on the supposition that buildings are inherently static and singular, whereas books, to their advantage, are transient and numerous: "One can demolish a mass; how can one extirpate ubiquity?" While a building as old as Notre Dame Cathedral is undeniably singular, it isn't static. After a century or so, buildings achieve a kind of slow, viscous fluidity, changing on a seemingly geological time scale. Over the course of eight centuries, the cathedral has been expanded, altered, ornamented, pillaged, adapted, restored, and renovated—a physical history of France, written in stone, lead, timber, and glass.

The church that just burned was as much a monument of the 19th-century Gothic Revival, courtesy of enthusiastic restoration architect Eugène Viollet-le-Duc, as it was a relic of the 12th-century Gothic. And given the slow pace of medieval construction, one cannot even pin the original to a single phase. A succession of anonymous master builders deployed Early, High, Rayonnant, Flamboyant, and Late iterations of the style.

In-between the Gothic bookends, Louis XIV had Robert de Cotte give the choir a Baroque face lift (which Viollet-le-Duc indignantly removed); revolutionaries sacked the place and used it for atheistic pageants; and monarchs from the houses of Bourbon, Bonaparte, and Orléans as well as officials of the various republics staged weddings, coronations, and funerals there—each necessitating elaborate, though not always permanent, reinventions.

French President Emmanuel Macron promises the restoration of Notre Dame Cathedral will be complete in five years, and French billionaires and megacorporations have already pledged more than $700 million toward that goal. Will Notre Dame Cathedral be the same as it was before the fire? No, that is beyond the capacity of the most meticulous preservation efforts. But Notre Dame Cathedral can be as *meaningful* as it was before the fire. While tragic, the fire creates an opportunity to write a new chapter. That story will be written in architecture.

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