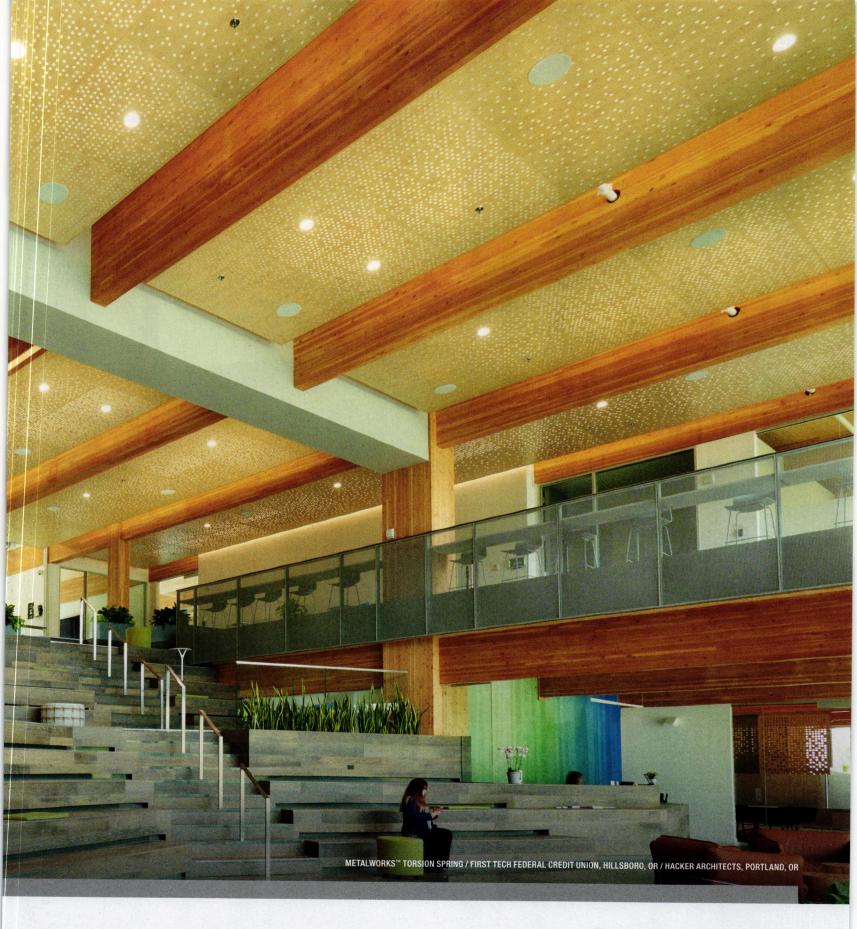




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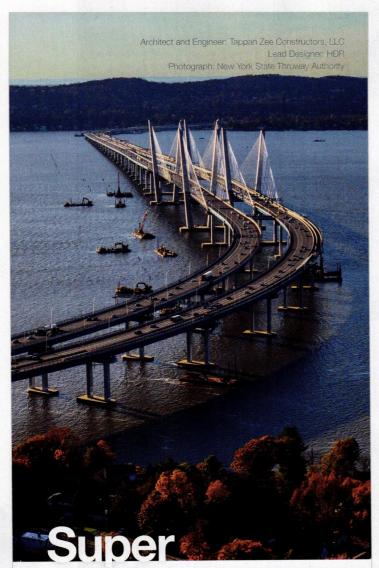
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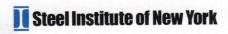


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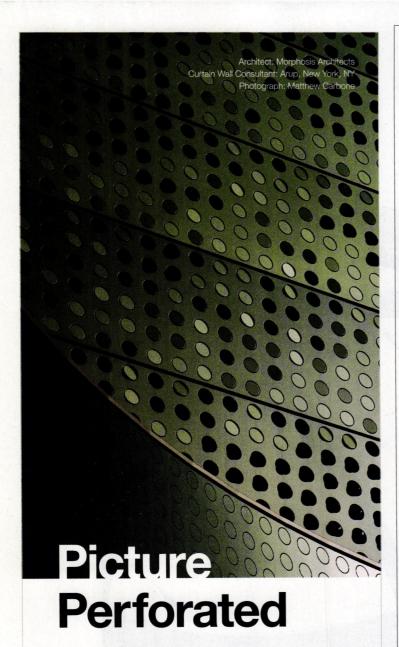


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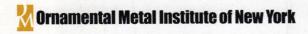
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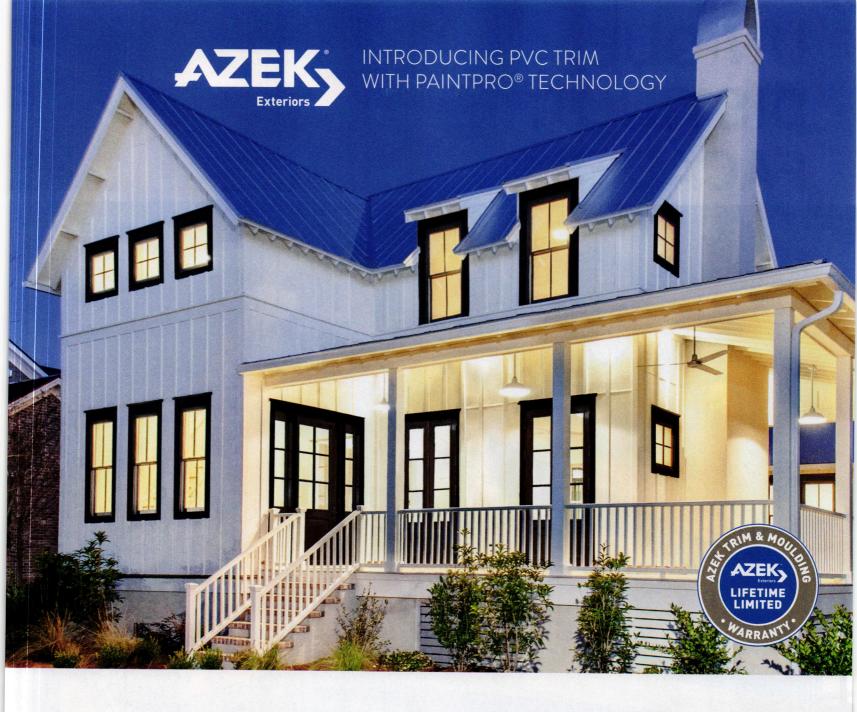


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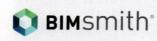


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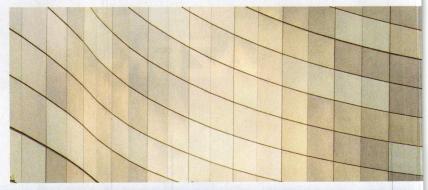
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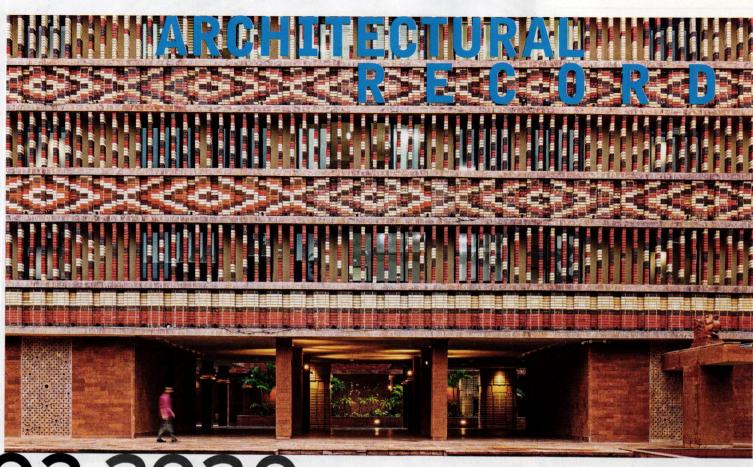


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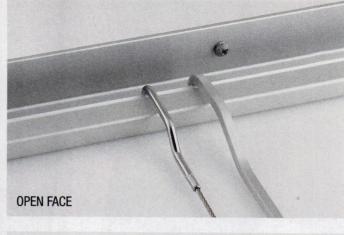


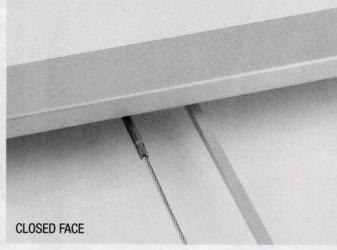
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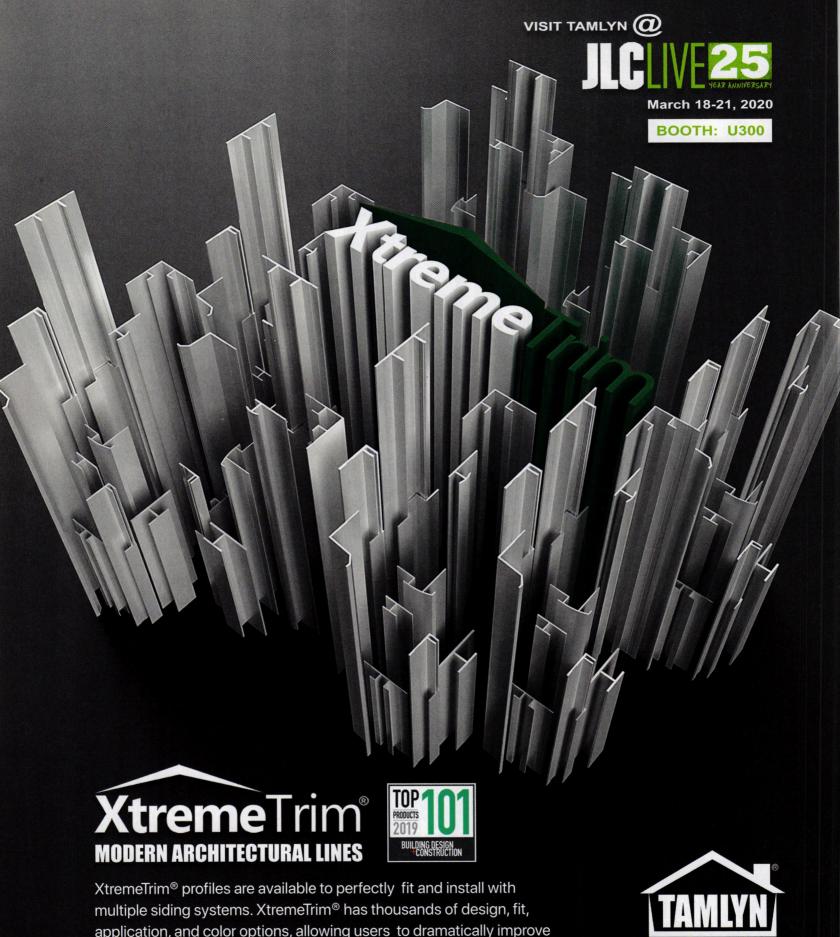
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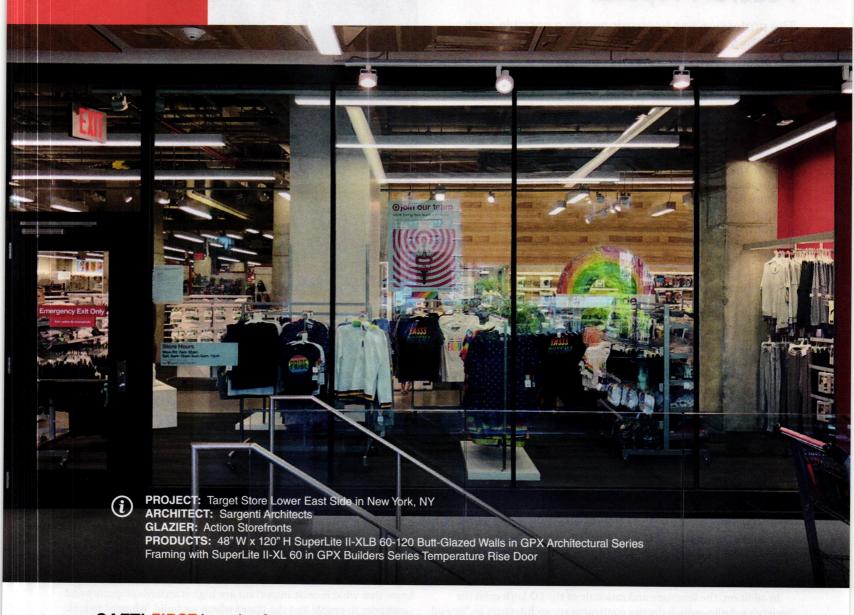
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Fallout from a Disastrous Federal Proposal

The profession has been gripped by a possible push from the White House that would have a huge impact on government architecture.

A READER Wrote RECORD last year arguing that architecture is a political-free zone, and that any discussion that touched on politics didn't belong in this magazine. We can agree to disagree on that—broadly, politics is about the public interest, and that is where architecture almost always resides.

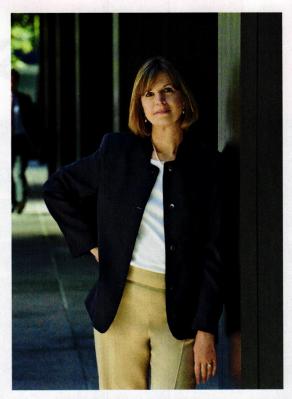
But in the past month, we have seen the politicization of architecture to an extent that few of us imagined possible. RECORD first broke the story that a proposed executive order (EO) was circulating in the White House that would dictate that "the classical architectural style shall be the preferred and default style" for most new and upgraded federal buildings. The response from the media, architects, and professional organizations was immediate, with most of the outcry against any top-down prescription of "style" for government buildings. The objections came from some surprising corners. For example, Michael Lykoudis, FAIA, dean of University of Notre Dame's architecture school, which emphasizes classical architecture and traditional urbanism, expressed dismay in the Washington Post at the proposed order: "Classical architecture is not a style," he wrote. "It is a dedication to principles of community, resilience, and beauty." Read more in the pages ahead about reactions across the profession (page 23). (As RECORD went to press, the proposed EO had not been issued.)

The narrow interpretation of "classical" as a style is just one serious problem with the proposed EO, no matter what your predilections in architecture may be.

First, the "master mind" behind the EO seems to be a single organization. As RECORD reported in our original story, the president of the National Civic Art Society, Justin Shubow (who is not an architect or historian but seems to have the ear of the White House) was Trump's first appointment to the U.S. Commission of Fine Arts, which reviews new architecture in Washington, D.C. Now another Trump appointment to the commission sits on the Society's board. And the mechanism for approving new federal architecture nationwide, put forth in the draft EO, would be a committee including one member from the commission as designated by the president.

In addition, the language and rationale of the EO both echo the Society's website—which decries contemporary architecture as "by and large a failure"—and reads as a summary of "Why America Needs Classical Architecture," a recent article in *City Journal* by Catesby Leigh, who was the 2018–19 research fellow of the Society.

Second, the EO draft, while sharply critical of modernist, Brutalist and Deconstructivist architecture, pays little or no attention to the myriad, complex factors that architects actually address beyond designing the facades of public buildings—the program, the users, the community, the urban context, the creation of public space, innovation



in materials and systems, construction details, efficiencies and budgets, as well as the quality of interior spaces. The document doesn't seem to have been written or even vetted by a working architect.

Third, the EO proposal ignores the single most important issue confronting architects today: how to help combat the climate crisis. But for an administration that in recent months has rolled back regulations protecting streams and rivers, air quality, and the protection of endangered species and public lands, this is no surprise.

Yet sustainability is the leading concern of young architects today—those who will be designing and building our future.

In this issue of RECORD, and in subsequent issues, we are zeroing in on how architects are taking action for a sustainable future—from SOM, the pioneers of glass and steel towers now exploring timber (page 78) to the passive strategies a team has employed in an unusual government building in India (page 68). And, as senior editor Joann Gonchar, FAIA, details in "Carbon Crackdown" (page 98), today's sophisticated tactics and tools are taking sustainable architecture far beyond energy savings.

People may not agree on what makes great architecture, but we do know that what is most important are high standards of quality and sensitivity to people and the places where we build. We need to look forward, not back, and use technology to make buildings that perform better and address the needs of today's world.

Cathleen McGuigan, Editor in Chief

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CASE STUDY

Middlesex School | Concord, MA

Smoke Vents Help Massachusetts School Set the Stage for Extensive Renovation

A Massachusetts school for students in grades 9-12 confronted a difficult space concern with a complete renovation of the campus theater. Architects prepared a plan that completely re-imagined the space and incorporated automatic smoke vents from The BILCO Company to provide an important layer of life and property protection.

The Middlesex School, based in Concord, Mass. sought a space where its entire population, approximately 400 students and 100 teachers and administrators, could congregate. Previous assemblies were held in a theater that could only accommodate about 400 people. Some people were required to stand during performances, and the building – built in the 1960s – needed a major overhaul. With campus space at a premium, school officials decided a major renovation of the theater was the best solution.

The scope of the renovation on the 55,000 square foot project at the school's Bass Arts Pavilion and Danoff Visual Arts Center was extensive, detailed and challenging. The team at CBT Architects needed to maintain the existing footprint of the building and preserve the theater's original walls and roof structure. They also faced environmental constraints.

The centerpiece to the project is the main stage area, which now includes balcony seating and has seen capacity increased by nearly twenty five percent. Architects also designed a visual arts center where students will find dedicated spaces for ceramics, digital photography, digital media and studios for drawing and painting. There is also a gallery that showcases work from professional artists. The upper floor of the visual arts center includes two art history rooms, a multi-purpose space and a mindfulness studio that overlooks a nearby pond.

The project included automatic smoke vents to ensure life safety for the building occupants. Smoke vents protect property and assist firefighters in bringing a fire under control by removing smoke, heat and gases from a burning building. They are activated upon the melting of a fusible link and are ideally suited for large expanses of unobstructed space such as factories, warehouses, auditoriums and retail facilities.

The automatic smoke vents selected for this project featured an acoustical sound rating to block outside noise from entering the building and motor operation to allow the vents to be open and closed remotely for building ventilation. Acoustical smoke vents carry both an STC and OITC rating for sound transmission and are available with an ISO 140-18 rating for rainfall sound.

Photos: Sarah Hamlin/Everchangingphoto



Top: Middlesex School in Massachusetts recently completed an extensive renovation project of the school theater. The renovation included the construction of a new visual arts wing that integrates a rich cross-section of artistic disciplines with a gallery, studio and classroom spaces. Bottom: The project included six double-leaf acoustical smoke vents manufactured by The BILCO



Company. The vents were equipped with electric motors that allow them to be opened and closed remotely for ventilation. They are activated upon the melting of a fusible link in case of a fire.

"The features that were included in the smoke vents were geared to student safety," said Michelle Oishi, lead architect on the project. "That was of paramount importance. The automated aspect was important due to the fact that we wanted very few things interfering with the rigging sets."

Ryan Cosmini of Pace Representatives, BILCO's sales representative in Braintree, MA procured the smoke vents for the contractor, J.S. Mortimer, Inc.

While ambitious in scope, the project delivered everything that the school required. "The entire community gathers there on a weekly basis, and it's very comfortable," said Steve McKeown, the school's project manager. "It provides a space where our community can gather, and that's something that is very important to our school."



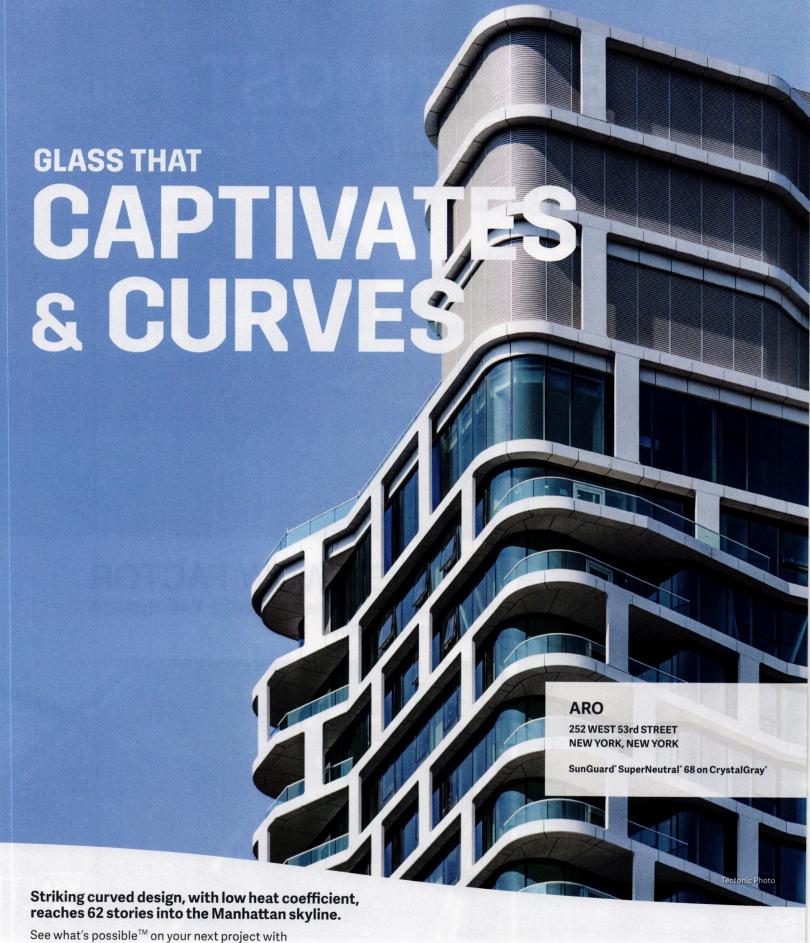
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The judges don't know who you are—whether you're black, white, young, old, whatever.

—Architectural historian Wesley Henderson, in Hollywood's Architect: The Paul R. Williams Story, from PBS SoCal and RKR Media, explaining how architectural competitions were a vital part of Williams's early career.

Voices Rise Up in Protest Against a Federal Classical Mandate

BY CATHLEEN MCGUIGAN

EARLY LAST MONTH, ARCHITECTURAL RECORD broke the story that the White House was considering an executive order (EO) that would dictate that "the classical architectural style shall be the preferred and default style" for new or upgraded federal buildings.

RECORD had obtained a preliminary draft of the EO, entitled "Making Federal Buildings Beautiful Again," which decries the quality of architecture under the General Service Administration's (GSA) Design Excellence Program for its failure to reintegrate "our national values into Federal buildings." The document calls for rewriting the Guiding Principles for Federal Architecture, issued in 1962, which became the foundation of the Design Excellence Program. The original principles state that "an official style must be avoided," and that new federal buildings should reflect their time.

The response to RECORD's article was instantaneous. Newspapers from San Francisco to London jumped on the story, social media and websites were flooded with comments, and design critics and editorial boards weighed in-most attacking the proposed EO. The AIA issued a statement, opposing "uniform style mandates and the idea of any official architectural style"-and called on its members to protest; in the first week, nearly 11,000 architects wrote to the president. The AIA first learned of the EO late last fall. In early January, the executive vice president/CEO Robert Ivy visited the White House to meet with domestic policy aide James Sherk, who denied such an order even existed. But the GSA later acknowledged that aspects of it were already moving forward. (At press time, the EO had not been officially issued.)

The AIA leadership has also reached out to the chairs of the House and Senate appropriations committees, "strenuously" urging them "to ensure that no funding is appropriated to implement or carry out this new dictate," arguing, among other objections, that the order could increase the cost of a federal building by as much as two or three times.

Before the draft EO was leaked to the AIA.



the organization had been closely following President Trump's appointments to the U.S. Commission of Fine Arts (CFA), which approves much of the architecture in the capital. The commission has seven expert members, and Trump's first appointment, in November 2018, was Justin Shubow-who is not an architect but the president of the National Civic Art Society, a nonprofit devoted to furthering classical architecture. (Shubow vociferously protested the Eisenhower Memorial, designed by Frank Gehry, which finally will open in May.) The Society's website contends that "contemporary architecture is by and large a failure," and seeks "to help architecture return to its pre-Modernist roots."

This past December, Trump made two more appointments to the CFA: James C. McCrery II, AIA, a founder and board member of the National Civic Art Society, and architect Duncan G. Stroik, AIA, whose work is "informed by the timelessness of classical architecture," according to the CFA's website. (The terms of the four other members, appointed by President Obama, expire next December.)

The fingerprints of the National Civic Art Society are all over the proposed EO. In the draft, the mechanism for the imposition of the classical style (traditional regional architecThe Treasury Building is an example of Neoclassical architecture in Washington, D.C.

ture—such as Spanish colonial—would also be permitted in places like Florida; think Mar-a-Lago) would be a President's Committee for the ReBeautification of Federal Architecture. Its members would include the commissioner of the GSA's Public Building Service—and at least one member of the CFA. That process would bypass the GSA's Design Excellence pro-

gram; the program's last director, GSA chief architect David Insinga, resigned his post at the end of January.

Many professional organizations have spoken out against the proposed policy, including the National Organization of Minority Architects and the American Society of Landscape Architects.

Other opposing voices have come from surprising corners. Michael Lykoudis, dean of the School of Architecture at Notre Dame, which emphasizes classical architecture and traditional urbanism, wrote to the Washington Post of his dismay in learning of the potential order. "Classical architecture is not a style," he said. "It is a dedication to principles of community, resilience, and beauty." The proposal "reduces an entire architectural philosophy to caricature."

Similarly, the Institute of Classical Architecture and Art, a group "dedicated to advancing the appreciation and practice of traditional architecture," stated it opposed "any government-mandated 'style' . . . and any dictate that narrows public discourse in the design of civic architecture."

Even the National Trust for Historic Preservation has came out against "any effort to impose a narrow set of styles . . . based on the architectural tastes of a few individuals."

Inclusive Play Areas Welcome Displaced Communities

BY MIRIAM SITZ

FOUR NEW public playgrounds in Lebanon offer more than just jungle gyms and slides. Primarily serving people who have been displaced from their homes by conflict, these community spaces, and the architects who created them, aim to engage residents in the entire life cycle of the design.

Architects Joana Dabaj and Riccardo Luca Conti cofounded the nonprofit design studio CatalyticAction in London at the end of 2014, after completing master's degrees in building and urban design in development at University College London. "We saw what impact the Syrian crisis was having in Lebanon and wanted to test how architecture can be a tool to empower communities," says Dabaj, who is Lebanese.

With UNICEF as the primary funder, the firm partnered with two aid organizations to design child-friendly spaces that respond to the needs of displaced people in four cities. Terre des Hommes Italia, an international humanitarian and children's-rights charity, identified sites in Arsal, Hermel, and Barja, while Amel Association International, a nonprofit, nongovernmental organization in Lebanon, selected a location in Qaraoun, where the local municipality has plans for a similar but larger project.

Community input is central to the design process. Working with local collaborators to do outreach, CatalyticAction held workshops for children, youth, and adult caregivers in each city, leading participants through activities, and holding conversation and feedback sessions to learn what features they needed and desired. "Even though these are child-friendly spaces, you need to take into account the other users," explains Dabaj. "If a child



goes to the park, he'll go with his parents or older siblings, so what are they going to do while they're there?" In one location, where the population included many people with disabilities, "We reached out to a very small local organization and held an activity with them," says Dabaj. "We wanted to understand what it would mean for this population to access such a space and what elements we should include to encourage them."

The play structures in each park vary, depending on the feedback, but include everything from spinning cubes and nest swings to wheelchair-accessible slides—essentially, a human-sized conveyor belt framed by

a series of handlebars.

CatalyticAction designs all of the equipment, which would be prohibitively expensive to purchase or import, and instructs local contractors in how to make it all using local materials. "We found a factory in Lebanon that creates customizable rollers, usually for airports, and asked them to make a version for our accessible slide," says Dabaj. "They didn't

The playground in Qaraoun (top) frames views of Mount Lebanon. At the park in Barja (middle), just south of Beirut on the Mediterranean coast, play structures cast shade on seating areas. An accessible slide (left, at right) is a highlight of park in Hermel.



know what that was but said, 'Please send pictures!'"

The importance of the project extends beyond the built environment. "We're trying to empower these communities and make them active agents, engaged in the process of creating something that will benefit them," says Dabaj. "There's a sense of autonomy."

In addition to creating public projects, the small team at CatalyticAction conducts research on empowerment through architecture. The firm recently won a grant to create a toolkit, based on their work, about how to codesign social infrastructure for and with people affected by displacement. The biggest takeaway is easy to sum up, says Dabaj: "The most important thing is a feeling of belonging." ■



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Taliesin Closure Sparks Controversy

BY ALEX KLIMOSKI

IN LATE IANUARY, the School of Architecture at Taliesin (SoAT)-the educational academy first established by Frank Lloyd Wright at his 800-acre family homestead near Spring Green, Wisconsin-announced that it will officially close its doors this June. Since it was founded in 1932, the school had evolved from an apprenticeship program, called the Taliesin Fellowship, which gave aspiring architects the chance to live at the estate and study under Wright, to an accredited three-year graduate

Although the school has historically maintained small enrollment numbers (its current capacity of about 30 students represents the upper threshold), the news of its closure has caused immense shock and sadness across the architecture community. For over eight decades, the program has offered a holistic curriculum based on Wright's principles of organic architecture, with students living and working alongside each other in a tight-knit DIY community. Since 1937, when the Taliesin

West campus was established in Scottsdale, Arizona, the school has operated seasonally between the two locations, which were named last year to the UNESCO World Heritage List, along with other notable Wright buildings. Over the years, students at Taliesin West have had a long tradition of constructing their own shelters on the property's 600 acres of desert land. "It was a really healthy, intense, 24/7 architectural education," says Cody Johnson, who was a student from 2014 until 2016.

perspective news

According to SoAT's announcement, the closure was the result of an inability to reach an agreement with the Frank Lloyd Wright Foundation, a separate organization that has stewardship of the Taliesin properties. (The two became independent entities in 2017, after the Higher Learning Commission decreed that the school could no longer be an accredited institution while under the auspices of the foundation.) Just hours after SoAT's announcement, the foundation released its own statement, which placed the onus of the deci-

sion on the school. In an e-mail to RECORD, Jeff Goodman, vice president of communication and partnerships at the foundation, stated that "the school has consistently failed to meet projections for enrollment, philanthropy, and earned revenues." But, also speaking to RECORD, students and recently departed staff describe the school as being as robust as ever, and even growing under the leadership of president Aaron Betsky, who came on as dean in 2015 and helped raise \$2 million for its independence. (Betsky had announced his plan to resign at the end of the semester.) Victor Sidy, who was dean from 2005 until 2015, says that the school "was finally on the path of cruising towards altitude." Alexandra Moquay, who left her post as SoAT's director of development last month, claims that the foundation's financial support of the school has been primarily in the form of \$1 per year rent for the use of its properties, as stipulated in the Memorandum of Understanding instated when the two organizations separated. But Goodman



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emphasized the importance of its donation, stating that, without it, "the school would never have been able to operate."

Several current students have told RECORD that, since the announcement, the foundation has acted aggressively toward them, for instance by incrementally restricting their use of certain spaces, and insinuating that pos-

sible legal action could be imposed upon them for speaking out against the closing of the school. Goodman calls these claims "entirely untrue."

Sidy and others have commented that the school's closing could have been avoided had the foundation been more committed to its survival. Michael Rust, treasurer of the Talie-

A student works at Taliesin's campus near Spring Green, Wisconsin,

sin Fellows, the school's alumni association, says that his organization was "not even given a chance to try and help."

Going forward, the foundation has indicated its plans to "advance Wright's legacy" by hosting K–12 and adult-education programs at the Taliesin campuses, but advocates for the school say that its founder intended to train architects for practice—an endeavor that could not be met by initiatives such as those proposed by the foundation. "It is my opinion that the consequences of the closure are so much greater than the foundation anticipates," says former student Johnson.

Both organizations say they are exploring options for current students to become accredited at a local university, such as Arizona State University, but, as of press time, details have not been confirmed. A current student told RECORD on behalf of her colleagues, "We've dedicated time, money, and hard work at Taliesin. While we are grateful that other universities have reached out to us, it is really not an adequate solution to say we can simply resume our education elsewhere."



[CLIMATE CHAMPION]

Julie Hiromoto

ARCHITECT JULIE Hiromoto, a director with HKS, has focused much of her career on sustainability and advocacy for it within the profession. She founded the Sustainable Knowledge Network at SOM, which endeavored to green the firm's operations, and was instrumental in launching the Center for Architecture Science and Ecology, a research consortium, founded by SOM and Rensselaer Polytechnic Institute, between academics, design professionals, and manufacturers.

As a representative of the AIA, and in her capacity as chair of the Committee on the Environment, Hiromoto testified before the U.S. House Energy & Commerce Committee's Energy Subcommittee in mid-February, discussing aspects of the Energy Savings and Industrial Competitiveness Act of 2019. The bill, H.R. 3692, aims to promote energy savings and emissions reductions by supporting the use of energy-efficient technology in residential, commercial, and industrial sectors. The Dallas-based architect spoke with RECORD about the AIA's stance on this legislation.

First, tell me about your role at HKS. What do you do as the "Firmwide Director of Integration"?

HKS has made a lot of investments outside of plain vanilla architecture, for lack of a better word. We have health-care clinicians on staff, a research group, parametric and digital designers, construction and fabrication experts. But sometimes those silos get in the way of communication and collaboration. If we really want to leverage all of our unique, diverse perspectives and experiences, we have to be more purposeful in coming to learn what we can from each other so that we're not reinventing the wheel.

Last year for me was about listening and learning, trying to establish the baseline and understand where the opportunities to effect meaningful change might be. In 2020, I'm rotating around several of our practices and embedding myself with those teams to understand the specific solutions that work for their client types or project demands, then find ways to translate those lessons across the larger firm. It's a grassroots-focused approach to integrating the firm's diverse expertise. Let's talk about H.R. 3692. While the AIA supports parts of the bill, it has taken a clear

perspective**news**

stance against one provision that would repeal a current policy-section 433 of the Energy and Security Act of 2007-which sets targets for the reduction of fossil-fuel use in new federal buildings by 2030. Tell me more about that.

Some people would say that the AIA has taken a very controversial position. Why would we oppose this House resolution when it includes many important commitmentswhether it's research for energy-efficient building systems and technology, education and training, or building codes? But, really, it's a matter of principle. If the goal is a net zero carbon economy [or better], we have to act with urgency.

The AIA made a purposeful effort last year

when the board decided to rally all of our resources, tools, staff, and energy around this one big thing: climate action. I think some people would say that section 433 is the most important piece of climate legislation in the last 20 years, when it comes to the building industry. It includes clear step targets that were established to reach an audacious goal for federal buildings: zero carbon. Repealing that won't get us there.

This seems like a bold move for the AIA.

Yes, it represents a huge attitudinal shift, one I've personally experienced within the last year. I sit on the Strategic Planning Committee, led by chair Brian Frickie, and going through the process of writing a plan for 2021 to 2025 has been enlightening. Historically, the AIA has wanted to serve all of its members equally-to represent everyone. But the Strategic Planning Committee has put a stake in the ground, saying that, if urgent and sustained climate action is important to us, we can't keep everybody happy and satisfied. We need to do what's right, and maybe we'll lose some members along the way. But we'll also gain some, and we're doing what's important for necessary change in the world. In your testimony, you said that when it comes to moving toward renewable energy sources, "Large-volume and iconic projects must lead the way, as they have the unique ability to capture the public's imagination."

Civic buildings are beacons of the institution of government, throughout our global distributed communities, so they are iconic in that sense. And, when you look at the federal building portfolio, the General Services Administration is one of the largest domestic landlords. They have a huge opportunity for leadership, because of their massive purchasing power and storylines. People are paying attention to that.

noted

Firms Announce New Offices and **Innovative Acquisitions**

WXY architecture + urban design will open a new office in Washington, D.C., led by Kushan Dave. Perkins and Will is expanding into Dublin, with a new practice led by Justin Treacy and Lydia Collis. NBBJ has acquired New York-based experiencedesign firm ESI Design, led by Ed Schlossberg. ESI becomes the global firm's 18th studio.

Designers Named for Serpentine Pavilion and Coachella Installations

The lawn of the Serpentine Gallery in London will host a temporary structure by Johannesburgbased Counterspace from June 11 to October 11. The three women who lead the firm are the voungest architects ever to be commissioned for this international program, now in its 20th year. In April, Architensions, based in New York and Rome, will create an installation for the Coachella Music and Arts Festival in California.

France Will Require New Public **Buildings To Be Mostly Organic**

President Emmanuel Macron announced a climateaction plan for the country, which mandates that by the year 2022 all new construction financed by the French state be made from at least 50 percent wood or other sustainable materials.

China Builds Two Hospitals for Virus Patients in Under Two Weeks

The novel COVID-19 epidemic, which began in Wuhan, prompted the government to build two medical facilities in record time. The first, called Houshenshan, has 1,000 beds, and Leishenshancompleted just three days later-has 1,600.



Billings Continue Growth in 2020

The Architectural Billings Index rose slightly in January, from 52.1 (seasonally adjusted) in December to 52.2. (Scores over 50 indicate an increase in billings.) New project inquiries and new design contracts also remained positive.

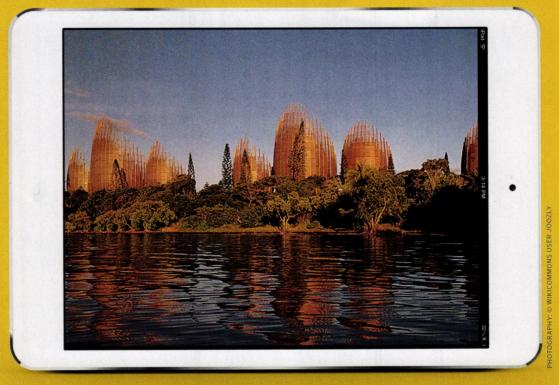


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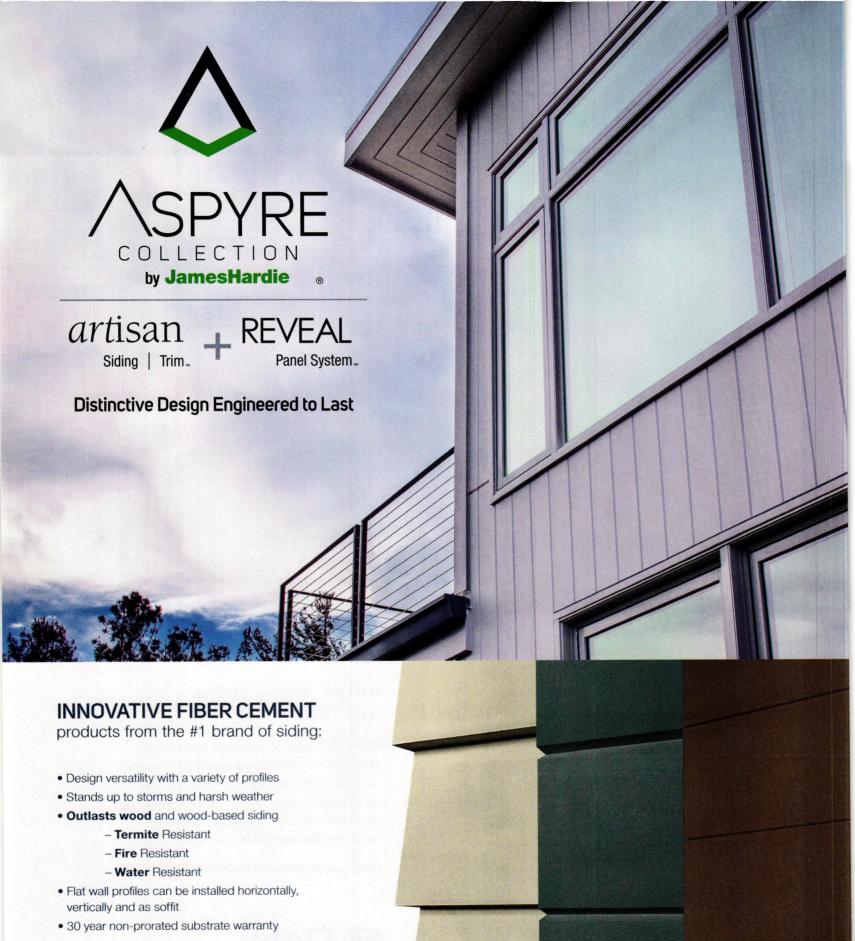


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A LARGE FAMILY RESIDENCE BY EZEQUIEL FARCA + CRISTINA GRAPPIN NESTLES INTO A VERDANT HILLSIDE WITH GRACE. BY LINDA C. LENTZ



PRIVACY WAS IMPORTANT to the young professional couple who purchased a 75,000-square-foot hillside property on the outskirts of Mexico City. They wanted to be far enough away from the crowded metropolis to enjoy nature, yet close enough for workday commutes and frequent weekend visits from friends and family living in the city.

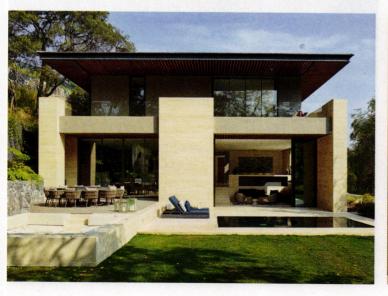
"We immediately fell in love with the site because of its majestic trees," says Cristina Grappin, who, along with partner Ezequiel Farca, was hired to design the house and its interiors. Their strategy was to place the house near the top of a hill, which would be a construction challenge, but it allowed great views of the surrounding forest and mountains. The plan, developed to correspond with the topography, features two volumes slightly angled on the north-south axis to avoid cutting any large trees.

The clients asked for a residence that would accommodate two young children and the husband's vintage-car collection while respecting its surroundings. "The couple showed us pictures of different styles of

The 15,000-square-foot residence (above) was sited near the top of a hill to avoid damaging trees and to maximize views. To accommodate frequent visits by friends and family, the architects devised a pair of spaces for entertaining on the ground floor of the south wing. These open to a patio (below, left) with a firepit and small infinity pool-cumjetted tub, and include a bilevel living/dining area (below, right) and adjacent media room.

architecture, including classical," says Grappin. "We understood what they liked about each image: it had nothing to do with style but with use. Therefore, we took a risk and designed a contemporary house." In doing so, the architects employed seemingly antithetical design strategies, integrating understated luxury and sustainability.

While large (15,000 square feet), the house, whose rectangular concrete-block volumes are clad in a local travertine, appears to succeed at both of these objectives. Farca and Grappin specified autoclaved aerated blocks, known for their insulating properties, and a rainscreen facade system to hold the travertine, thereby increasing thermal performance. Additionally, working with a bioclimatic consultant, the





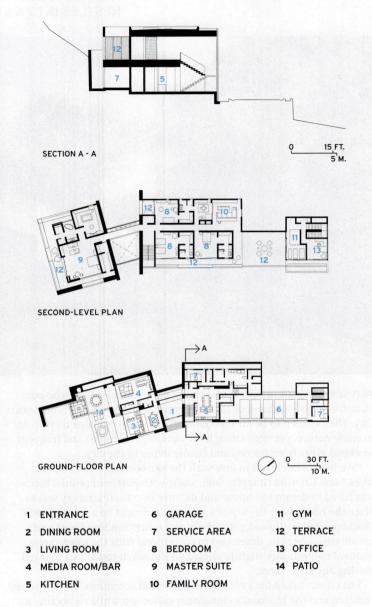


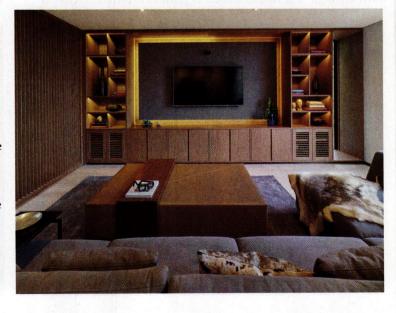
A floating limestone stair (above) adjacent to the home's spacious foyer is enclosed in glass, and leads to the family's private quarters on the second level, where the master suite, bedrooms, play area, and family room (below, right) are located.

architects created a high-performance building by installing photovoltaic panels on the roof and employing a graywater system for landscape and toilet needs. The placement of the fenestration, along with operable windows, helps with passive cooling, so there is no need for air-conditioning, and, because of the temperate climate, hydronic radiant-floor heating beneath the limestone floors provides ample warmth.

Divided into public and private zones, the house flows easily from a south-facing patio-really an extension of the adjacent living/dining and media rooms-through a gracious double-height foyer and into the family-sized kitchen. Limestone flooring unifies the entire ground level, inside and out, and the same travertine used on the exterior appears on many of the interior walls. Upstairs, the family's private quarters are split by a bridge that overlooks the foyer and connects the two volumes, with the master suite occupying the smaller south side, and three bedrooms with baths and terraces, plus a family room on the north. A terrace above the garage leads to an office and a gym.

The house, completed last year, has been quite successful with the family, says Grappin, adding, "The husband often works at home now, because, he says, he doesn't want to leave."









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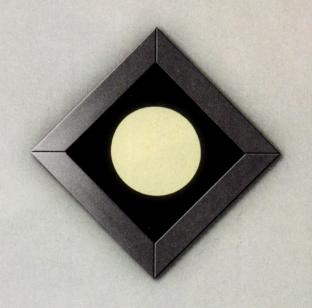
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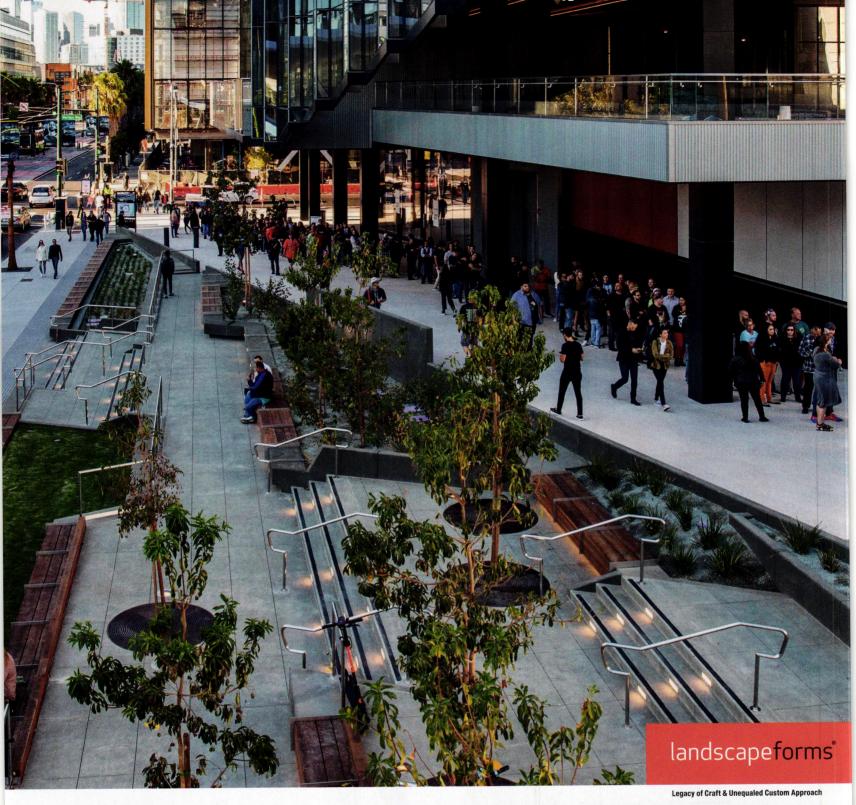
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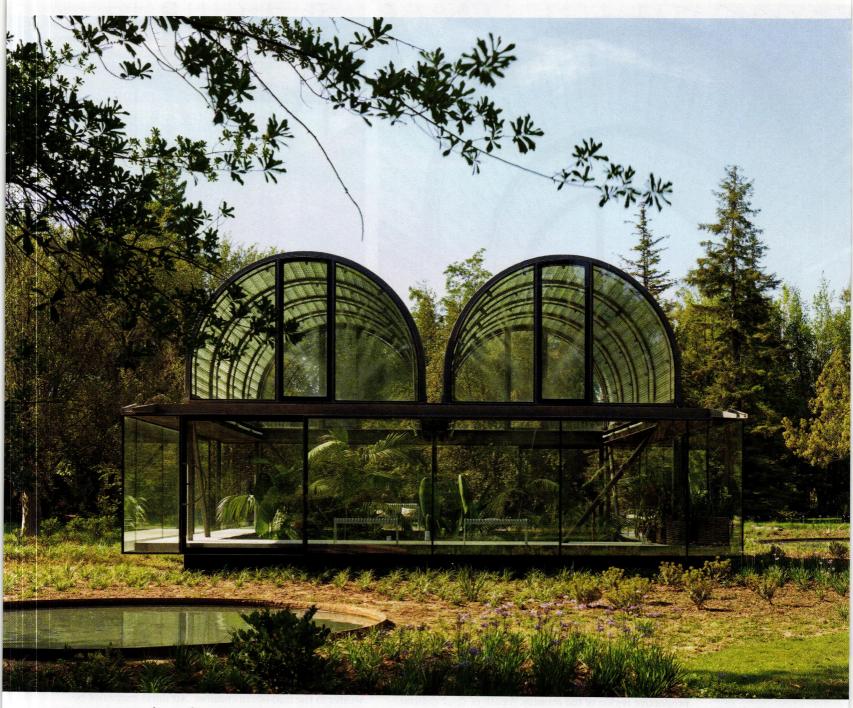
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PAST RECORD VANGUARD MAX NÚÑEZ BRINGS A VERDANT OASIS TO A SUBURBAN RESIDENCE IN CHILE, BY MIRIAM SITZ



SOME 10 MILES southeast of Santiago, Chile, in the mountainous municipality of Pirque, 2017 Record Vanguard firm Max Núñez Arquitectos has designed a greenhouse just steps away from a repeat client's suburban home. A study in contrasts, the rational, precise structure brings a lush jumble of tropical plants to an area straddling the border between bustling city and semi-arid mountainous countryside.

Architect Max Núñez envisioned the greenhouse as both machine and looking glass. "What you see is actually the way it works," he says. "We didn't want to add any other elements than those appropriate for a greenhouse." The design also creates multiple perspectives for observation: "From inside, you can see the natural beauty that surrounds you, but you can also enjoy it from the outside looking in, like a jewel box."

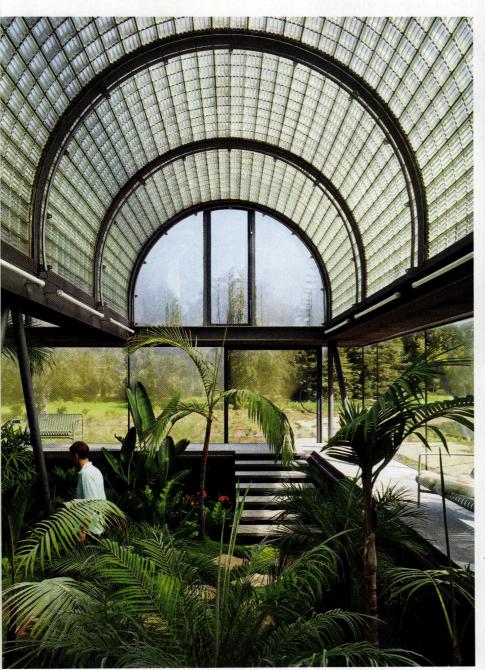
PHOTOGRAPHY: © ROLAND HALBE

Each side of the small, square building measures roughly 40 feet,

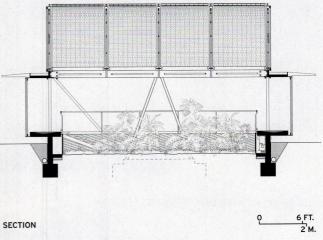
Two glass-brick vaults form the roof of the greenhouse, which is elevated 28 inches off the ground to create space for future landscaping along the building's perimeter.

with expansive glazing and operable windows on every facade. Supported by a skeletal steel structure, the greenhouse is topped off with a pair of dramatic vaults rendered in glass brick. The bricks are smooth on their exterior face but have a gently fluted surface facing the interior, which serves to diffuse the sunlight that hits the plants.

The Santiago-based architect, who founded his studio in 2010, began designing the Pirque greenhouse in early 2018 for a retired businessman who loves plants but had no experience with tropical flora. (Landscape architect Juan Grimm is working with the client on the plantings.) Situated some 500 feet from the main house and primary







along expansion joints in the vaulted ceiling (above), the sprinkler system's atomizer nozzles spray a fine mist of water (previous page). LED tube lights line the roof beams (top, right).

Poking out of pipes

residence (Núñez had previously renovated the man's apartment in the city), the site is located within a viticulturally productive region of the country. A path of large natural stones, sourced from the nearby mountains, leads to the elevated volume, raised more than 2 feet off the ground.

Within the greenhouse, a 4-foot-wide walkway along the interior perimeter encircles a 27-by-27-foot sunken pit. A small staircase leads down to the garden floor. The vaulted ceiling rises to just over 20 feet high, creating space for larger plants to grow tall. Two thin structural columns meet in the center, forming an inverted V that supports the central roof beam. "I wanted everything to feel lightweight, so that when you're inside, you don't perceive it as a very heavy structure," says Núñez. "Rather, the idea is that the plants support the roof."

An integrated heating, ventilation, and irrigation system

keeps interior temperature and humidity stable throughout the year, where the mild seasons vary from the mid-30s in winter to the mid-80s in summer. Air ducts concealed beneath the promenade supply warm air; windows placed at the corner of each wall provide a cross draft; and microsprinklers installed along the arches of the vaults spray a fine mist of water. The three systems are electronically coordinated and automated. The windows, for instance, open automatically when the interior temperature exceeds 68 degrees Fahrenheit. "For greenhouse technology, it's quite simple," says the architect.

The symmetrical, square building stands in contrast to both its contents and its surroundings. "The idea was to create something that interacts with and challenges what's growing inside," says Núñez. "The illusion is of control over nature-something you cannot control." ■



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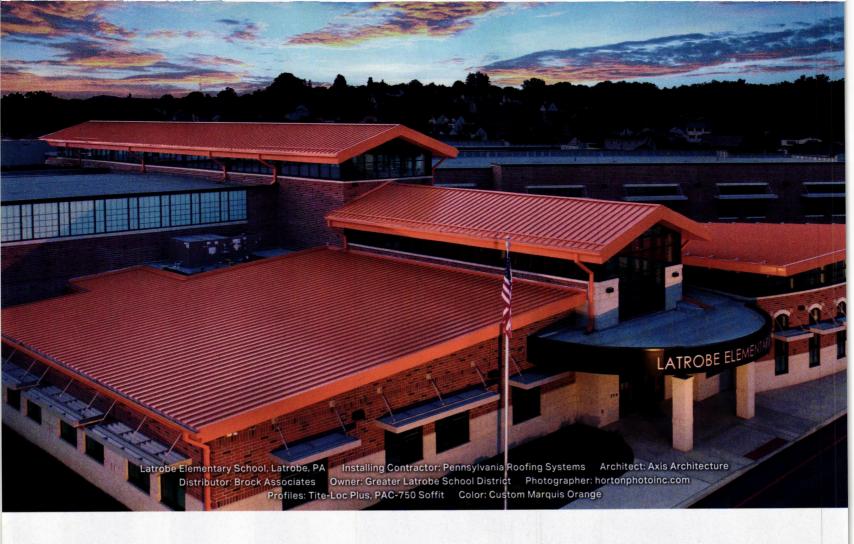
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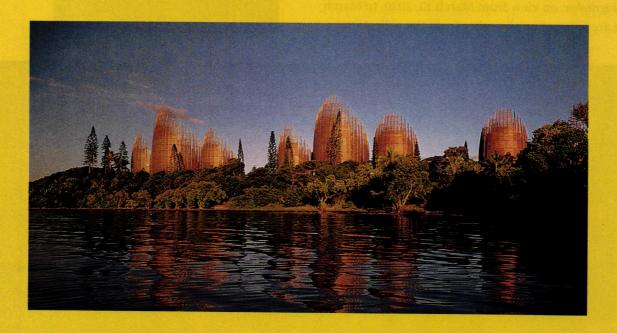
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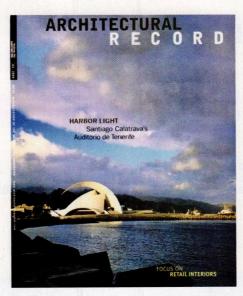


The architect for the Buffalo State Asylum for the Insane is Henry Hobson Richardson, who designed the sandstone complex with Romanesque Revival features in 1881. The asylum, now a National Historic Landmark, has since been converted into the Richardson Olmsted Campus, in which one part, the Hotel Henry, was renovated by Deborah Berke Partners in December 2016.

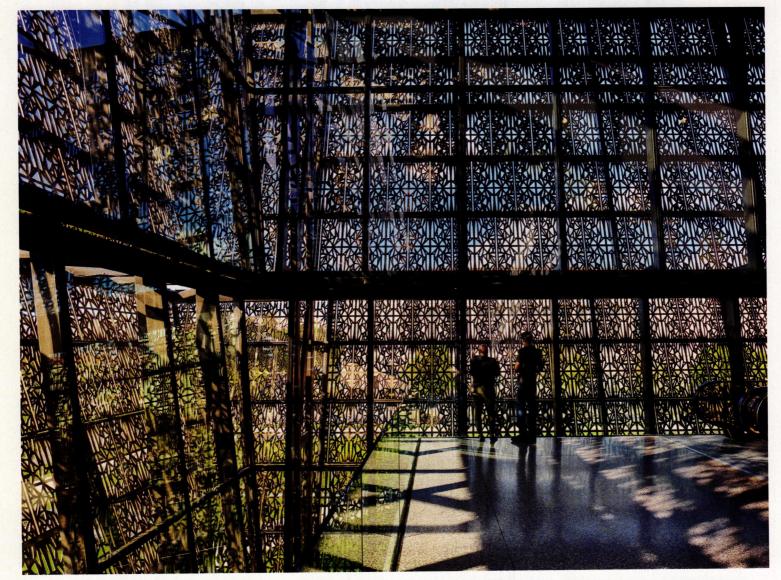
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The Architects' Photographer

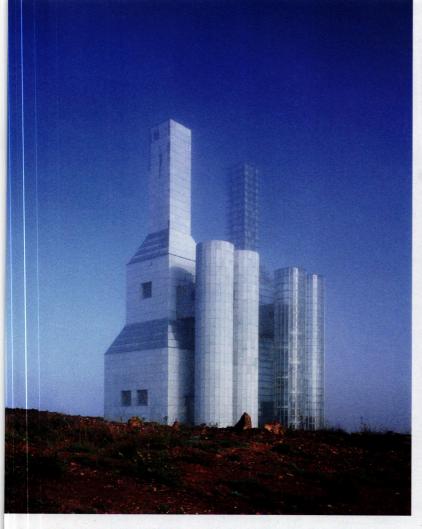
ALAN KARCHMER began photographing while in architecture school. "Everything about photography came naturally, while I struggled with design," he says. Little more than a year into his architectural practice, he shot the Stafford House in New Orleans by Errol Barron/Michael Toups Architecture, which was published in Record Houses in 1980. His work has been featured in the architectural press worldwide—including our pages—ever since. In celebration of Karchmer's planned donation of his archive to the National Building Museum in Washington, D.C., the museum has mounted the exhibition Alan Karchmer: The Architects' Photographer, on view from March 13, 2020, to March 21, 2021. Here are some of our favorites from the collection.



AUDITORIO DE TENERIFE This shot of Santiago Calatrava's performing-arts building in Spain made the cover of Record's February 2004 issue. The commission followed Karchmer's work on the Milwaukee Art Museum, which he photographed for Record in 2002, and led to numerous jobs with the architect in the following years.



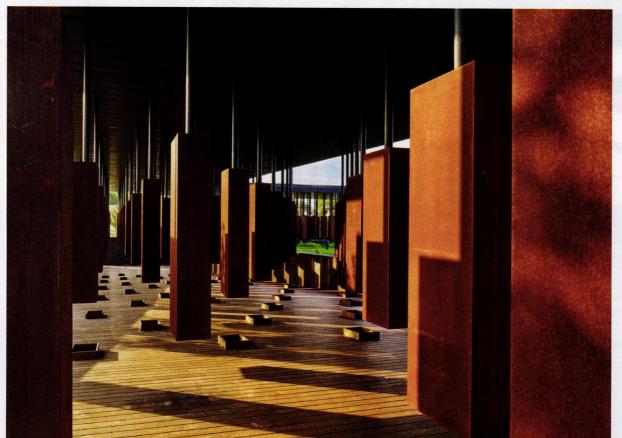
NATIONAL MUSEUM OF AFRICAN AMERICAN HISTORY AND CULTURE Karchmer was commissioned by the Smithsonian to create a comprehensive portrait of the latest addition to Washington, D.C.'s National Mall by Freelon Adjaye Bond / SmithGroup (2016). He shot the scrimlike "corona" from the interior to communicate its powerful presence.



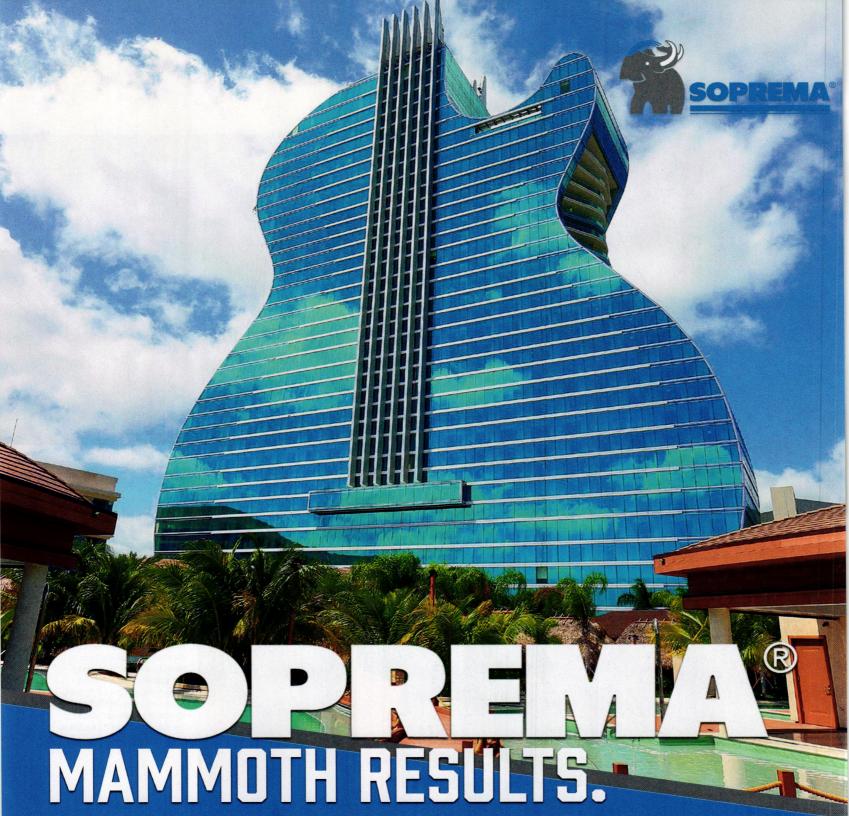
HEJDUK MEMORIAL TOWERS In 2003, when Karchmer photographed this posthumous project by John Hejduk, in Peter Eisenman's City of Culture Galicia in Santiago de Compostela, Spain, the morning fog was beginning to clear. "The ethereal light reinforces the mystical character of Hejduk's work," says the photographer.



TANGLEWOOD HOUSE 2 To capture the context and dramatically thrusting cantilever of this house in Western Massachusetts by Schwartz Silver (2008), Karchmer backed up to a spot with a direct sight line through a clearing on the densely wooded plot.



NATIONAL MEMORIAL FOR PEACE AND JUSTICE
For MASS Design's memorial in Montgomery, Alabama (2018), Karchmer composed this photograph, which presents the suspended weathering steel monuments at eye level, to convey the magnitude of the structure's scale and depict the significance of its vastness.



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Calling Mr. Sandman

Artist Costantino Nivola worked closely with a who's who of modernist architects.

BY CATHLEEN MCGUIGAN

WHEN WE imagine how art connects to architecture, we tend to think of, say, a mural commissioned for a skyscraper lobby or an immense sculpture parked outside-like the epic Mark di Suvero perched next to Renzo Piano's Daimler Chrysler building in Berlin or the looming Richard Serra guarding the entrance to Tadao Ando's Modern Art Museum of Fort Worth.

But Costantino Nivola (1911-88) was an artist of a different sort, whose work with some of the greatest architects of the 20th century was more subtle and closely engaged with the buildings themselves. His muscular sculptures and reliefs-of abstracted forms and figureswere often integrated directly onto exterior walls. He worked largely in sand-cast or carved concrete, which complemented the tough materiality of the modernist structures and urban spaces he enlivened. Yet, as the critic Ada Louise Huxtable argued, Nivola played off architecture, rather than deferring to it, bringing texture and complexity with works that more than matched their host buildings with a sense of timelessness.

Though he was extraordinarily prolific, Nivola is not nearly as well-known as he should be. An exhibition at the Cooper Union in New York may begin to remedy that. Called Nivola in New York: Figure in Field (through March 15), the gracefully installed show highlights a range of the artist's works, particularly in New York City, where he created 21 public projects, of which at least 17 survive-for schools, plazas

Nivola circa 1955 (right). The mold-for a maquette for a relief-is in the Cooper Union show. An ensemble of Nivola sculptures (below) on a 1955 Manhattan apartment building's courtyard wall, designed by Raymond Lowey.

perspective exhibition

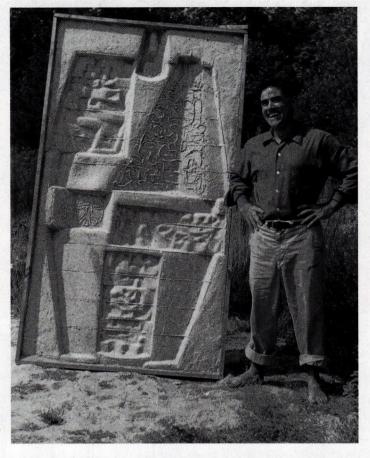
and civic buildings. The show's curators, Steven Hillyer, director of the architecture archives at Cooper, and architect Roger Broome, also have published a guide to visiting those extant works throughout the city's five boroughs.

Nivola was born in Sardinia, the son of a mason, and studied design in Monza. After working for Olivetti's

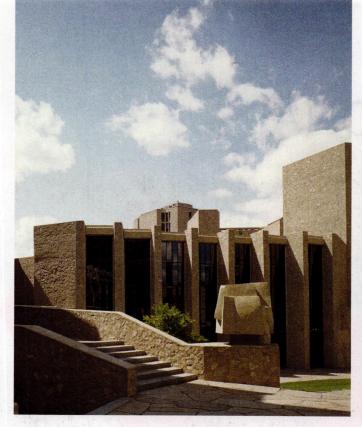
publicity department in Milan, he and his designer wife, Ruth, who was Jewish, fled Italy, landing in New York in 1939. Tino, as he was known, became part of the then-small art world in Greenwich Village, supporting his family as a magazine art director (including for Interiors and Progressive Architecture). Later, the Nivolas moved to the Springs, on the East End of Long Island, where their neighbors included Jackson Pollock. It was there, in 1949, playing with his children on the beach, that the artist began developing his technique of

sand-casting-making molds of wet sand into which he poured plaster or concrete. He also worked in the ancient technique of sgraffito, scratching designs through layers of cement.

His first major commission was in 1954, for the Olivetti showroom on Fifth Avenue: a wall relief 75 feet long and 15 feet high. Richly modeled and textured, it was neutral in colorperhaps so as not to compete with the lavish décor by the Milanese firm BBPR, with its curving marble pedestals rising out of the green marble floor like stalagmites, each one









topped by a single typewriter. When the showroom closed in 1970, the relief was rescued by Nivola's friend Josep Lluis Sert for his Science Center at Harvard. Nivola then applied some color to it, as he apparently always wanted to. A photomontage of the relief—and a wonderful small maquette of it—are central features in the Cooper Union exhibition.

Besides Sert, Nivola collaborated with Eero Saarinen (on the Morse and Stiles colleges at Yale); Marcel Breuer; Pietro Belluschi; SOM; HOK; Raymond Lowey; and Harrison & Abramovitz. With architect Richard Stein, he created a number of the New York works. And with Paul Rudolph and Shepley Bullfinch Richardson & Abbott, he made two sgraffito murals in 1969 for the Hurley building in Boston, which are now under threat of demolition.

The artist was good friends with many of these architects, but one of his closest compadres was Sert, who introduced him to Le Corbusier in a New York restaurant in 1946, when the master was in the city for the United Nations project. Corbu, much older, began to visit Nivola, first in his small New York studio, where, "bourbon in one hand and sketchbook in the other," Nivola recalled, "the tutorial began." Le Corbusier painted every day, and when, in 1951, he visited his protégé in Springs, he painted a mural on the walls of the living room in the Nivolas' old shingled house, where

A sculpture at Saarinen's Morse College at Yale (top, left); the Le Corbusier mural in the Springs (top, right). An 25-foot-long photomontage of the Olivetti mural in the Cooper Union show, with a tabletop sculpture in the center foreground (right).

it remains today (the house is privately owned).

In the 1960s, Nivola continued to create public work, but he also made paintings and smaller tabletop sculptures; the three types of artwork are so different, one can hardly believe they are by the same artist. The bold, frenzied paintings of New York are crazily dense with the energy of people, buildings, and traffic, whereas his refined small sculptures, in polished marble or bronze, have the serene simplicity of ancient Cycladic art.

Those later pieces are in museums and private collections, but Nivola's surviving public work with architects remains available to all of us; it was a matter of principle the artist deeply believed in. "A work in a public place is a civic act," he said. "It has to do with how we live together . . . [and] should create an atmosphere, a quality that goes above the ego of the individual artist." Nivola was a fascinating, versatile artist and humanist whose gifts should not be forgotten. ■



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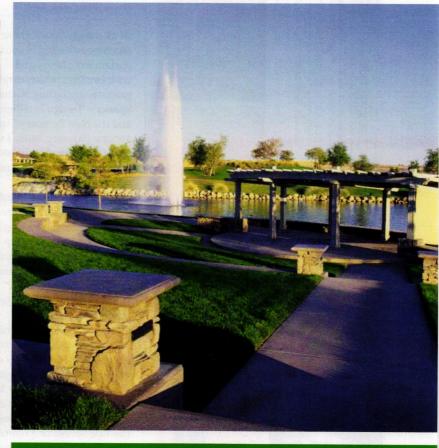


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perspective books

Architectural Theory Makes a Comeback

Designing Social Equality: Architecture, Aesthetics, and the Perception of Democracy, by Mark Foster Gage. Routledge, 131 pages, \$44.95 (paper).

Aesthetics Equals Politics: New Discourses Across Art, Architecture, and Philosophy, edited by Mark Foster Gage. MIT Press, 317 pages, \$34.95.

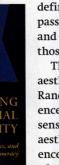
Reviewed by George Baird

IN THE early 2000s, there was much questioning of the importance of theory and criticism for architectural practice-including Michael Speaks's "Design Intelligence and the New Economy" in RECORD (January 2002). I wrote about this situation in 2004 ("Criticality and its Discontents" in Harvard Design Magazine) and argued that any new architectural approach would need a supporting body of theory to help develop design or it would "devolve into merely pragmatic and merely decorative work."

Over the subsequent years, theoretical issues were discussed in academic conferences and publications, but things seemed generally quiet on the philosophical front. Now, with two books by Mark Foster Gage, a New York architect and associate professor at the Yale School of Architecture, both of which investigate aesthetics and politics in relation to social equality, the time might be right to bring this discussion to a professional audience.

The book Gage has written is a slender but ambitious treatise; the other is a companion volume of influential texts by notable contemporary thinkers such as the French philosopher Jacques Rancière, the American philosopher Graham Harman, and Elaine Scarry, a professor at Harvard who has written much on aesthetics and ethics. This compilation also includes shorter commentaries by Gage's colleagues in the design field, including architect and Yale professor emerita Peggy Deamer and Cooper Union architecture professor Michael Young.

In Designing Social Equality, Gage seeks to erase the distinction between the social and the so-called "aesthetic" dimensions of architecture. He argues that aesthetics need not be understood as a question of beauty but can be





defined as that which "encompasses all that surrounds us and our political relations with those surroundings."

This broad definition of aesthetics is a claim that Rancière has made in his reference to the "distribution of the sensible." Although he accepts aesthetics as a sensory experience, his emphasis is on the set of relations between that experience and its interpretation. According to Gage, Rancière's "distribution of the sensible largely describes a condition of access or . . . a measure of distance between what a person can see, say, touch, hear, smell, and feel and to whom they may come in contact with." Rancière's notion of "aesthetic distances," Gage notes, are those that occur between the observer and the object: in the foreground is that which is sensed; in the background is that which can be potentially sensed; and, finally, the third is that which is unknown and unknowable.

This reference to the unknowable or inaccessible opens the door to another major

philosophical construct that has been garnering attention in academic architectural circles and that Gage has adopted-that of "object-oriented ontology," (usually referred to as OOO), as conceived by Harman. His idea of the object is not a simple one, since it combines both what he calls "sensual" objects-ones that can readily be apprehended or "sensed" by a subject, and "real" ones that exist beyond the sensual, and are always withdrawn from human apprehension. In other words, there are architectural objects that indeed appear in the world as sensuous entities, as well as those that embody more mysterious features-and belong to this less accessible state that Harman calls the "real." Harman teaches philosophy at SCI-Arc, where early initiates of his theories are David Ruy,

chair of postgraduate programs at SCI-Arc (whose architecture office, Ruy Klein, is in New York), and Tom Wiscombe, SCI-Arc undergraduate program chair (who has a firm in Los Angeles).

In the early stages of Harman's influence, the objects designed by his architectural followers of OOO indeed evoked considerable perceptual mystery. When they didn't, as sometimes happened, they just looked self-consciously weird. (While Gage doesn't include illustrations in his book, the reader can find an example by Wiscombe in *Log* 33.)

Nevertheless, it is through an appeal to this inaccessible real that Gage and those influenced by Harman want to reinvigorate architecture. To this reader, it is as though they are using Harman's thinking as a sort of analog of Freud's ideas about the human unconscious. Furthermore, OOO's influence in certain architectural circles raises a number of questions. First of all, it has been an axiom of phenomenological philosophy from Edmund Husserl to Maurice Merleau-Ponty that an individual subject's perception does not guarantee access to reality in itself. So Harman's construct, within this philosophical tradition, is not as radical as it might seem. It is true that he polarizes the opposition between "sensual"

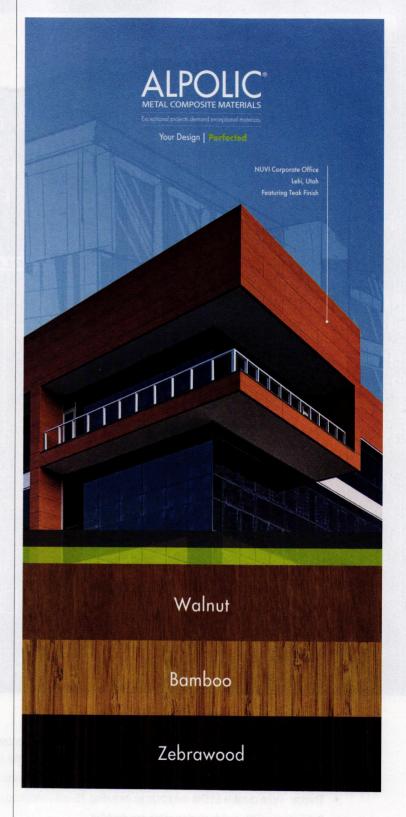
I am not sure that object-oriented ontology offers much more to architecture than a traditional appeal to phenomenology from Husserl, Martin Heidegger, Merleau-Ponty, or Hannah Arendt would be able to do.

objects—those readily accessible to immediate perception—and "real" ones, or the inaccessible, to a greater extent than traditional phenomenology would do. In the end, however, I am not sure that OOO offers much more to architecture than a traditional appeal to phenomenology from Husserl, Martin Heidegger, Merleau-Ponty, or Hannah Arendt would be able to do.

Harman's approach links to Rancière's in his conviction that the estrangement of the unknown makes all perceiving subjects equal because of that inaccessibility. Gage wants architects to "allude to the existence of deeper realities lurking below the surface" in their designs, rather than "distilling big singular ideas into reductively simplistic diagrams or metaphors" such as the current focus on "program" and "sustainability." For this reason, he deplores the current professional and academic focus on program and sustainability as just such "big singular ideas."

In addition to these issues is the one raised by Gage's Yale colleague Deamer in her valuable, wary commentary in *Aesthetics Equals Politics*. Deamer gives short accounts there of a number of current intellectual and cultural tendencies that have flowed, one way or another, from OOO. And she does not fail to note that two of the more obviously political ones have diverged drastically from one another—one to a quite radical, more-or-less Marxist left, and the other to an extreme right-wing libertarianism. This problematic divergence among some in the band of followers of OOO, it seems to me, does not augur well for its future influence in the world.

George Baird is a Toronto architect, author, and critic.



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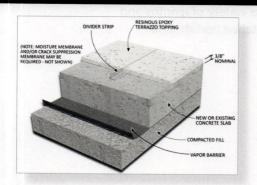
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These materials harness the versatility, performance, and visual appeal of masonry.

By Kelly Beamon

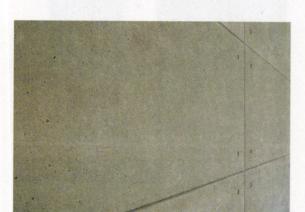
Arctic

Stone-veneer manufacturer Cultured Stone has extended a menu of its popular Hewn Stone earth tone hues to include Arctic, a bright white shade. The 1½"-thick units come in a range of formats including 3" x 8", 3" x 14", 5" x 14", 5" x 22", and 8" x 22". culturedstone.com

Granulated Cement

Safe-manufacturer INKAS has engineered a dust-free granulated cement, to make the material easier for its workers to handle and to increase its shelf life to about one year. (Powdered cement, when exposed to humidity, can harden in months.) A patent is pending for the company's granule-processing technique.

inkas.com



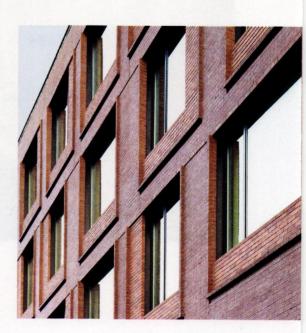
Conclad Collection

What appears to be concrete is actually an alternative made of gypsum and recycled cellulose: Conclad adds an industrial finish to interior walls and ceilings similar to concrete but easier to install. Available in three shades of gray, and in 23" or 46" squares and 23" x 46", 46" x 92", and 46" x 115" panels, the lightweight formaldehyde-free units can be cut with woodworking tools.

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mer and weighing 70% less than full bricks, Meridian Brick's realistic Authintic veneer was designed for easy installation on exterior and interior walls. The versatile units can be specified in Modular (77%" x 2½"), Queen (77%" x 2¾"), and King (95%" x 25%"). authinticbrick.com





Northern Ash

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versettastone.com



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custombuildingproducts.com



Anchor System

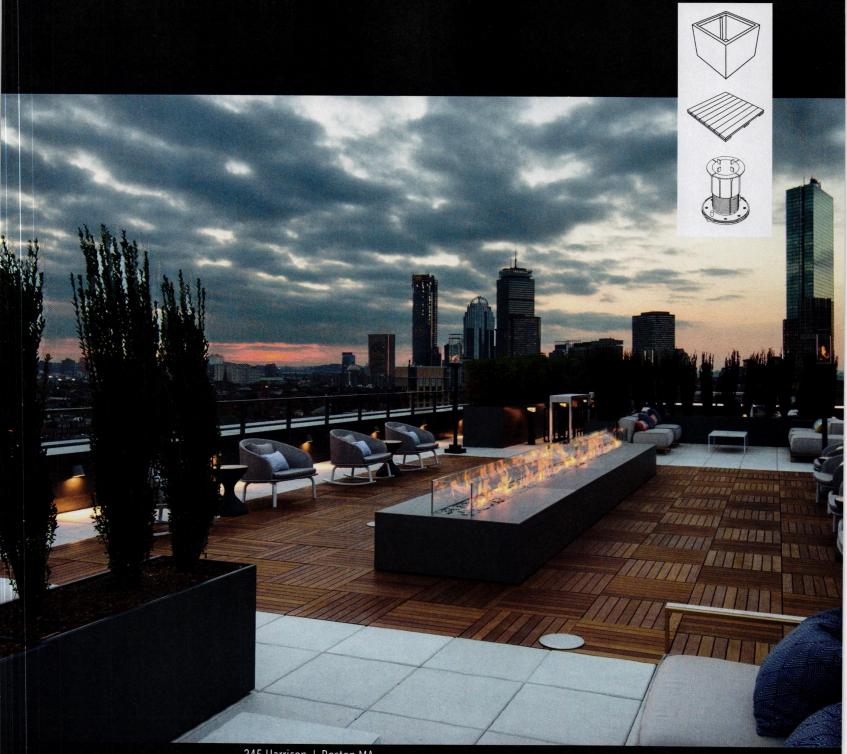
Developed to shore up existing masonry tiles in complex restoration projects, Cintec North America's patented cement-based anchoring system employs a series of wire ties and cementitious grout to bear the load of the tiles that sit behind face brick masonry, within the wall assembly. The company's "microcement" technique is recommended for projects requiring blast protection, seismic reinforcement, and historic preservation.

cintec.com



Mega-Tandem Wall System

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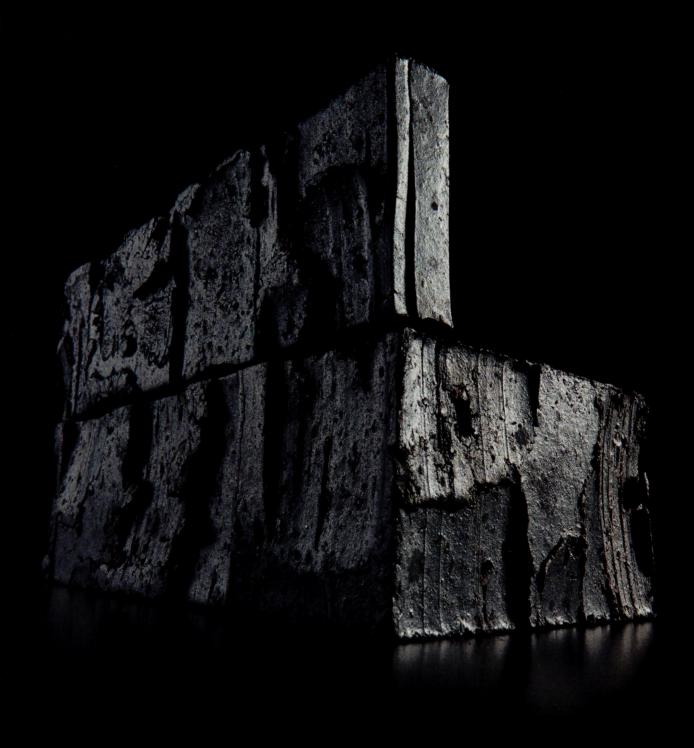


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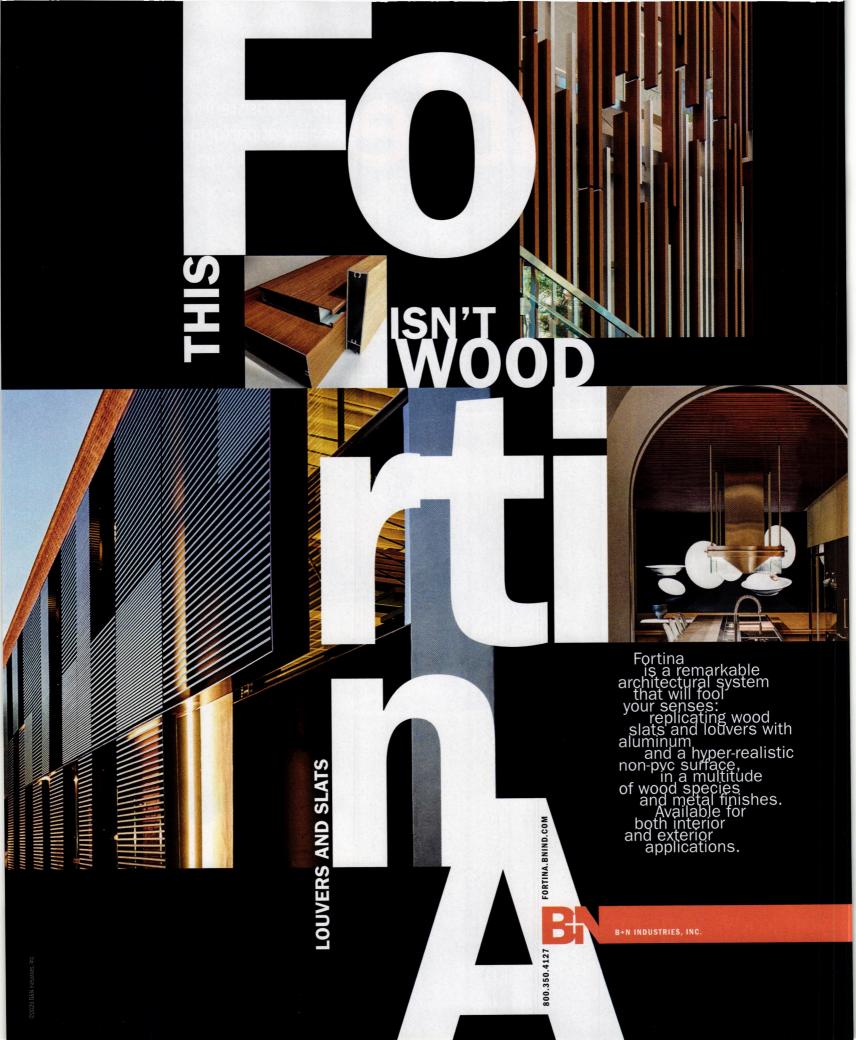


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By Kelly Beamon



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chemetal.com



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linetec.com



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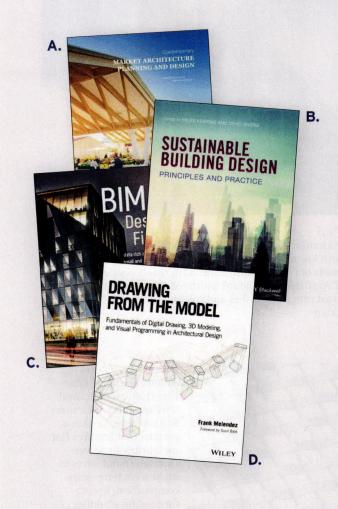
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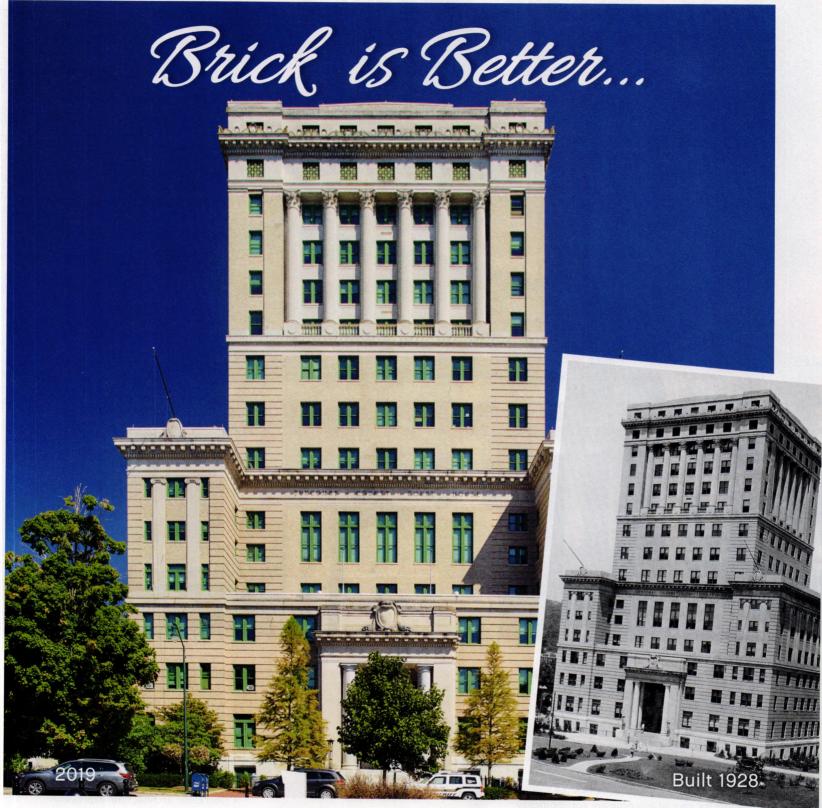
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This book expands on BIM (Building Information Modeling), showing its applicability to a range of design-oriented projects. It emphasizes the full impact that a data modeling tool has on design processes, systems, and the high level of collaboration required across the design team. It also explains the quantitative analysis opportunities that BIM affords for sustainable design and for balancing competing design agendas, while highlighting the benefits BIM offers to designing in 3D for construction. The book concludes with a deep look at the possible future of BIM and digitally-enhanced design.

D. Drawing from the Model: Fundamentals of Digital Drawing, 3D Modeling, and Visual Programming in Architectural Design - \$79.00

Drawing from the Model: Fundamentals of Digital Drawing, 3D Modeling, and Visual Programming in Architectural Design presents architectural design students, educators, and professionals with a broad overview of traditional and contemporary architectural representation methods. The book offers insights into developments in computing in relation to architectural drawing and modeling, by addressing historical analog methods of architectural drawing based on descriptive geometry and projection, and transitioning to contemporary digital methods based on computational processes and emerging technologies.



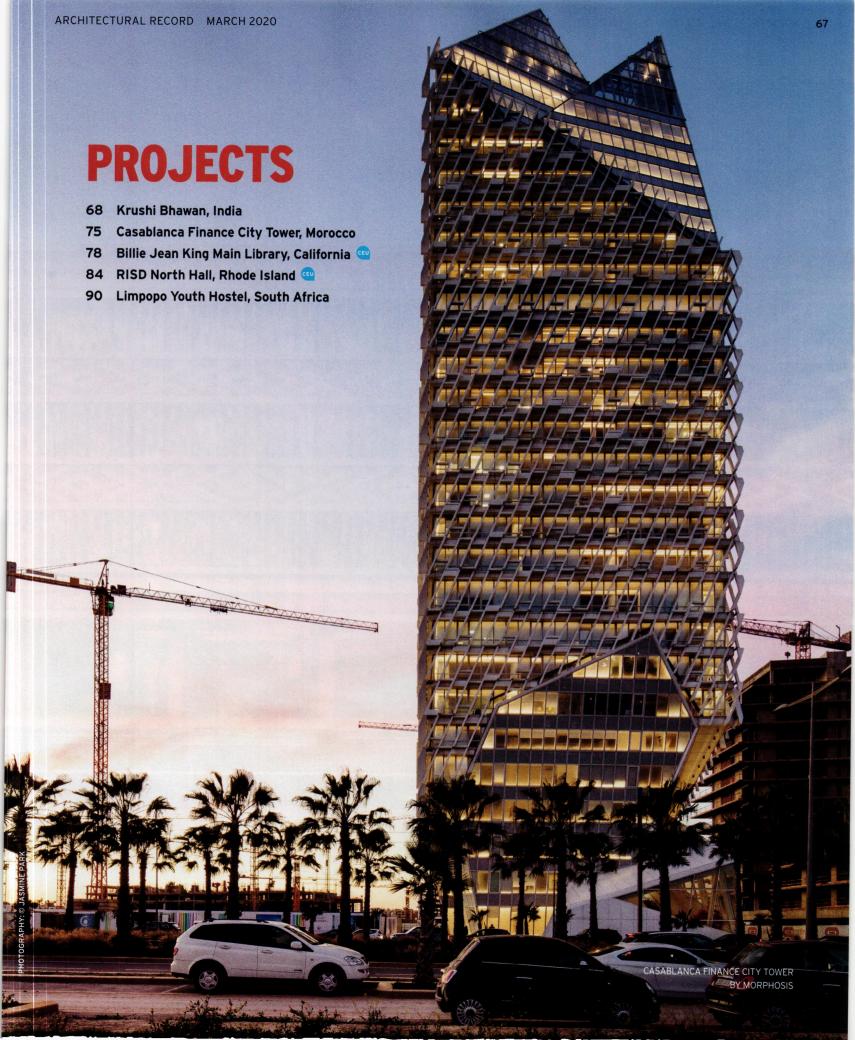
TIMES CHANGE BUT

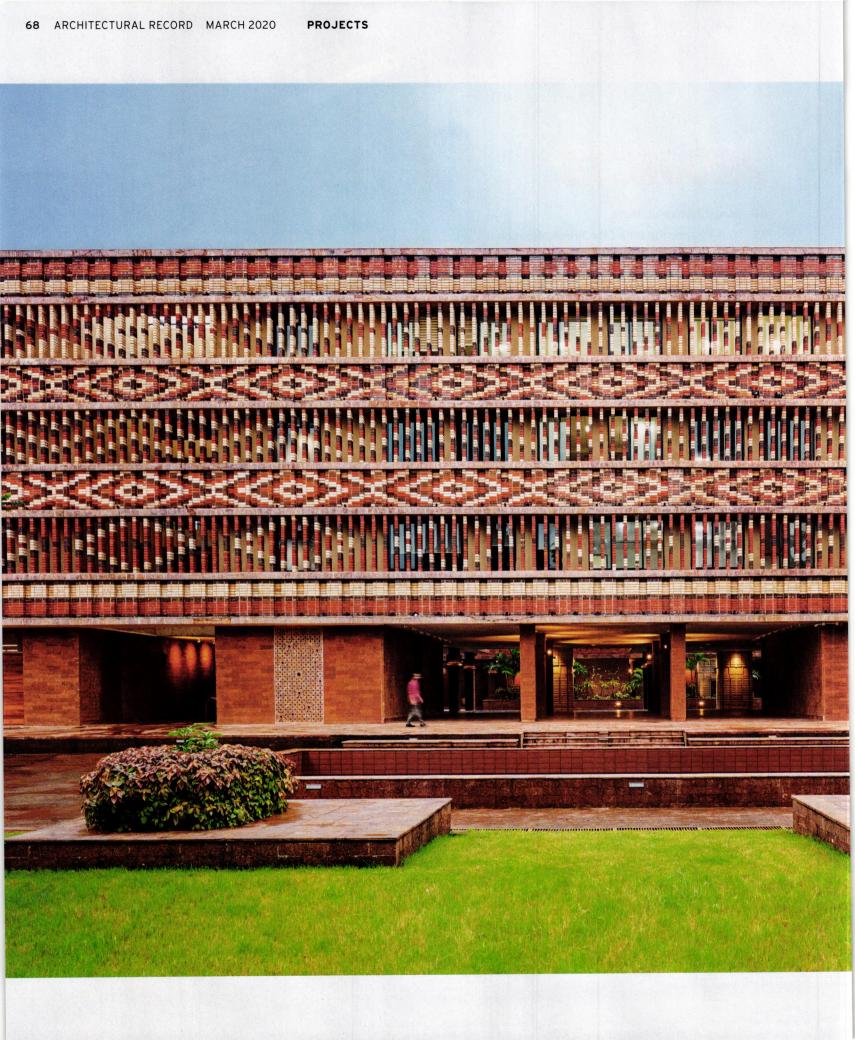
Brick is Timeless.

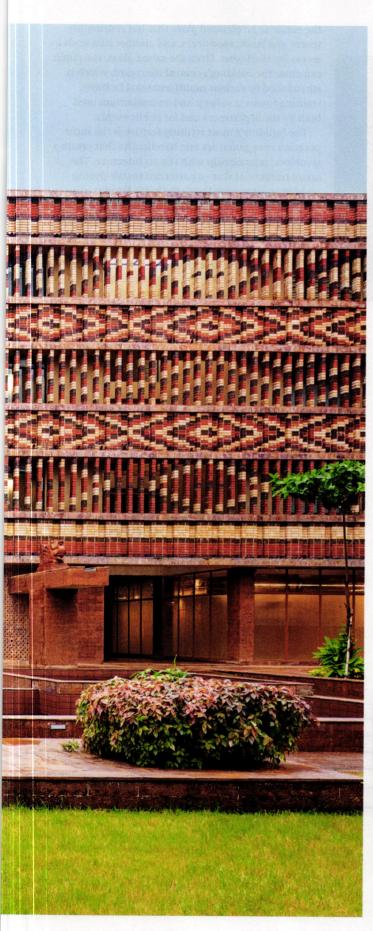


The Standard of Comparison Since 1885 beldenbrick.com









Krushi Bhawan | Bhubaneshwar, India | Studio Lotus

Artisanal Architecture

An unusual government building embraces local culture and traditional crafts.

BY APURVA BOSE DUTTA

PHOTOGRAPHY BY ANDRE J FANTHOME

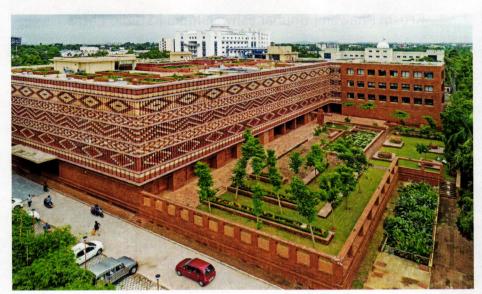
THE CLIENT for the Krushi Bhawan, a government office building in eastern India, had a very different notion at first about the project. "We initially envisioned a typical glass office building," admits Srinibas Naik, speaking for the Department of Agriculture and Farmers' Empowerment in Bhubaneshwar, the capital of the state of Odisha. "But gradually we warmed up to this unconventional design." When Studio Lotus, the Delhi-based architecture firm, got the commission, they took the brief and radically developed it, creating a low-rise redbrick facility that embraces local traditions, deeply engages the public, and tackles climate concerns—all of which are seldom inspirations for modern government buildings in India. Located in the center of the city, near other state facilities, the Krushi Bhawan sits in a garden and is open and inclusive. "We wanted to provide a well-lit and ventilated building, as well as explore the connection of the city to the building's interiors," says Sidhartha Talwar, design principal and cofounder of Studio Lotus. "All of this is missing in the nearby office buildings."

The plan of the four-story, 140,000-square-foot concrete structure is based on a grid of approximately 15 feet by 15 feet. The main floor is accessible to the public, while the government offices are on the upper floors; a roof terrace will eventually be accessible for training purposes. From the main gate are two pathways—one for



SCREEN TIME The open brick facade uses a pattern inspired by a vernacular textile-dying technique (left), while the porous wall encircling the raised plaza (above) helps make a connection to the street.

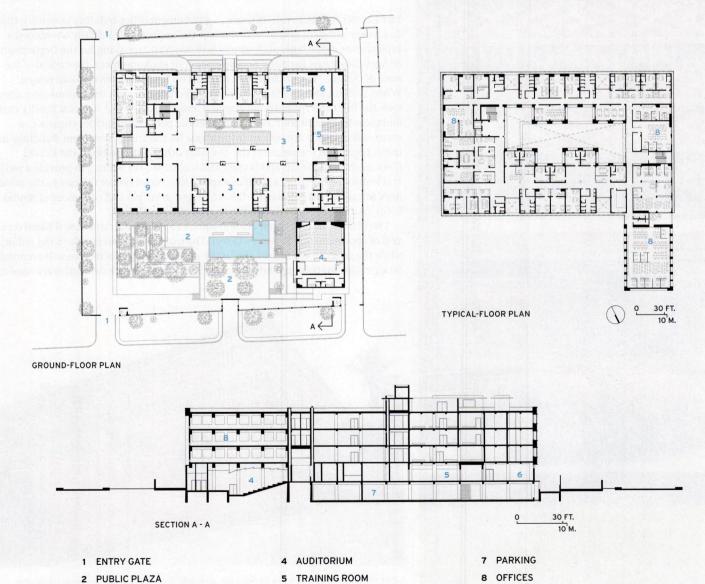
3 CENTRAL COURT



the public to an elevated plaza that has community spaces and landscaped areas, and another that leads to access for employees. From the raised plaza, the public can enter the building's central courtyard, which is surrounded by various multifunctional facilities, training rooms, a gallery, and an auditorium used both by the department and for public events.

The building's most striking feature is the incorporation of regional art and handicrafts that create a symbiotic relationship with the architecture. The area's traditional ikat—a patterned textile-dyeing technique—is mapped onto the brick facade with remarkable elegance, in colors similar to the soils of Odisha. And the tribal craft of *dhokra*, or metalwork, is evident everywhere—in light fixtures and screens with animal figures and foliage. The exposed columns surrounding the central courtyard are made of local sandstone and laterite. The bricks, however, were sourced elsewhere. "We wanted the bricks to be

EXHIBITION SPACE



6 MULTIPURPOSE HALL

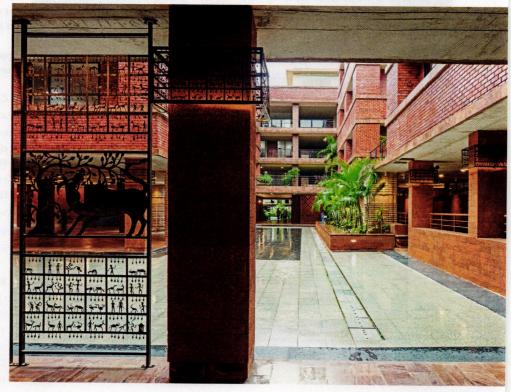


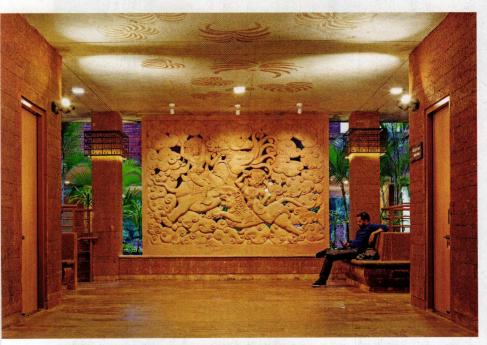
ANIMAL, VEGETABLE, MINERAL *Dhokra*, or tribal metalwork, is used for screens and light fixtures, while columns are made of sandstone (above and right).

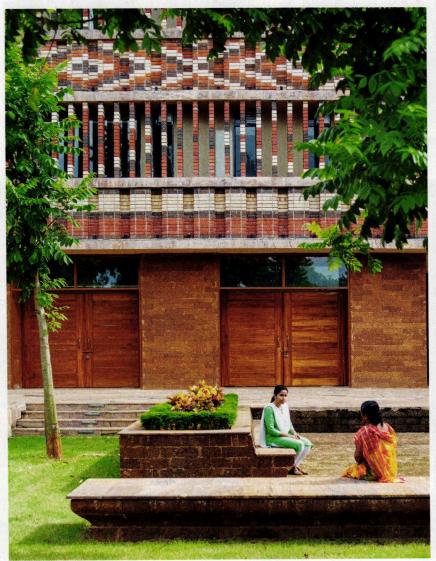
of a certain standard and stability," explains Talwar. "We got them from northern India, where we could find them in the corresponding colors."

Interior walls are adorned with agricultural motifs—a crop calendar is inlayed into a stone floor, for example—and scenes from local mythology, and local stone is used for cladding and flooring, as well as in the landscape features of the plaza. Overall, these details imbue the project with a strong sense of cultural familiarity and regional context. When the design team commissioned the local craftspeople, they provided them only with general ideas, giving them ample creative license for designing the narratives and then fabricating the artisanal elements.

The craftsmanship and extensive sustainable features of the architecture are a tribute to the vision of Otto Konigsberger, the German-born architect and planner who, at the invitation of Prime Minister Jawaharlal Nehru in 1948, laid out the modern city of Bhubaneshwar. The building uses passive design strategies in the staggered massing (that helps shield the building from the heat of the sun), the recessed windows, and the double-skin brick facade. To address the tropical climate, a night-purge







ventilation system—a first in an office building in Odisha—takes advantage of the structure's optimal north—south orientation: 40 mechanized rooftop ventilators extract hot air and inject the cooler night air through ceiling and floor vents. Only 20 percent of the interior spaces are air-conditioned—the third-floor offices that become extremely uncomfortable for a brief period each year. The raised plaza, the courtyard, and light wells all enhance air circulation. Other sustainable aspects of the project are solar panels on the roof, rainwater harvesting, and the extensive use of local materials.

The magnificent yet unintimidating scale of the building, and the solid massing interspersed with intricate detailing, evoke power while celebrating the skills of almost forgotten artisans. Where the design falls short is in the interior modular furniture, which is no match for the elegantly crafted exterior. (The architects agree and wish they had protested against the furnishings.) Lack of proper maintenance may also prevent the building from remaining as timeless as it now appears.

Notwithstanding, architecture is never only about the finished building, but also about its intention. And in fulfilling the architects' vision, the execution was a successful collaborative process among the designers, the builders, and, with the client's enthusiastic encouragement, 150 local artisans. The achievement of this unusual project, in one of the fastest-developing second-tier cities in India, is bound to influence peer cities across the subcontinent. "People are enjoying the ambience here," says Naik. "It is a source of pride for us and our city."

Krushi Bhawan could become an inspiration for designers of urban buildings globally, where the past can be skillfully knit into the present through the combination of sustainable and contextual design solutions with a contemporary architectural vocabulary that is rooted in craft and traditional culture. Bold in its approach, the building provides a model for creating identity and architectural expression that can go on into the future, in Odisha and beyond.

Apurva Bose Dutta is an architect and award-winning architectural journalist, curator, and editor based in India.

credits

ARCHITECT: Studio Lotus

CONSULTANTS: Aterling India Consulting Engineers (mechanical, electrical, HVAC, plumbing); NNC Design International (structural); RHOA Landscape Architects (landscape)

CLIENT: State Government of Odisha (Department of Agriculture & Farmers' Empowerment)

SIZE: 140,000 square feet

COST: \$10 million

COMPLETION DATE: September 2018

SOURCES

MASONRY: Jindal Bricks

BUILT-UP ROOFING: Sigma Insulations

TILE/SHINGLES: Junction Tiles

GLASS: Saint Gobain

CLOSERS AND PULLS: Dorma

LIGHTING: Philips, Wipro, Jaquar, Leksa



Casablanca Finance City Tower | Morocco | Morphosis

Diamond Cut

A crystalline tower is a landmark for a new financial district.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY JASMINE PARK

THE SITE is Casablanca's former Anfa airport. It may not be the one where Humphrey Bogart famously bid farewell to Ingrid Bergman in the 1942 film classic named after the Moroccan port city, but it was an important military and commercial hub for decades until it closed in 2007. Located about five miles from the old Medina, nearly 250 acres of runway and demolished aeronautical buildings are now being developed here into Casablanca Finance City (CFC), a public-private initiative born in 2010 that invites global firms to establish their regional headquarters in Casablanca. "If you want to do business in Africa, you need boots on the ground," says CFC director of strategy, partnerships, and communication Manal Bernoussi. A city of nearly 31/2 million, Casablanca (its name means "white house," of course) is home to Africa's largest mosque and soon-to-be-largest theater, designed by Paris

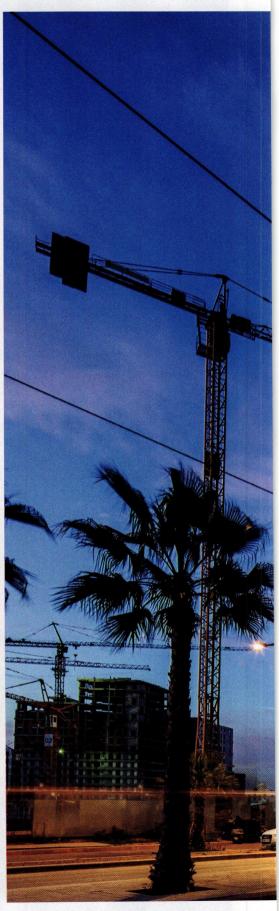
architect Christian de Portzamparc and opening later this year. The city is now poised to become the continent's economic capital.

For CFC's first building, its leaders wanted a landmark, by a Pritzker Prize-winning architect, no less. A 2013 competition invited Rem Koolhaas, Zaha Hadid, Thom Mayne, and I.M. Pei's firm, Pei Cobb Freed & Partners, eventually awarding the office tower to Los Angelesbased Mayne—his first built work in Africa. "We are always looking to France," says Saïd Ibrahimi, CEO of Casablanca Finance City. "We wanted something different for this."

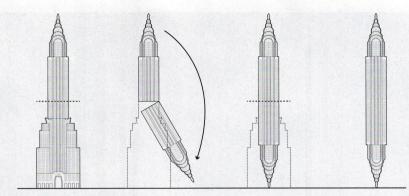
Mayne and the New York office of his firm, Morphosis, led by Ung-Joo Scott Lee, designed a building that has one very obvious thing in common with just about every other building in Casablanca—it is white. But that's where the similarities end.

The 400-foot-tall, 25-story tower-among the

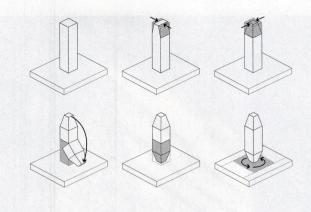


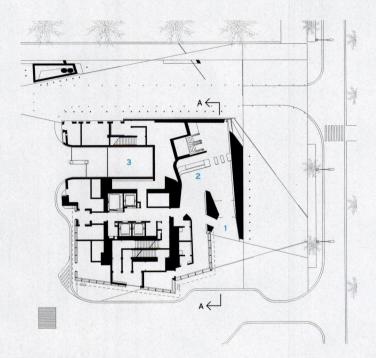




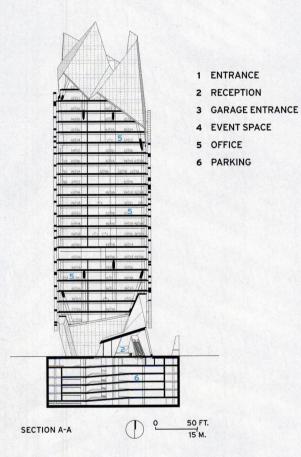


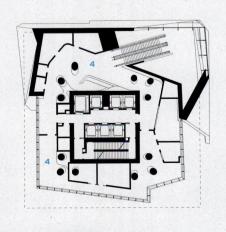
EARLY STUDIES (ABOVE AND TOP, RIGHT)





GROUND-FLOOR PLAN





SECOND-FLOOR PLAN



19TH-FLOOR PLAN



25TH-FLOOR PLAN



highest in the city, but slightly smaller than the minaret at the giant Hassan II Mosque—tapers at the top, but also at its base. "It touches the sky and the ground," says Mayne, who made sure it did so memorably by upending the typical tower morphology and creating a shard-like crown—which contains an open-air event space with green walls—and a prismatic base.

The midsection of the reinforced-concrete building, which houses offices for tenants PricewaterhouseCoopers and AIG, among others-all of whom fit out their own spaces-is wrapped in a fixed, angled, textural brise-soleil inspired by traditional geometric mosaics and wood latticework screens characteristic of Moroccan architecture. Originally conceived in concrete-"We wanted to give it a handmade quality," says Mayne-the modular facade elements, prefabricated in Italy, were ultimately made out of aluminum, for cost reasons, and assembled on-site to have varying depths. That striking feature, and the low-E-coated insulated glazing with a frit pattern beneath it, work together to control glare and heat gain in this mild climate (though often the shades need to be drawn as well). It is one of several featuresincluding tenant submetering for lighting, plug loads, heating, cooling, and water, and the use of occupancy sensors for lighting control-that contribute to the project's meeting LEED Gold requirements, the first in Morocco to do so.

While LEED Gold today feels rather unremarkable, and this building's systems in particular rather standard for such a perceived accolade, on a larger scale, Morocco's ambitions for sustainability surpass those of many nations. It has the world's largest concentrated solar farm, at the door of the Sahara desert, and a goal to have 52 percent of its power come from renewable energy by 2030. Half of CFC's site is devoted to green space, with an expansive new park opening soon.

Morphosis's tower cuts a singular figure on the city's skyline. But that may not be for long. Construction activity is heavy at CFC, with other office buildings, a school, a potential supertall, and lots of housing going up, including two condominiums beside this office tower that are a little too close for comfort. "The speed at which this whole urban ensemble has come together is just astounding," says Mayne, who doesn't seem to mind his building's fading into the background. "I like the cheek-by-jowl quality. This is not a city of perfection; you have to accept happenstance." In this case, that also means a less than ideal construction quality, particularly for Morphosis's signature complex assemblies. Nevertheless, the crystalline structure, a true diamond in the rough, has made its mark, its glass top and mesh armature twinkling in the Moroccan sun.





credits

ARCHITECT: Morphosis – Thom Mayne, design director; Ung-Joo Scott Lee, project principal

ASSOCIATE ARCHITECTS: Omar Alaoui Architectes

ENGINEERS: Tractebel Engineering (structural; m/e/p); Thornton Tomasetti, Arup (competition phase)

GENERAL CONTRACTOR: Bymaro

CLIENT: Casablanca Finance City

SIZE: 226,000 square feet

COST: withheld

COMPLETION DATE: April 2019

SOURCES

GLASS: Guardian

BRISE-SOLEIL AND CURTAIN WALL: Simeon

FLOOR AND WALL TILE: Florim

RESILIENT FLOORING: Tarkett

CARPET: Interface

LIGHTING: Zumtobel (interior); Erco (exterior)

ELEVATORS AND ESCALATORS: Schindler

INTERIOR PANELING: St. Gobain

ACOUSTICAL CEILINGS: Armstrong





Billie Jean King Main Library | Long Beach, California | Skidmore, Owings & Merrill

Time for Timber

A very old material is getting renewed architectural respect.

BY SUZANNE STEPHENS

PHOTOGRAPHY BY BENNY CHAN/FOTOWORKS

OVER THE YEARS following World War II, in which Skidmore, Owings & Merrill (SOM) rose to prominence, its architecture was largely identified with an astute deployment of steel, concrete, and glass using a Miesian vocabulary. Now the firm is showing it can exercise the same finesse with timber as the structural solution. This natural material composes 80 percent of the new Billie Jean King Main Library in Long Beach, California-named for the legendary tennis player who grew up there and presided over the building's dedication last September. The design solution-a long, rectilinear framework of glass and reddish Douglas fir-offers a fitting homage to the athlete famed for the power of her serves and the efficiency of her ground strokes and volleys.

Wood made sense for the new two-story, 93,500-square-foot building, explain Paul Danna and José Luis Palacios, design partner and design director, respectively, in the Los Angeles office of SOM, since the city wanted to keep intact an existing underground parking garage on the site. A timber framework for the library could sit lightly on the garage's concrete columns, and by reusing 85 percent of that existing structure, material waste for the new project would be reduced by 65 percent. On top of this sustainability strategy (sidebar, page 82) is the advantage that the warm tones of the natural material avoid the cold, institutional look of so many contemporary public buildings. "Wood adds instant character to the complex," says Palacios.

The library especially needed to attract the community with an inviting space, as the outdated former library, built in the 1970s, looked like "a closed bunker," in the words of Special Collections librarian Jeff Whalen. "Now the library is filled with light," he adds, pointing to the generous glazing supplementing the wood.

In these days of digital dependency, the staff also did what so many



REACHING OUT The entrance for the north facade (above) of the Billie Jean King Main Library is sheltered by an expansive porch. At the entrance, a two-story light well opens to the sky and illuminates each floor (below).

libraries now do—it opted for a rich program of varied activities in which reading and browsing though books is only a small part of the agenda. To lure local residents inside this precinct, the library staff asked for a family learning center, a children's reading room, a veterans' resource center, and a cluster of multipurpose community rooms with its own separate entrance. The library also has makerspaces with capabilities for 3-D printing and robotics, and even film editing. And, not to be forgotten, 300,000 books do occupy the shelves.

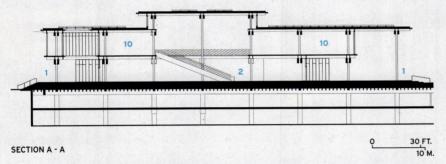
Since Long Beach, a booming port city about 25 miles south of Los Angeles, receives abundant sun, the architects designed the low-rise building's flat roofs—fitted out with a battery of 1,590 photovoltaic modules—with deep overhangs for the expanses of glazed walls. The canopy on the south facade juts out 32 feet, where an entrance overlooks Lincoln Park—undergoing substantial landscaping on the site of the former library, now being razed. Visitors will be able to enter from the park on the south, near the downtown civic center, but for the time being they come in on the opposite side, where an expansive wood-framed "porch" faces a residential neighborhood. To help identify the entrance within this expanse, the architects have carved out a dramatic two-story light well, open to the sky, which you pass through to enter the main space.

Inside, SOM has organized the various spaces around a 39-foot-high atrium with clerestory windows at the top of the second level. Because of the daylight suffusing the interior, the amount of electric lighting needed is reduced.









- 1 ENTRANCE
- 2 ATRIUM AND GALLERY
- 3 CIRCULATION DESK
- 4 CHILDREN'S AREA
- 5 LIBRARY SHOP
- 6 FAMILY LEARNING CENTER
- 7 SPECIAL COLLECTIONS
- 8 MEETING ROOMS
- 9 OFFICES/WORKROOMS
- 10 COLLECTIONS

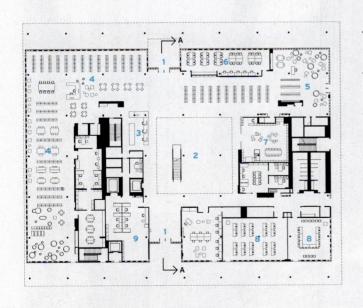
- 11 READING ROOM
 12 3-D-PRINTING LAB
- 13 MAKERSPACE STUDIO
- 14 STUDY ROOMS

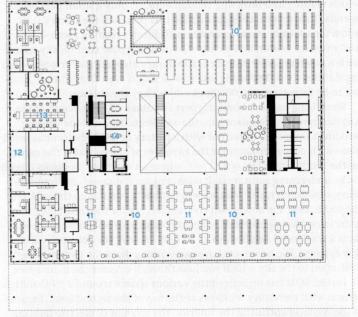
THE WARMTH OF WOOD Beams, joists, girders, and blocks of stained Douglas fir are boldly expressed in the lobby (opposite, top) and the atrium (opposite, bottom). The library is located in the northeast corner of the civic center (left, at center).

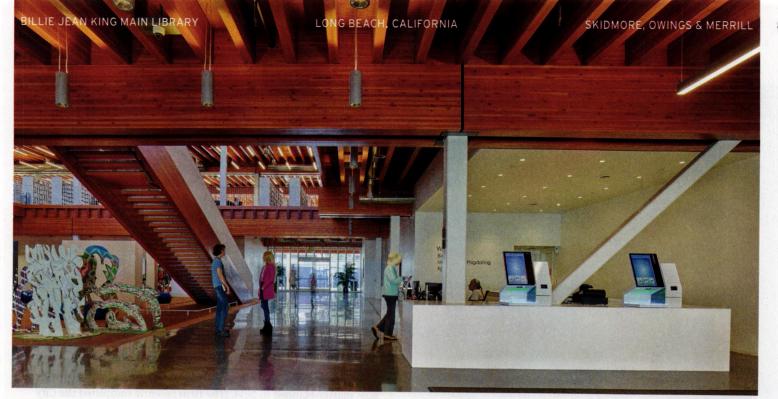
Yet despite all the transparency and luminosity of the interior spaces, it is the exposed wood structure that steals the show. SOM has treated the various parts and pieces of the library as if they belonged to a Japanese temple: the wood glulam beams, joists, and blocks between the joists create a Constructivist interplay, emphasized by the timber girders that penetrate the glass curtain wall. To heighten the sense of precision, the architects employed a 2-foot module for both the curtain wall and the structure.

SOM chose a red-stained Douglas fir for the mass-customization of prefabricated components, with most of the wood coming from Oregon and the rest from Washington state. (A hardwood scientist assisted with the complex process of fabrication, delivery, and installation.) By using wood and the existing foundation, the architects estimate they cut the embodied carbon by 61 percent, compared with erecting a new parking garage and a conventional concrete building.

But not everything here is wood. To resist lateral seismic movement, the team installed V-shaped steel supports, aided by a grid of square steel columns filled with concrete. In addition, on the west facade, where there is no overhang, the architects cut the solar load by making the curtain wall more opaque by virtue of an aluminum vertical plank system, alternating with strips of glass. The overall result is a library where you feel as if you are in an expan-











PROJECTS



ARCHITECTS TAKE ACTION

SOM has created a series of vignettes (shown below) that illustrate how sustainability issues are addressed by the design solution.





ENERGY & CARBON

1,590 Solar PV panels, natural daylighting and efficient HVAC equipment reduce energy use by 63%*

*below the ASHRAE 90.1 2007 baseline





MATERIALS & RESOURCES

Durable materials and mass customization of components result in 35 PSF of CO2EQ-a total 61% reduction in embodied carbon compared to building new garage and concrete structure





The reuse of **85%** of the existing garage reduces material waste by 65%. 80% of the building is wood, which can be upcycled post-building life





WATER

An integrated rainwater-storage system, drip irrigation, and low-flow fixtures save 138,909 gallons of water, resulting in a 42% reduction of total water consumption





LIVABILITY & WELL-BEING

Exterior curtain wall design maximizes daylight and views while mitigating glare

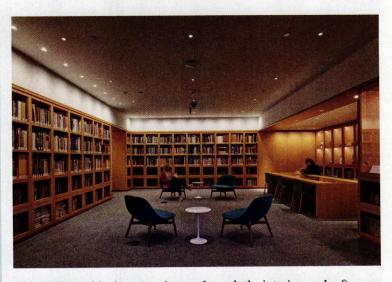




ECOLOGY

The site consists of 47% native planting and 53% drought-tolerant planting, and is developed on a brownfield site

Metrics are an approximation



sive pavilion, with views opening up through the interiors and soft illumination permeating the reading rooms, studios, and stacks.

The library is part of a 22-acre civic-center redevelopment, which SOM master-planned in 2014. (The firm recently completed the City Hall and Port Headquarters.) A few gangly, mediocre buildings-by other architects-still remain, awaiting their fate.

In Long Beach and beyond, SOM is keeping its signature vocabulary of modernist modular structures of steel, concrete, and glass intact. At the same time, it is working to address climate change-and giving wood a prominent role in its architecture, already anticipated by its Timber Tower Research Project, first announced in 2013. Its goal has been to use mass timber as a main structural material to reduce a tower's embodied carbon footprint. The Billie Jean King library's bold muscular framework, with its preponderance of wood, continues the firm's legacy while introducing a renewed vibrancy to the general conversation. An inviting new beacon for the downtown, the library proves a building needn't be a tower to be noticed.

To earn AIA LU/HSW credit, read this article and the ones on pages 84 and 98, and complete the quizzes at continuingeducation.bnpmedia.com.

credits

ARCHITECT: Skidmore, Owings & Merrill - Paul Danna, design partner; José Palacios, design director; Jed Zimmerman, managing director/project manager; Michael Mann, managing director; Masis Mesropian, senior designer; M. Zarmine Nigohos, project architect; Steve Zimmerman, senior technical designer; Roshanak Mostaghim, technical designer; David Renken, interior designer

ENGINEERS: Skidmore, Owings & Merrill (structural); KPFF Consulting Engineers (civil); Syska Hennessy Group (m/e/p)

CONSULTANTS: Skidmore, Owings & Merrill (sustainability/environmental graphics); Gustafson Guthrie Nichol (landscape); Ron Anthony (wood scientist); Newson Brown Acoustics (acoustics); HLB Lighting Design (lighting)

GENERAL CONTRACTOR:

Clark Construction Group **CLIENT: City of Long Beach**

OWNER: Plenary-Edgemoor Civic Partners

SIZE: 93,500 square feet

CONSTRUCTION COST: \$48 million COMPLETION DATE: September 2019

SOURCES

METAL PANELS: VNSM METAL/GLASS CURTAIN WALL:

Benson Industries

GLASS: Viracon (exterior curtain wall); Vitro (interior)

PAINTS, STAINS, COATINGS: Sherwin-Williams, PPG, Tnemec

ACOUSTICAL CEILINGS: Armstrong, USG BUILT-UP ROOFING: Sika Sarnafil

LIGHT BOX

A two-story light well near the north entrance admits daylight to both the main floor (bottom) and the second level (right). To protect the special collections room on the main floor from daylight, SOM enclosed it in ash wood paneling (opposite).







RISD North Hall | Providence, Rhode Island | NADAAA

On the Flip Side

A thin profile of shingled cladding juxtaposes with brick in a hybrid residence-hall structure.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY JOHN HORNER



ABOUT FACE
The new residence hall uses a mix of materials in its cladding to relate to the various contextual elements nearby, and is topped by nearly 9-foothigh parapets at its uppermost level, to shield mechanicals (opposite and top, right).



NORTH HALL, the new dormitory at the Rhode Island School of Design (RISD), looks like nothing else at the art college's rolling urban campus, or at its close Ivy League neighbor in Providence, Brown University. Tall and dark, with bladelike edges, the rectangular building, by Boston-based architect NADAAA, has a distinctive presence, covered in a zigzagging array of shingled fiber-cement panels over its long east and west facades, and in blocks of differently patterned brick crowned by anodized aluminum fins on the short north and south ends.

A wide range of historic and contemporary architecture mingles along the steep streets that are home to these two prestigious institutions. A Venetian Renaissance–style structure at the base of a hill leads to a concrete behemoth by Philip Johnson (1971) at the top; a glass and brick confection by Rafael Moneo (2008) stands beside a pediment-topped neoclassical facade. Then there are the countless towers and steeples. Over the years, Victorian houses have been shuttled around to make room for green spaces and new buildings, which most recently include a creative-arts center by Diller Scofidio + Renfro (2011), an engineering-research center by KieranTimberlake (RECORD, November 2018), and a performing-arts complex by REX currently under construction, all at Brown.

Major building projects are less frequent at RISD; North Hall is the first newly constructed dormitory here in 34 years. But it's not the first project NADAAA principal and RISD alumnus Nader Tehrani has worked on for the school—an adaptively reused bank building just across the Providence River includes the Fleet Library (2006) within its first two stories, designed by Tehrani's then firm Office dA. (Its upper levels were renovated as student housing.)

For North Hall, RISD followed Brown's lead by employing Integrated Project Delivery (IPD), a collaborative approach to design and construction that includes the client, architect, contractor, engineers, and consultants in weekly meetings from the outset. "This is the first time we've had a project with a big enough budget to make IPD feasible," says Annie Newman, RISD's director of planning, design, and construction. "There are a lot of up-front costs."

The phased project includes the renovation of other dorms built on the slope, including the adjacent Nickerson Hall (currently under way) and the creation of a new green between it and North Hall. Those two buildings are connected by a canopy supported by hefty, staggered brick piers in the shapes of the letters R, I, S, and D. "The canopy is a gate to a new urban promenade," says Tehrani, whose firm was awarded the project following a 2014 master plan

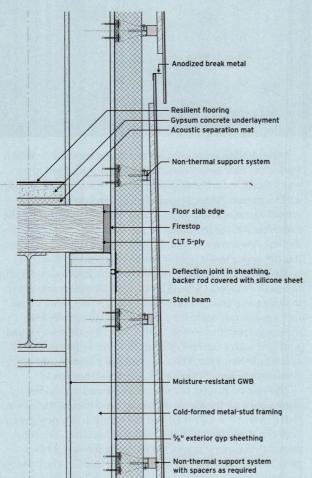


ARCHITECTS TAKE ACTION

A closer look at the steel and cross-laminated timber construction

It took only 21/2 weeks to erect North Hall's six-story structure, which combines steel columns and beams with cross-laminated timber (CLT) floor slabs. The steel beams were fabricated with penetrations to allow building systems to pass through them. For instance, mechanical systems are located in the corridors, feeding the entry wall of the bedrooms, each of which has a dedicated thermostat and heat pump for individual thermal comfort. The CLT decks, which are made mainly from black spruce and manufactured by Nordic Structures in Canada, replace energy-intensive concrete, with the aim of reducing carbon emissions. The hybrid structure allowed for 9-foot-high raw wood ceilings that don't need added finishes. The five-ply CLT slabs are topped with an acoustic mat and selfleveling gypsum concrete to help reduce noise transfer between floors. Much of the CLT came in standard 8-foot widths, though NADAAA used several narrower sections to increase efficiency of installation. Where excess CLT did occur, the architects collected the field-cut slab pieces and used them to create custom counters and furniture for the dormitory.





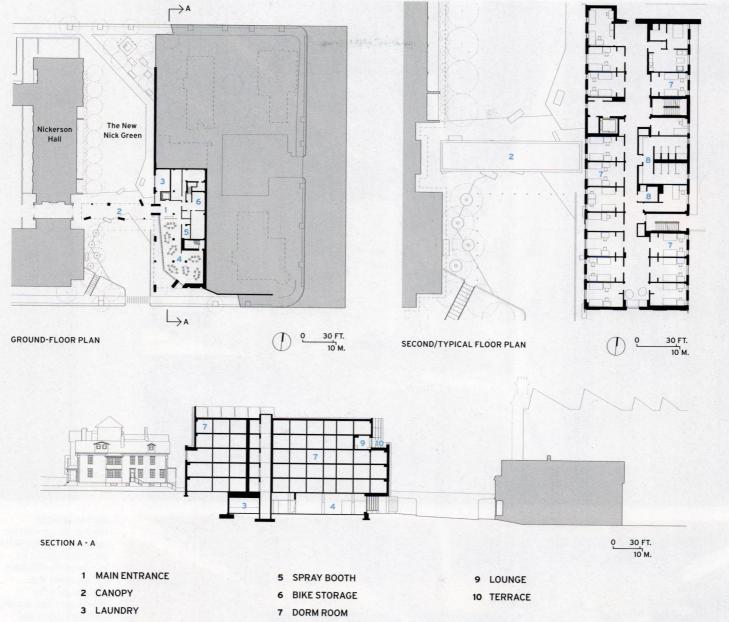
FLOOR-SLAB/SHINGLE SECTION

1 VINYL FLOORING CLT MFP 4 SUSPENDED MESH CEILING 5 STEEL BEAM STEEL COLUMN **EXHAUST GRILLE** VRF CARRIER SUPPLY GRILLE

AXONOMETRIC OF CORRIDOR

PHOTOGRAPHY: COURTESY ODEH ENGINEERS

87



4 ART STUDIO

8 BATHROOM

credits

ARCHITECT: NADAAA - Nader Tehrani, Katherine Faulkner, Arthur Chang, principals; Matthew Waxman, Gretchen Neeley, Nathan Vice, Richard Lee, Aaron Weller, Lisa LaCharité, Ronnie Kataki, design team

ENGINEERS: Odeh Engineers (structural); Vanasse Hangen Brustlin (civil); Jensen Hughes (code); Environmental Systems (mechanical); Arden Engineering Constructors (plumbing)

CONSULTANTS: Landworks Studio (landscape); Wiss, Janney, Elstner Associates (building envelope); Andelman and Lelek Engineering (energy modeling)

GENERAL CONTRACTOR:

Shawmut Design and Construction **CLIENT: Rhode Island School of Design** SIZE: 40,800 square feet

COST: \$25 million (North Hall) **COMPLETION DATE: August 2019**

SOURCES

SHINGLE PANELS: Cembrit ACCENT BRICKS: Endicott Clay Products, Spaulding Brick **CURTAINWALL: Kawneer**







SOCIAL SPACES Much of the ground floor serves as a daylight-filled art studio (above). A lounge on the fifth floor, its CLT ceiling slab exposed as in the individual rooms, features a kitchen, dining and seating areas, and a terrace (left). Select wood accent pieces, including a bench-cum-screen at the entrance (opposite), were made by NADAAA's in-house fabrication studio, Nadlab.



RFP that included two other Boston-based studios—Machado Silvetti and Kennedy & Violich Architecture—and Los Angeles—based Michael Maltzan Architecture.

Though RISD has no sustainability guidelines in place for new buildings, the hope with North Hall was to limit the environmental impact of its construction and reduce energy consumption once occupied. In early IPD strategy sessions, NADAAA proposed the use of cross-laminated timber (see sidebar, page 86). In addition to being a low-carbon approach, it dramatically reduced construction time for this fast-track project, which broke ground in June 2018 and opened for the Fall 2019 semester, just 14 months later.

The 40,800-square-foot residence hall was designed from the outside in to use approximately 27 percent less energy than a typical codecompliant building. Those unusual exterior walls—inspired on the one hand by the shingled roofs of nearby houses and the perforated brick of Pietro Belluschi's 1950s dormitory down the hill—have enhanced insulation, with a lower-than-average U-factor. Inside, everything from lighting occupancy sensors and low-flow showers, faucets, and toilets aid in the cause.

The no-frills interiors feature exposed ductwork in common areas and exposed timber ceilings in the bedrooms and fifth-floor lounge. Walls are painted a deep purple on the ground floor and lighten as you ascend the building to medium blues and an almost-white gray at the uppermost level.

The need to accommodate 148 beds resulted in a building that was much larger than some of its immediate neighbors, but almost dimin-

utive compared to Philip Johnson's sawtooth-roofed tower (Brown's List building) across the street. A structure that is at once overscaled and slight—its laminar sides and sharp edges accentuating thinness—NADAAA did a commendable job carving out of its massing as much volume as possible, with cornice lines, terraces, and material shifts that relate to the surrounding context. From some perspectives it is king of the hill, from others just part of the eclectic mix.

The architects at NADAAA are no strangers to academic buildings, having designed several dynamic teaching facilities from Atlanta to Australia. Most recently, the Daniels Building at the University of Toronto (RECORD, November 2018) is an exciting clash of neo-Gothic grandeur and contemporary spatial and structural bravura-so otherworldly in fact, that an episode of the futuristic web TV series Star Trek: Short Treks was filmed there. As housing, North Hall is, alas, more subdued, reminiscent instead of an earlier Office dA apartment complex, South Boston's groundbreaking-formally and in terms of sustainability-Macallen Building (2007). Like Macallen, North Hall's diversity of materials and textures and brooding form may seem an odd insertion into any neighborhood, whether a transitional industrial site in South Boston or an idyllic college campus, yet somehow it works. At RISD, appropriately enough, the building is as much an art project as an architectural one, the college itself providing to one former student the palette to create something that stands out, but also fits right in.

To earn AIA LU/HSW credit, read the articles on pages 78 and 98 and complete the quizzes at continuingeducation.bnpmedia.com.

Limpopo Youth Hostel | Bela Bela, South Africa | Local Studio

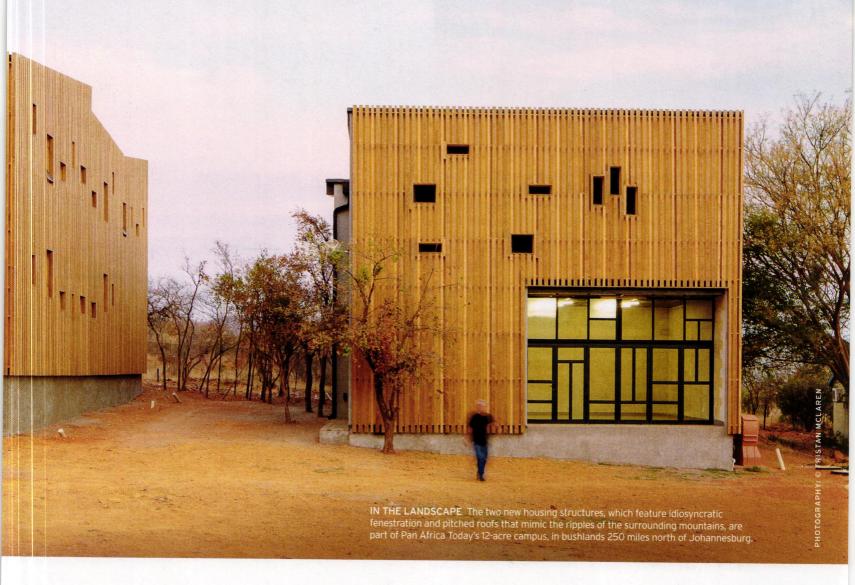
School of Thought

The design team for two new dormitories for an activist youth group turn a limited budget into an opportunity to experiment with wood.

BY ALEX KLIMOSKI



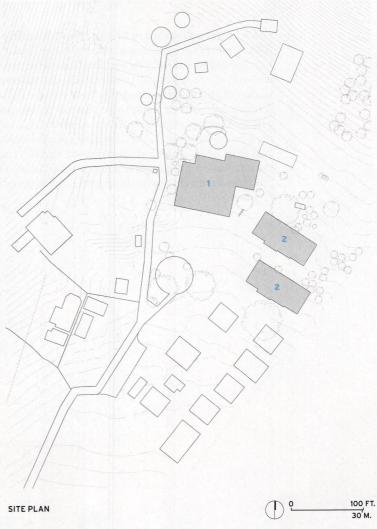
SINCE IT was established in 2012, South African firm Local Studio—a 2018 RECORD Vanguard—has built a reputation around resourceful, low-cost design solutions for social infrastructure projects in Johannesburg, where it is based. Until recently, the majority of the studio's work—which includes projects such as a refugee-support center, a community-outreach facility, and multiple schools—has been in disadvantaged neighborhoods with little access to basic civic spaces. But over the past couple of years, the firm has expanded its reach to rural areas; among its latest projects are two modest, timber-clad dormitories for the nonprofit organization Pan Africa Today, located in Bela Bela, about 250 miles north of Johannesburg in the shrublands of Limpopo Province.





The new two-story buildings, each 7,250 square feet, with identical layouts, are part of a 12-acre campus purchased in 2015 by Pan Africa Today, which is focused on educating young people about socialist principles. Originally built in the early 2000s as a wedding venue, the complex included several Cape Dutch-style structures: guest bungalows, a dining hall, and other ancillary spaces. Now the site supports weeklong training camps, workshops, and conferences that bring together activists from across the globe in order to "build solidarity among trade unions, civil society, and youth and women's movements," according to the organization's website. As Thomas Chapman, founder of Local Studio, explains it, the collective's intent is to better prepare citizens for active political involvement. "Protesting capitalism is massive in this country-socialism isn't as much of a dirty word here," he says. Despite significant strides toward poverty reduction since its transition to democracy in 1994-when the African National Congress, which has long had ties to the South African Communist Party and the Congress of South African Trade Unions, became the country's ruling party-South Africa still has one of the highest inequality rates in the world, according to the World Bank.

The majority of the buildings were in good shape and didn't need to be altered; some were converted into classrooms and meeting spaces, and the bungalows still serve as overnight accommodations. The chapel, according to Chapman, was converted into the Karl Marx Library. But the organization required more lodging units. The brief called for two straightforward, easy-to-maintain, and sustainable blocks with a total of 112 beds that could be built with little money. Initially, the budget only allowed for a concrete-block structure and plaster and





- **DINING HALL**
- ACCOMMODATION BLOCK
- 3 DORMITORY ENTRY
- LODGING UNIT
- MULTIPURPOSE LEARNING ROOM



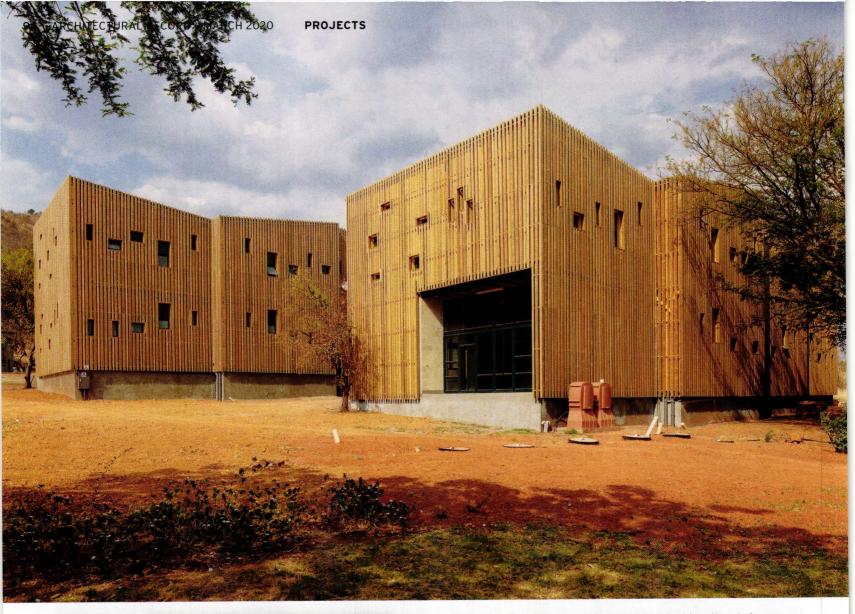
ACTIVE LEARNING Each building, constructed with lightweight concrete blocks, comprises seven lodging units and a multipurpose educational space that opens to the outdoors, activating the surrounding landscape (above and right).

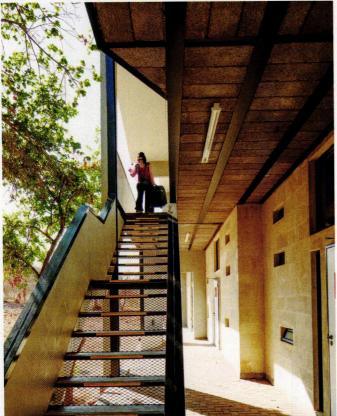
paint for the shell, but the architects negotiated a bit more funding so they could have some room to innovate.

The design team opted for wax-impregnated South African pine for the cladding. Given the monetary constraints, it was not possible to wrap the buildings entirely in timber, so the architects took thin slats and floated them off the structure, leaving spaces in between. "With a little experimentation, we created an architectural effect that catches light in interesting ways," Chapman says. They also played around with the fenestration, which appears as a random assortment of differently sized apertures but is the result of a simple logistical exercise: with each room containing four tightly fit double-deck bunks, the architects gave each individual bed its own operable window. "We wanted to ensure that each person had some control, which is limited when you have to share a small space with seven others," he says.

Local Studio also convinced the organization to include social space within the buildings. On the ground level of each structure, the architects transformed one of the eight equal-sized units into a multipurpose educational room, with glazed doors that open to the landscape. Partially enclosed balconies also serve as popular gathering spots; since the dormitories have no air-conditioning, these alcoves provide much-needed shade. The buildings are powered by a local solar farm, and blackwater is recycled for the irrigation of a nearby vegetable garden.







LESS IS MORE Slats of wax-impregnated local pine—which float from the exterior surfaces, creating subtle effects with natural light—clad the structures (above). Given the lack of air-conditioning, the stairwells are located within partially enclosed outdoor areas to provide shade (left).

Despite its rural location, Chapman says he doesn't see much difference between this project and the studio's work on small urban sites. "You don't have the surrounding city to respond to, but you are still building a community. All of our work considers public space and ways to bring people together." Philanthropic projects in rural areas, such as the Lapalala Wilderness School, about 100 miles to the southwest of Limpopo, make up nearly half of the firm's current work, a trend that Chapman embraces. "We're enjoying the balance."

credits

ARCHITECT: Local Studio – Thomas Chapman, Crystal Waddell, Alexia Kolatsis, Lize Wessels, design team

ENGINEERS: The Structural Workshop (structural); Earthworkshop (civil)

GENERAL CONTRACTOR:

AMECON

SIZE: 14,500 square feet

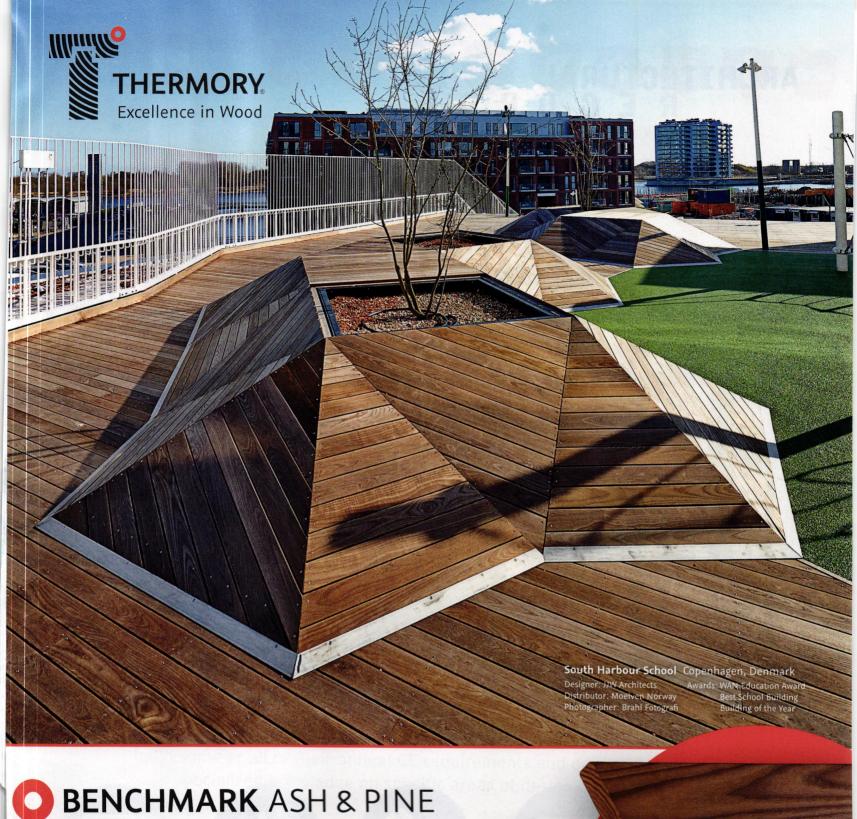
COST: \$1.2 million

COMPLETION DATE: June 2019

SOURCES

STRUCTURAL-CONCRETE BLOCKS: Hebel CLADDING: Rhino Wood

BUILT-UP ROOFING: Atlas



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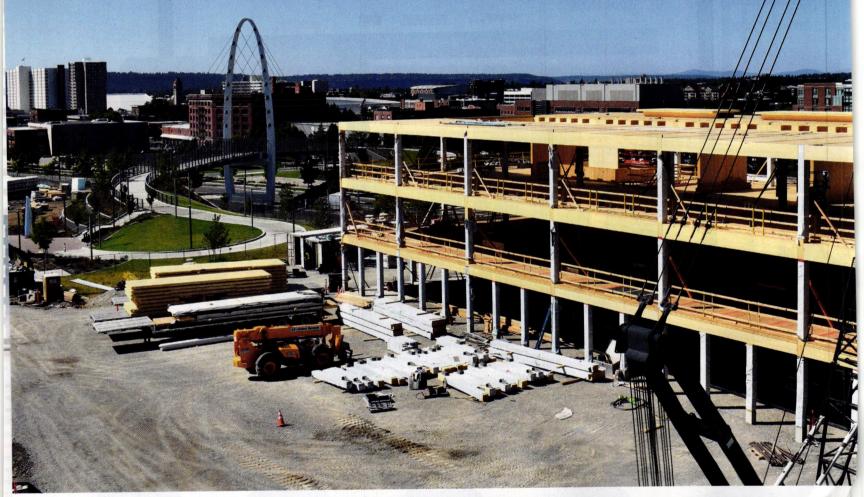
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Carbon Crackdown

After focusing for decades on energy efficiency, the green building movement sets its sights on "up-front" emissions.

By Joann Gonchar, FAIA



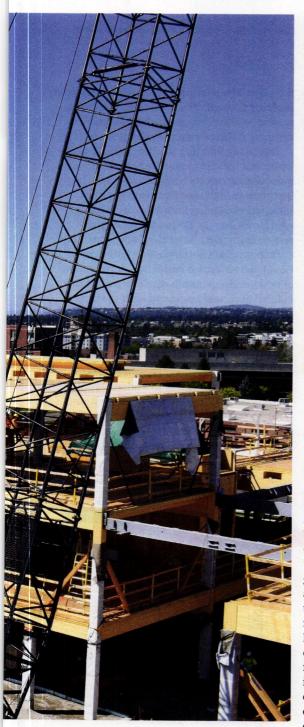
THESE DAYS, you would be hard-pressed to find an architect who hasn't heard that buildings are responsible for nearly 40 percent of the world's carbon dioxide emissions, which trap the heat in the atmosphere and warm the earth. Some may still assume that operating energy is the sole source of these greenhouse gases. But a significant chunk, 11 percent of annual emissions, are due to construction and all the processes that lead up to it-including manufacturing materials into products and transporting them to the site. This CO₂ is sent

into the atmosphere well before someone puts the key in the door and switches on the lights for the first time.

A community of design professionals has been working hard to sound the alarm about these "up-front" or, as they are more commonly known, "embodied" emissions. With the world's building stock expected to double by 2060, they are making the point that it is critical to rein in these greenhouse gases if we want to limit the global temperature rise to 1.5 degrees Celsius and avoid climate calamity.

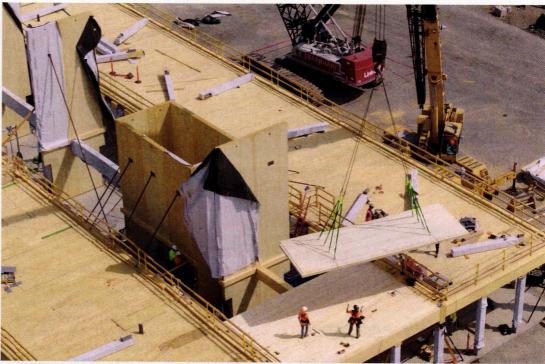
And, fortunately, their warnings are gaining urgent attention.

Architect and structural engineer Kate Simonen, director of the Seattle-based Carbon Leadership Forum (CLF), an organization founded a decade ago to tackle embodied emissions, says there is growing recognition that the window for taking action is narrowing. "Now people can see all the way to 2050," she says, referring to goals set by Architecture 2030, the nonprofit established by architect and climate activist Ed Mazria, which calls for complete



Katerra's Catalyst Building, a 150,000-square-foot academic structure for Eastern Washington University in Spokane (above and right) is the first project to use the cross-laminated timber panels made in the company's nearby fabrication plant.

decarbonization of the built environment by midcentury. There is new awareness that global warming is a near-term problem, says Amy Seif Hattan, vice president of corporate sustainability at engineering firm Thornton Tomasetti, adding that "we don't have to wait to operate buildings to make a difference."



For most laypeople, "carbon emissions" is an abstract concept-one that is far less familiar than energy consumption. "You don't get a carbon bill," points out Pauline Souza, a partner and director of sustainability at San Francisco-based architecture firm WRNS Studio. Yet even though the global-warming potential (GWP) of a particular material or activity might be difficult to visualize, it can be quantified-measured in tons of CO2 or CO2e. The latter term refers to carbon dioxide "equivalents," meaning other heat-trapping gases such as methane or nitrous oxide, but all are expressed in terms of the quantity of CO2 that creates the same level of warming. This footprint is calculated through a process known as life-cycle assessment (LCA), which considers a product throughout its lifespanfrom extracting raw materials, manufacturing, and use to disposal-and evaluates its effects in several environmental-impact categories, including the effect on air and water quality and GWP.

Such an analysis can be highly rigorous, like the report that the tech-forward construction company Katerra commissioned from CLF for its Catalyst Building—a 150,000-square-foot academic structure for Eastern Washington University under construction in Spokane and made of carbon-storing mass timber. Designed by Vancouver-based Michael Green Architecture (now owned by Katerra), it is the first project to use the cross-laminated timber (CLT) components manufactured in the factory that Katerra recently opened nearby. The analysis

drills down into the environmental performance, not only of the building, but of the CLT supply chain, examining such particulars as forestry operations, lumber transport, the factory's energy source, and the steps involved in fabricating the mass-timber elements, including finger jointing the wood, adhesive application, and pressing. The aim of the study was to identify "hot spots," or areas of potential improvement, while demonstrating Katerra's environmental credibility to prospective customers, says Craig Curtis, the company's head of architecture and sustainability.

The level of resolution of the Katerra analysis might sound daunting, but it is an academic study, points out Simonen. The embodied-carbon accounting that design and construction firms perform is generally much simpler and is often aided by one or more of a growing body of digital estimating tools. Some of the well-established tools include the Athena Impact Estimator, best suited for early design phases, and Tally, a Revit plug-in developed by architecture firm KieranTimberlake and tailored for design teams working collaboratively in BIM. Late last year, the CLF, in partnership with construction company Skanska and the software developer C-Change Labs, among others, launched the free, opensource Embodied Carbon Construction Calculator, or EC3. Focused on the specification and procurement phases of projects, it allows the comparison of similar materials from different suppliers. The recently released



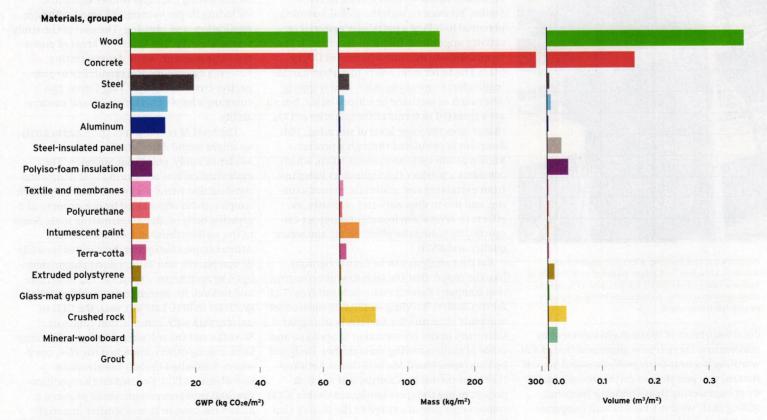
Beacon, a tool developed by Thornton Tomasetti, analyzes and compares different structural systems.

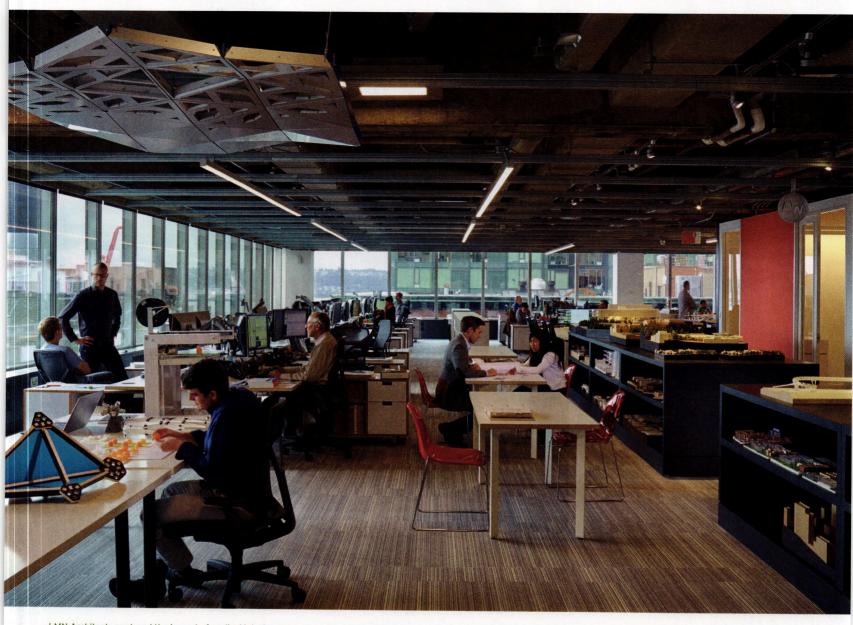
Besides the new array of software, recent changes to green-building certification programs are pushing project teams to consider ing life-cycle assessment (WBLCA)-which generally encompasses the structure and enclosure-and then reducing embodied carbon. But in the latest version, v4.1, now in beta testing, the credits have been tweaked so that projects can earn one point simply for performing a WBLCA, and then gain additional points for reducing the embodied-carbon

The Catalyst Building is predominantly timber and concrete (left). However, an LCA study (below) showed that some of the project's smallest components, such as aluminum cladding elements, have outsized globalwarming potential.

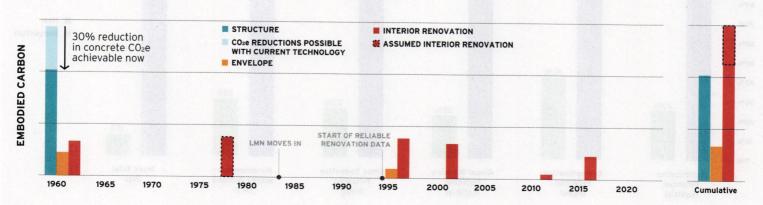
footprint. The idea, according to the U.S. Green Building Council, which manages the rating system, is to encourage using a life-cycle assessment (LCA) to inform design decisions.

The Living Building Challenge (LBC), meanwhile, has included embodied-carbon reduction among its "imperatives" since its inception in 2006. But two years ago, the International Living Future Institute (ILFI), which oversees the LBC and several other related initiatives, introduced a separate Zero Carbon program encompassing both operational and embodied emissions. Certification of new buildings entails disclosure of all the embodied carbon associated with the materials and construction of a project, a 10 percent reduction, and the purchase of environmental offsets to bring net embodied emissions to zero. The program is proving popular with corporations with strong decarbonization commitments, according to Andrew Lee, director for carbon and energy at ILFI. Microsoft, for instance, says it will pursue the certification for modernization projects at its Silicon Valley and Puget Sound campuses as part of an

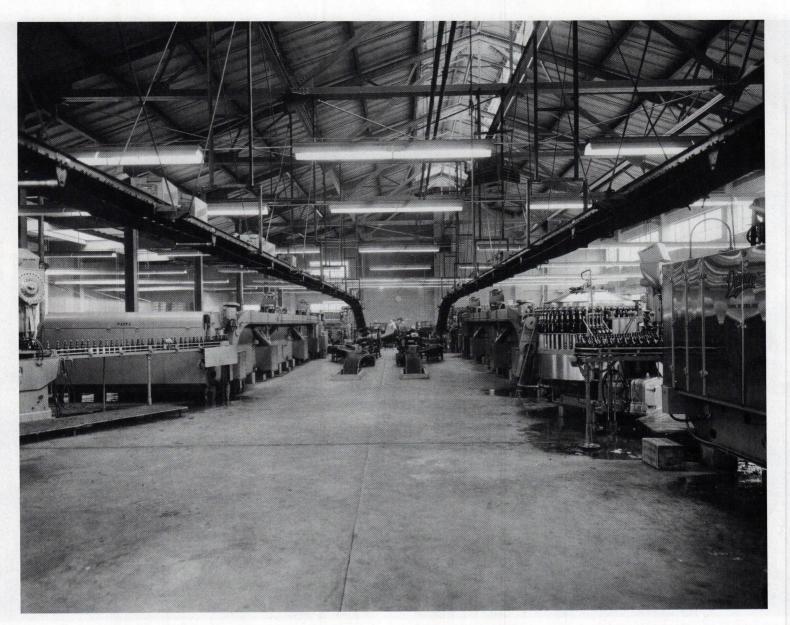


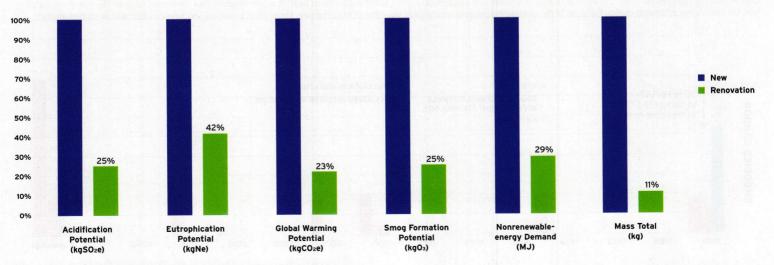


LMN Architects analyzed the impact of cyclical interior renovations to a midcentury office tower in downtown Seattle, where it has its own workspace (above). Their study revealed that the cumulative embodied-carbon footprint of the remodeling projects was greater than that of the structure, the original envelope, and a new curtain wall combined (below).



CARBON TIMELINE - 801 2ND AVENUE, SEATTLE







Before moving into their offices (above) in a former beer-bottling plant (opposite, top) in Philadelphia, KieranTimberlake made extensive modifications. Even so, an LCA showed that the renovation's effects, across several environmental-impact categories, were much lower than new construction would have been.

aggressive plan announced in January to be carbon negative by 2030, and by 2050 to remove all the carbon the company has emitted since its founding 45 years ago.

Programs like LEED and LBC are voluntary. But some North American jurisdictions have already moved to make embodied-carbon reductions obligatory. In January, the Buy Clean California Act, which requires state agencies to take the GWP of certain building materials into account on state-funded projects, went into effect. Washington State's lawmakers are actively considering "buy clean" legislation. Last spring, Vancouver published an ambitious Climate Emergency Response plan that includes a target for a 40 percent reduction in embodied carbon for

new construction by 2030, compared with a 2018 baseline. And in November, the board of supervisors in Marin County, California, approved a low-carbon concrete code that will apply to both public and private construction. "It won't be long before such regulations proliferate," predicts Stephanie Carlisle, a principal at KieranTimberlake. "Architects will have to comply."

To develop or enhance their embodied-carbon literacy, some design firms are analyzing their own completed projects—projects that were not necessarily designed with embodied carbon in mind—to try to better identify opportunities for reductions on future work. Thornton Tomasetti recently published the initial results of an ongoing multiyear

survey of structures it had designed. It found the highest concentration of embodied carbon in floor slabs for most building types, in the foundations of aviation facilities, and in the columns for skyscrapers. "As you go taller, the columns can get massive," explains Duncan Cox, a senior associate in the London office. Making structures more efficient by using less material is one way reductions could be achieved. Such savings could be significant, since up to 70 percent of a building's embodied emissions is contained in its structural system, says Cox.

With so much carbon locked up in a building's bones, renovation and adaptive reuse make undeniable sense as emissions-reductions strategies. Carlisle points to her own firm's



WRNS Studio's building for Sonoma Academy (above) is built into a slope (opposite, top), which helped with the envelope's thermal performance but required a carbon-intensive retaining wall. The project employed several low-embodied-emissions strategies (opposite, bottom), including using low-cement block in place of some traditional CMU.

offices in Philadelphia's Northern Liberties neighborhood, in a former beer-bottling plant built in 1949. Before moving into the two-story, 60,000-square-foot masonry-clad steel-andconcrete structure in 2013, KieranTimberlake made changes that included replacement of the windows and the roof, the addition of raised access floors, and the construction of interior partitions, tracking and evaluating design options via BIM and Tally. Despite the extensive modifications to the old bottling plant, the revamp's embodied carbon was only about a quarter of what it would have been had the firm opted to construct a new building.

Renovations, can, of course, be carbon-intensive-particularly those performed on the same space multiple times over the life of a building, such as tenant improvement projects-but, so far, there is little industry data available to

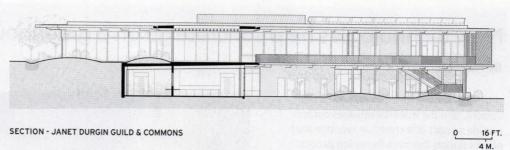
help quantify the impacts of cyclical remodeling. The Seattle-based architecture firm LMN wanted to get a better handle on the cumulative effects of such projects, which are about 10 percent of their work, so they analyzed renovations to their own office building-a 17-story International Style tower designed by SOM in the late 1950s. The concrete-framed edifice was a good candidate for such an exercise, since LMN had drawings, specifications, and other documentation for the changes to the space it occupies-currently about 2.5 floors-and for a curtain wall replacement that the firm designed in the 1990s, explains Kjell Anderson, director of sustainability.

Taking into account carbon reductions achievable with current construction practices, and assuming that all the tenants renovated their spaces with the same frequency as LMN,

and with similar design strategies and materials, the results of the analysis were a surprise: they showed that the total embodied emissions of interior modernizations over the past 60 years surpassed the combined embodiedcarbon footprints of the structure, its original envelope, and the new curtain wall. And the study probably understates the true impact of the renovations, says Anderson. It is based on LMN's workspace planning, with no enclosed offices, which is less carbon-intensive than one with many interior partitions. But the investigation helps the firm make the case with tenant improvement clients for low-embodiedcarbon strategies, including detailing for disassembly, reusing or refurbishing existing furnishings, and for open-plan layouts.

One target of intense scrutiny by advocates for embodied-carbon reductions is concrete. By

some estimates, Portland cement, concrete's key ingredient, is responsible for 8 percent of greenhouse-gas emissions globally-in part because so much of it is used (an oft-quoted detail is that concrete is the second-most consumed substance on earth, behind water) and partly because of the processes involved in its manufacture. While several startup companies are investing in technologies that promise to transform concrete into a material that sequesters carbon (see sidebar, page 106), many design teams are using less exotic methods to trim the embodied emissions on their projects. Portland, Oregon-based ZGF Architects, for instance, cut embodied carbon by nearly 25 percent on its Clifford L. Allenby Building, an 11-story, 360,000-square-foot California state



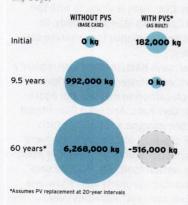
office block in downtown Sacramento, slated for completion in December. Much of the reduction is due to replacement of a portion of the cement with fly ash and slag (supplementary cementitious materials, or SCMs, that are waste products of coal combustion and steel-

making respectively). Using an LCA tool that ZGF developed specifically for concrete, and working with local architect Lionakis and the design-build contractor Rudolph and Sletten, the firm fine-tuned the mix specifications to achieve targets for compressive strength and



PV PANELS & OPERATIONAL ENERGY

Total Carbon Emissions: Embodied + Operational Carbon (kg CO₂e)



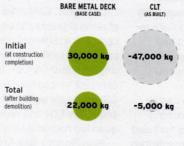
(kg CO₂e)

1% of embodied carbon on project Embodied carbon:



od is FSC certified and reflects the full

CLT 2% of embodied carbon on project Embodied carbon: (kg CO₂e)



ysis assumes CLT is FSC certified and has rates of 159

LOW-CEMENT BLOCK

1% of embodied carbon on project

Embodied carbon: (kg CO2e)



New technologies help concrete go on a greenhouse-gas diet.

By Peter Fairley

It takes a lot of heat to make Portland cement, and the material releases carbon dioxide as part of a chemical reaction that occurs during the manufacturing process. Since concrete is mostly rock and sand bound together by Portland cement, the latter gives the global concrete industry a carbon footprint larger than that of the entire country of India.

A number of innovators are working to clean up the world's leading building material by pumping it full of CO2. One such process-from Dartmouth, Nova Scotia-based CarbonCurehas already caught on with project teams, and a California-based competitor is hot on its heels with a complementary approach. Combined with some more established lower-tech tricks, these processes could trim concrete's embodied carbon by over 80 percent.

CarbonCure's process starts with CO2 captured from fertilizer and ethanol plants and purified primarily for use in carbonated drinks. But instead of carbonating sodas, Carbon-Cure's process carbonates concrete. The CO2 is pumped into concrete mixers, where it chemically bonds with and becomes trapped in the concrete. That keeps the CO2 out of the atmosphere, but it also makes the concrete stronger. The latter delivers most of CarbonCure's carbon benefit by reducing the amount of carbon-intensive Portland cement required to achieve a given pour's specified compressive strength. "Every pound of CO2 sequestered reduces another 25 pounds [of embodied CO2] through cement reduction," says Christie Gamble, CarbonCure's senior director of sustainability.

Nearly 200 concrete plants in North America and Singapore use CarbonCure's process, to date trapping or eliminating about 125 million pounds of CO2. Gamble attributes the technology's adoption to its ability to cut embodied carbon without added cost, since savings from using less cement pay for the CO2 and Carbon-Cure's license. "Almost every architect and engineer you talk to is interested in reducing environmental impact. When it's cost-neutral, it becomes an easy sell," she says.

Crucially, CarbonCure's technology can be combined with the other means of trimming concrete's footprint, such as replacing Portland cement with less carbon-intensive cementitious materials like fly ash from coal plants and steel slag. Cementitious supplements already displace about one-fifth of global cement demand,



A Law School building for the University of California, Hastings in San Francisco, designed by SOM and set for completion this month, combines CarbonCure technology with mixes that have high ash and slag content.

and experts say it could ultimately displace over two-thirds.

Juan Gonzalez, sustainability manager for operations at San Jose-based Central Concrete, says his firm routinely uses CarbonCure's process with concrete mixes that have high ash and slag content. He points to the floors that Central Concrete poured last year for the SOM-designed new San Francisco law building at the University of California, Hastings. For that job they added CO2 to concrete with a 55:45 ratio of Portland cement to substitutes, cutting embodied carbon in half relative to conventional concrete.

Los Gatos, California-based Blue Planet, one of several teams chasing CarbonCure's success, has a different cost-neutral scheme for cutting concrete's embodied carbon. They also rely on industrial CO2, but instead of tweaking concrete's need for cement, Blue Planet uses CO2 to create synthetic limestone that can sequester CO2 and replace aggregate-the quarried rock and sand used in concrete.

Blue Planet's Bay Area pilot facility takes raw pollution streaming from a gas-fired power plant and reacts it with highly alkaline industrial wastes from, for example, cement kilns,

mining operations, chemical plants, and demolished concrete. The reaction produces calcium carbonate-i.e., limestone-that is 44-percent sequestered CO2 by weight. The firm's first commercial plant, in construction east of San Francisco, will produce enough aggregate to sequester up to 1 million tons of CO2 a year. It will offset more CO2 by reducing imports of rock quarried in far-off British Columbia.

Greg Kats, a Blue Planet board member and a sustainability consultant, says one bump in Blue Planet's path is continued debate over how to quantify embodied carbon for materials that sequester CO2. Kats is working with the CSA Group, a Canadian standards body, to forge international guidance for concrete carbon disclosures.

What's clear, says Kats, is that there is plenty of CO2 to work with. Power plants worldwide release enough carbon to meet global aggregate demand, says Kats. And both Blue Planet and CarbonCure imagine a future in which capturing the gigatons of CO2 released every year by cement plants worldwide further slashes concrete's carbon footprint. Gamble says ongoing CarbonCure projects will "showcase that closed-loop concept" later this year.

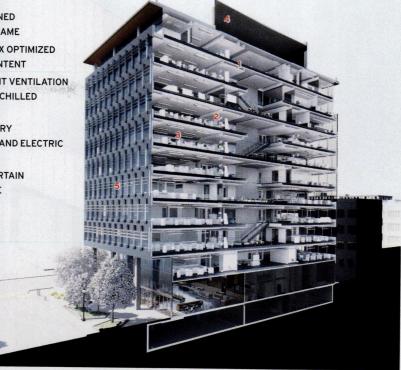
ZGF tweaked the concrete mix for the Clifford L. Allenby Building in Sacramento (right). The mix specification, along with other strategies, helped reduce the project's embodied carbon by nearly 25 percent.

GWP. Other strategies for shaving embodied emissions on the project, which is on track for LEED Platinum, include wider curtain wall modules to reduce aluminum content and a post-tensioned frame, which allows for thinner slabs and—because the resulting structure is lighter—also permits smaller footings.

Some firms are finding that it can be tricky to balance goals for operating energy and embodied carbon. WRNS Studio encountered this challenge on its Janet Durgin Guild & Commons at Sonoma Academy in Santa Rosa, California. Completed in 2018, the 19,500square-foot, two-story steel-framed structure, encompassing media studios, makerspaces, offices, and student dining, with an all-electric commercial kitchen, is built into a slope. This partially below-grade configuration meant that about one-third of the building's exterior envelope would be a retaining wall. typically constructed of poured-in-place concrete or concrete masonry units (CMUs). "This was great for our window-to-wall ratio, but not for our embodied-carbon footprint," says Souza. The firm's solution was to build the retaining wall with a combination of locally sourced reduced-cement blocks and standard CMUs. The approach cut the GWP of the retaining wall by about 32 percent. WRNS also opted for low-embodied-carbon materials for other parts of the building, using CLT for part of the roof instead of metal deck and reclaimed cedar for some of the siding. But because of the necessary below-grade structure, the building's carbon-use intensity comes in at about 52 kilograms of CO2e per square foot, which is higher than the firm's other recent educational projects. The building is, however, operating at net positive: photovoltaics (PVs) on its roof and on a neighboring building supply a surplus of electricity, even covering the demands of the energyintensive food preparation facilities.

Katerra encountered some of the same push and pull between operating efficiency and embodied emissions on its Catalyst project. Like the Sonoma Academy building, Catalyst has net zero energy aspirations, but with off-site PVs. One of the revelations of the CLF study was that some of the buildings' smallest elements are responsible for outsize embodied emissions. For instance, the facade system's insulated metal panels and aluminum clips—part of an assembly that includes CLT and terra-cotta—have a high GWP, given that they represent a small proportion of the materials used on the project by mass. Curtis says the

- 1 POST-TENSIONED CONCRETE FRAME
- 2 CONCRETE MIX OPTIMIZED FOR SLAG CONTENT
- 3 DISPLACEMENT VENTILATION
 AND PASSIVE CHILLED
 BEAMS
- 4 HEAT-RECOVERY
 VENTILATION AND ELECTRIC
 HEAT PUMPS
- 5 7' 6"-WIDE CURTAIN WALL MODULE



SECTION/PERSPECTIVE - CLIFFORD L. ALLENBY BUILDING

company felt it could not compromise on these components, since they were critical to the envelope's thermal performance and will help the building achieve its operations goal.

Even though it includes some highemissions elements, Catalyst will be nearly embodied-carbon-neutral. According to CLF's calculations, the project's timber stores 204.4 kg of CO2e per square meter, which comes very close to the building's overall global-warming potential of 207 kg of CO₂e per square meter. However, the report cautions that "one could say that the biogenic carbon storage practically offsets the impacts of construction, at least in the near-term before the wood decomposes in a landfill at end-of-life." Simonen explains that the disclaimer is due to a host of factors, including unknowns like how long the building will be in use, and that accounting for carbonstorage capacity can be complex. "Did the carbon storage take place in the past 40 years, when the tree was growing, or will it take place in the future, when a new tree is planted?" she asks rhetorically.

Despite the proviso, the Catalyst project demonstrates that there is real potential for carbon-neutral or even carbon-positive buildings—at least for small or medium-size structures. "We don't have the capacity to build that way at scale—at least not yet," says Simonen. But she points to exciting innovations in materials—not only for wood, but for other products, including those made with agricul-

tural waste, and highly experimental ones like concrete that would be "grown" from bacteria. "What motivates me is the possibility that buildings will be more than 'less bad,'" she says. "That they can be part of the solution."

Continuing Education



To earn one AIA learning unit (LU), including one hour of health, safety, and welfare (HSW) credit, read "Carbon Crackdown," review the supplemental material found at

architecturalrecord.com, and complete the quiz at continuingeducation.bnpmedia.com. Upon passing the test, you will receive a certificate of completion, and your credit will be automatically reported to the AIA. Additional information regarding credit-reporting and continuing-education requirements can be found at continuingeducation.bnpmedia.com.

Learning Objectives

- 1 Define and explain the difference between "embodied carbon" and "operational carbon."
- 2 Describe how embodied carbon is measured.
- **3** Describe low-embodied-carbon construction strategies.
- **4** Discuss new technologies for sequestering carbon in concrete.

AIA/CES Course #K2003A



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Why Use Cover Boards in North America?

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The Evolution of Water-Resistive and Air Barriers in Commercial Building Envelope Construction

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Making Transitions: Keeping Air and Water Barriers Continuous

Sponsored by Georgia-Pacific Gypsum

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Integrated Water-Intrusion Management Solutions for Multifamily Properties

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- CATEGORIES

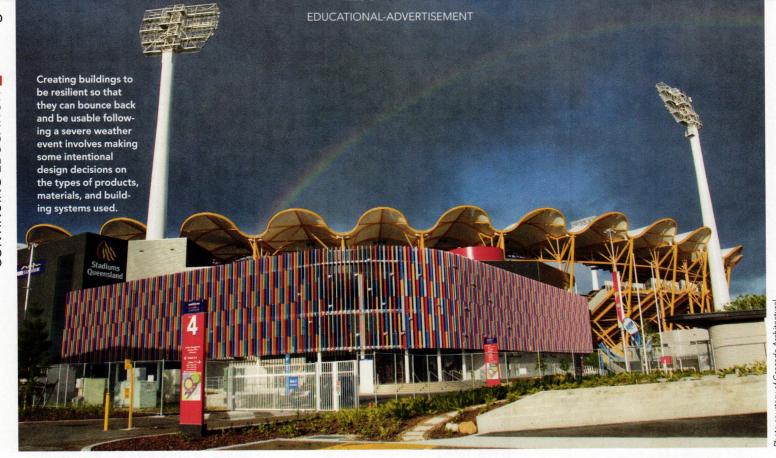
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LS LIFE SAFETY AND CODES

PM PRODUCTS AND MATERIALS

ST STRUCTURAL



Resilient Design

Creating buildings for adaptation to changing climate conditions

Sponsored by Cascade Architectural and C.R. Laurence Co., Inc. | By Peter J. Arsenault, FAIA, NCARB, LEED AP

uildings are routinely designed to meet the needs of the local site, average weather conditions, and climate. However, when those local weather and climate conditions change or become more intense than historical data suggests, it is incumbent upon design professionals to adjust building designs accordingly. The fairly recent widespread observance of such changes include an increase in the intensity or quantity of severe weather events such as hurricanes, tornadoes, heavy rain, wind, drought, etc. These conditions are leading to impacts on communities and buildings, including water-related events such as flooding and sea level rise, hot and dry conditions that are literally sparking wildfires around the world, and severe wind events that cause direct damage to buildings and infrastructure.

Recognizing severe weather and related events as a design issue is a first step. Determining an appropriate design response is the next. This course looks at some of the basic issues of resilient design and some examples of specific design strategies that can be implemented to create buildings that can remain resilient in the face of increasing changes and challenges.

DEFINING RESILIENT DESIGN

Resilience, resilient design, resiliency—these terms seem to get used interchangeably but without a lot of clarity sometimes on what is being talked about. A not-for-profit organization called the Resilient Design Institute (RDI) has done a good job of sorting these out for us. It defines the general term "resilience" as "the capacity to adapt to changing conditions and maintain or regain functionality and vitality in the face of stress or disturbance. It is the capacity to bounce back after a disturbance or interruption." This is consistent with the way the word resilience is used in general (e.g., resilient flooring "bounces back" after being stressed from foot traffic) and reflects a broad-based understanding. If this quality of resilience is what we seek in our buildings and communities, then it needs to be specifically and intentionally part of the design. Hence, the RDI defines resilient design as "the intentional design of buildings, landscapes, communities, and regions in order to respond to natural and man-made disasters and disturbances—as well as long-term changes resulting from climate change—including sea level rise, increased frequency of

CONTINUING EDUCATION

AIA Continuing Education

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

- Identify and recognize accepted principles associated with resilient building design for the safety of people and the integrity of buildings.
- 2. Assess the durability and safety performance aspects of glass and glazing systems as they relate to resilient and sustainable design.
- Explain the capabilities of coiled wire fabric in protecting people and property from damage and harm in both common and severe conditions.
- 4. Determine ways to incorporate the principles presented of public safety and resilient design into specific buildings as shown in case studies.

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heat waves, and regional drought." In short, it acknowledges that there are specific, identifiable issues that warrant equally specific design responses.

To provide design professionals with some guidance on how to achieve successful resilient designs, the RDI offers a variety of insights and resources, including its 10 Resilient Design Principles available at www.resilientdesign.org.

In addition to RDI, the AIA and other organizations have adopted positions and policy statements on resilient design and offer programs for architects and community leaders. These include the "Reframing Resilience" initiative of the AIA and the Design and Resilience Teams (DARTs) offered through the AIA's Center for Communities by Design. More information is available on these programs at www.aia.org.

With all of the above in mind, we look next at some specific ways to implement resilient design into buildings. These examples are applicable to all building types in a wide variety of locations and contexts.

GLASS AND GLAZING SYSTEMS

For buildings to be resilient enough to survive severe weather and still be functional after an event, the most vulnerable parts of the building must be addressed. This means looking at the entire building envelope, including the roof, walls, and, most notably, glass and glazing systems. The typical approach is seen in news reports of people putting up plywood over windows as a storm approaches. That may work for residential and low-rise commercial buildings, but it is not practical for anything higher than two stories. Furthermore, typical exterior building materials for commercial and institutional buildings are normally not conducive to having plywood nailed or screwed onto them.

What is the best approach for most buildings then? To design them with glass and glazing systems that incorporate materials and products that are intentionally fabricated and tested to withstand severe weather conditions, such as high wind loads, airborne debris impact, and/or extreme temperatures. These products can significantly improve the resiliency of buildings. They can also take a variety of forms with some of the more common types discussed in the following sections.

Thermal Entrance Systems

Many commercial, institutional, and industrial buildings incorporate aluminum-framed storefront and glass entrance systems on the first floor. While these are fairly common, there are real differences in the way these types of storefront and entrance products perform. In the case of resiliency, attention should be placed on the specification of the component parts and materials.

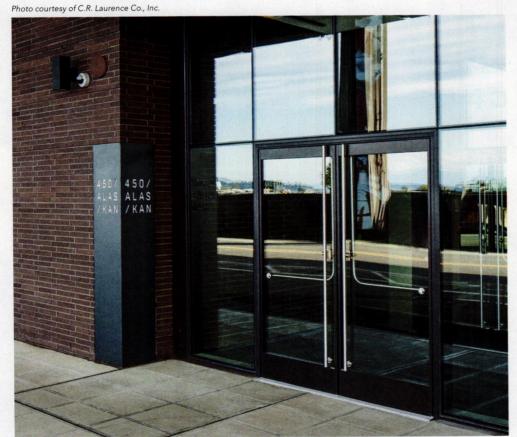
A resilient entrance system means that it is strong enough to withstand serious damage from storms while providing superior thermal performance. That way, if the building is occupied, it will help keep the interior environment warm in cold weather and cool in hot weather—a notable benefit at any time, but especially if the building is without power for extended periods.

Achieving this higher level of performance is based fundamentally on three things: the structural and material integrity of the aluminum frame and glass; the insulating value of the system; and the ability to prevent air and water infiltration through the system. Fortunately, there are products available that address all three of these criteria and manage to do so with aesthetic qualities that are appealing and sought after. For example, there are ultra-narrow stile entrance systems available that provide an elegant, all-glass appearance while still delivering exceptional thermal performance normally found in full-frame doors. Excellent thermal performance translates to U-factors as low as 0.33 to help control heat transfer during extreme temperature conditions. This is achieved in part by allowing insulating glass to be used that is 1 inch thick. In addition, such entrance systems meet or exceed the air infiltration requirements of the International Energy Conservation Code (IECC) and ASHRAE 90.1, both of which contain mandatory provisions on this topic.

As a premium storefront product, these entrance systems retain a desirable appearance of heavy glass doors with minimal vertical lines. When it comes to the hardware used for door pulls and panic devices, it is possible to attach them directly to the glass. At least one manufacturer has developed a means to secure such door-pull hardware directly onto 1-inch insulating glass panels using unique throughglass fittings. This provides an added aesthetic and functional benefit without compromising the performance of the doors.

PROTECTING PEOPLE AND PROPERTY

Resilient building design needs to address a variety of potential forces or conditions that can harm people or damage buildings. As already noted, these can include protection from wind-borne debris/missiles but can also include protection against sudden bursts of pressure or even blasts. An alternative to raising the protective performance of individual building envelope components, such as glass and glazing systems, is to protect them with an additional material that is placed on one side



High-performance entrance systems provide greater resilience through properly specified components and enhanced thermal properties, all while offering an elegant design using ultranarrow door stiles.





Coiled wire fabric can be used on either the outside or the inside of buildings to provide a variety of attributes, including increased resilient design.

or the other. This creative solution is based on using conventional, proven materials in innovative ways.

What type of material would be appropriate here? One choice is coiled wire fabric, which acts like a metal curtain or screening to cover and protect walls, glazing, and entrances in a way that allows a good deal of design flexibility. Coiled wire fabric is often used to provide solar protection and ornamental decoration in buildings. By selecting a grade and type of wire fabric that is appropriately tested, protecting the critical components of a building's envelope is also possible. Such an approach can help avoid a breach in the envelope that would allow wind and water penetration inside. This can be achieved using coiled wire fabric systems on either the inside or outside of the building enclosure.

For a better understanding of this design concept, let's now take a closer look at this innovative product.

Coiled Wire Fabric Systems

First, it is important to recognize that coiled wire fabric products are different from traditional metal mesh materials. The essential difference is they are designed as architectural products for use as a finish material, not just a utilitarian one. As a durable, thin material, coiled wire fabric is lighter in weight than traditional wire mesh and offers more design flexibility. For interiors, architects and designers use coiled wire fabric products for window curtains, ceiling treatments, wall coverings,

security gates, and even as complete sculpting partitions, all adding elegance and purpose to the spaces where they are used. On building exteriors, they can provide sun shading, fall protection, and visual facade treatments. In all cases, they can allow for ventilation or the controlled passage of air and light.

A closer look at the attributes of coiled wire fabric systems follows.

- Material makeup: Coiled wire fabric systems begin with a base metal wire in varieties of steel, aluminum, brass, copper, or stainless steel. The choice of the wire material and its gauge impact the weight, functionality, and aesthetics of the final fabric. By altering the base material, weave thickness, wire gauges, weave pattern, and finishes, the strength, rigidity, and appearance can all be chosen to meet the design or performance characteristics being sought. It is worth noting that the fabric is available in virtually unlimited widths and up to 40 feet in length, so large installations can be achieved with a single panel in many cases. For projects needing more than a 40-foot span of fabric, multiple coils can be spliced together at the job-site in a routine fashion and still create a continuous or seamless appearance.
- Design concepts: Coiled wire fabric is used as a highly decorative design element that adds dramatic and elegant screening to exterior and interior applications. It is highly customizable and available in virtually unlimited finishes. Coiled wire fabric is available in

either a natural, uncoated state or with resilient powder-coating finishes for a sharp, longlasting, durable aesthetic. This means that the color choices are broad, allowing it to be a successful part of virtually any design scheme. Further, the finishes can be specified with low VOC content to protect against that exposure when used on interiors. In fact, some coiled wire fabric products carry Declare labels with the International Living Future Institute.

- Attachment systems: The means of attaching the wire fabric to the building can be done in a variety of ways and with a variety of appearances. The material can be left to hang (i.e., flowing freely), secured at both the top and bottom, or even be pulled taut to create a semi-rigid condition. Because of its fabric nature, curved and undulating shapes are easily achieved, providing facades and interiors with more character and vitality than rectilinear shapes alone. Products are available in either fixed or movable configurations along track attachment systems that are engineered to fit the precise aesthetic and performance requirements of a project. Many attachments are offered in aluminum, steel, or stainless steel and are available with optional ceiling, wall, or suspended mounting systems. Engineered attachment systems can be manufactured flat or undulating to varying degrees, then finished with the coating or color of choice.
- Performance traits: From a resiliency performance standpoint, coiled wire fabric can be used as an element across a full facade in coordination with other building enclosure systems to protect otherwise vulnerable components. In appropriate strengths, it can provide partitioning for safety, fall protection, blast mitigation, and security. As a material added to a building, coiled wire fabric is a long-lasting and durable product requiring minimal if any maintenance. The open nature of the fabric is such that it can be used for solar shading, which can contribute to energy savings. It can also be used for lighting effects (i.e., illuminated with wash lighting) or light diffusion to further enhance the interior ambient lighting of a space.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP. is a nationally known architect, consultant, continuing education presenter, and prolific author advancing building performance through better design. www.pjaarch.com, www.linkedin.com/in/pjaarch





PRODUCT REVIEW

Resilient Design

Cascade Architectural



Fabricoil® Coiled Wire Fabric Transforms Parking Garage

Cascade Architectural provided the fully engineered Fabricoil® coiled wire fabric systems for the Building 4 parking garage on the HCA Campus in Nashville, Tennessee. The company is a leading manufacturer of coiled wire fabrics for a wide variety of applications. The Fabricoil® product meets all of the functional requirements—most notably ventilation, fall protection, and long life cycle.

www.cascade-architectural.com

C.R. Laurence



GRS Laminated Glass Railing System

The GRS Laminated Glass Railing System features advanced dry-glaze technology and a precision-torque installation tool that automatically levels and plums the glass panels for enhanced sightlines. The system is impact resistant and has Florida Product Approval. It is also ICC-ES certified, which takes the guesswork out of meeting building codes nationwide.

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Why Use Cover Boards in North America?

Sponsored by Georgia-Pacific Gypsum

over board can be a strategically important addition to roofing systems to help protect against the most common threats to flat or low-sloped roofs. The risk of damage from wind, water intrusion, fire, foot traffic, and the potential of puncture can all be mitigated using cover boards as a protective layer above the insulation. In addition, the inherent nature of cover board can also offer better acoustic performance and allow for additional support for photovoltaic energygeneration systems as well as vegetative roofs.

Modern cover board comes in several varieties and can be finished or coated with different materials depending on the specific needs of the roof. One of the more popular choices

for low-slope or flat roofs is a fiber-infused gypsum board with a laminated fiberglass mat facer. A rigid cover board, with good compressive strength, distributes impact to prevent insulation compression and improves puncture resistance

For installations where hail is a concern, a cover board that can handle compression loads in the 500-900 psi range (e.g., fiberglass-mat gypsum board) can protect the roof even in extreme weather events. It is hard enough to protect the foam insulation from the impact of very large hailstones but can still flex to cushion the membrane itself.

Continues at ce.architecturalrecord.com

Photo courtesy of Georgia-Pacific Gypsum

CONTINUING EDUCATION

AIA Continuing Education 1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

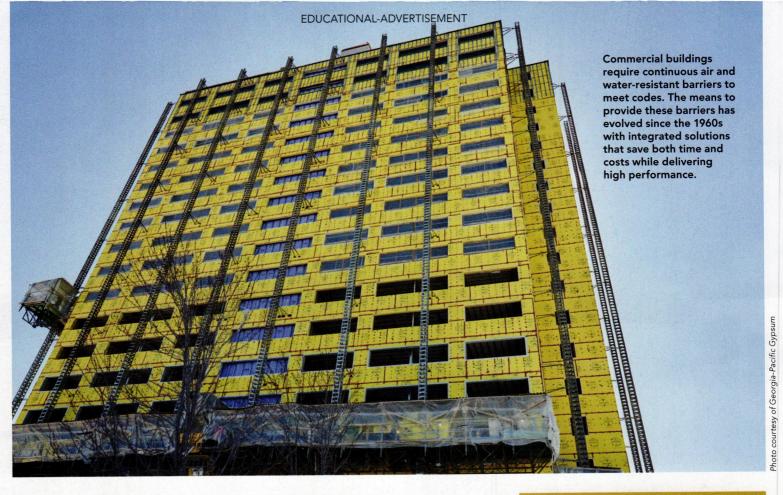
- 1. Explain what cover board is, and list best practices for installing cover board in roof assemblies.
- 2. Identify what factors affect roof lifespan, and discuss how these factors can impact the health and safety of occupants.
- 3. List the key approvals to seek with cover board to ensure the comfort, safety, and welfare of occupants.
- 4. Describe how cover board can impact building performance to improve durability, indoor air quality, and occupant comfort.

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The Evolution of Water-Resistive and Air Barriers in Commercial Building **Envelope Construction**

Understanding integrated sheathing and WRB-AB System Solutions

Sponsored by Georgia-Pacific Gypsum

ommercial building envelopes have evolved in recent decades, driven in large part toward better performance for durability, resilience, and energy efficiency. Some of the motivation for these results has been driven by code requirements, others by green building standards, and some simply by owner demands for better performance, faster installation, and labor efficiencies.

In response, a number of building products have used innovation backed up by performance testing to address the particular need to create the four barriers needed as part of any building enclosure—namely waterresistive barriers (WRBs), air barriers (ABs), thermal barriers, and vapor retarders.

Continues at ce.architecturalrecord.com

CONTINUING EDUCATION

AIA Continuing Education 1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

- 1. Explain the key functions required by building codes for water-resistive barriers, continuous air barriers, vapor retarders, and thermal barriers in a building envelope/enclosure.
- 2. Describe the durability, resilience, energy efficiency, and advantages/disadvantages of the various WRB-AB systems currently on the market.
- 3. Describe the differences in manufacturing and performance between coated and fully integrated methods of all-in-one sheathing systems available in the marketplace today.
- 4. Design with integrated sheathing products to achieve labor, material, and installation time savings in commercial building envelope construction.

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Making Transitions: Keeping Air and Water **Barriers Continuous**

Integrated sheathing solutions help streamline detailing and installation

Sponsored by Georgia-Pacific Gypsum | By Peter J. Arsenault, FAIA, NCARB, LEED AP

uilding envelopes need to create the four barriers needed as part of any building enclosure—namely water-resistive barriers (WRBs), air barriers (ABs), thermal barriers, and vapor retarders. Commonly, these are each thought of as independent products or systems that are easy to imagine across a smooth, continuous plane in a wall or roof deck. However, actual construction is not completely smooth and continuous. There are places where different materials and assemblies meet, such as the transition from an above-grade wall to a concrete slab or foundation wall. There are also openings in most walls for windows, doors, and other features, meaning there is a transition of the barriers around those openings.

The place where the roof meets the wall, particularly in a commercial building that may have a parapet wall, is another transition area where the continuity of the barriers can be compromised if they are not designed, detailed, and installed correctly. In this course, we will focus on these three transition areas in particular: wall to foundation, openings, and roof to wall.

Continues at ce.architecturalrecord.com

Peter J. Arsenault, FAIA, NCARB, LEED AP, is a nationally known architect, consultant, continuing education presenter, and prolific author advancing building performance through better design. www.linkedin.com/in/pjaarch, www.pjaarch.com

CONTINUING EDUCATION

AIA Continuing Education 1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

- 1. Identify the role that building construction transitions play (roof to wall, wall to foundation, and wall to disparate materials) in achieving a well-designed building envelope, including conditions that contribute to failure.
- 2. Recognize the points in the design process where construction transitions need to be addressed and specific areas that required detailed attention.
- 3. Review the conditions that promote movement of bulk water, moisture, or vapor drive, and how those conditions impact construction transitions, specifically at roof-to-wall, wall-to-foundation, and wall-todisparate-material locations.
- 4. Describe the importance of maintaining the continuity of water-resistive barriers and air barriers across construction transitions, and assess integrated sheathing products and systems as a means to achieve that continuity.

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All images courtesy of TAMLYN

Integrated Water-Intrusion Management Solutions for **Multifamily Properties**

Single-source products for various facade options

Sponsored by TAMLYN | By Rebecca A. Pinkus, MTPW, MA

ver the past several years, construction of multifamily residential properties has increased to accommodate changing demographics both in cities and suburbs. The combination of Millennials moving into their own dwellings-often now with new families—and Baby Boomers moving from the suburbs to cities has kept the multifamily residential sector going strong.1 Multifamily construction refers to anything from two-unit duplexes and townhomes to apartment and condominium complexes with hundreds of units. In short, multifamily residential properties are big business, both for architects and builders.

When architects are tasked with building multifamily units, water-intrusion

management strategies can take significant time and effort in the project. After all, moisture management is increasingly being understood as a critical aspect of building design and construction. When done properly to address the local climate, a good moisture management system can help protect the building structure, extend the life of exterior cladding and paints, and protect the building against everything from mold and rot to insect infestations. When not done properly, the opposite can be true, and the consequences can result in structural damage to the building and health hazards for building occupants, both of which can be dangerous and costly.

Moisture typically gets into a building in three different ways:

CONTINUING EDUCATION

1 AIA LU/HSW

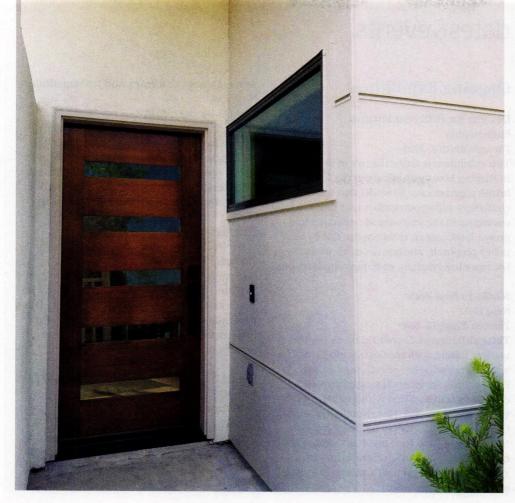
Learning Objectives

After reading this article, you should be able to:

- 1. Describe the relationship between rainscreens and water-resistant barriers (WRBs) in multifamily residential units, and how they add to the health, safety, and well-being of building occupants.
- 2. Identify how new permeable WRBs integrated with drainage materials can be used with multiple siding/facade applications in a successful building envelope strategy that keeps moisture out and the indoor air quality safe for occupants.
- 3. Explain the properties and benefits of using extruded aluminum trim on multifamily residential project exteriors.
- 4. Discuss how extruded aluminum trim can complement an integrated water-intrusion management strategy for multifamily residential projects, and in so doing improve the overall health, safety, and well-being of occupants.

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AIA COURSE #K2003D



Projects with multiple cladding materials, such as the stucco and fiber cement shown here, often require different water-resistive barriers (WRBs) or assemblies between the sheathing and cladding. This can result in increased installation time.

- 1. external sources, such as rain, snow, and ice;
- 2. internal sources, such as burst pipes; and
- 3. construction sources, such as damp materials or poor workmanship.

All buildings that are exposed to exterior moisture are at risk of water intrusion. The combination of wind and gravity—and the near certainty of eventual cracks-means that water will find a way to get in. A fault in the actual building design, for example, can inadvertently trap water in a way that directs that moisture back into the building rather than off of and away from the building. Alternatively, building professionals may fail to take into account certain aspects of the site, and that results in water intrusion. A building may get stronger wind exposure than expected, and when it rains, the wind may push water into vulnerable spaces. Internal sources, such as burst water pipes or building occupants who fail to maintain the building or generate moisture from within the property, can also cause moisture damage. Finally, moisture can get in when builders or

contractors simply do not secure the building in a way that they are supposed to, either by installing something improperly or through substandard work. Regardless of who is responsible or how it happens, when moisture gets into a building, it is a bad situation. As such, a good moisture management plan and system can help prevent future problems. In this course, we will focus on external moisture management.

For the most part, builders in climates with more predictable rain and snowfall such as the Pacific Northwest or Northeast tend to understand the importance of moisture management systems and know how to incorporate them into projects. Between building codes that require the protection and general experience with wet weather, good moisture management practices are becoming standard in these parts of the country. Builders in hotter and drier areas, however, have not been overly concerned with such practices since they have not had to worry much about them. Local building codes may not require as stringent moisture management for buildings

in drier climates; however, changes in weather patterns have meant that buildings in these areas are not protected when they need to be. Across the country, moisture management strategies are increasingly being included in building design, and this includes multifamily residential projects.

Moisture and water-intrusion management systems include a combination of water-resistant barriers (WRBs) that protect the building assembly, rainscreens that include furring (wood, metal, plastics), exterior facade materials, and some form of exterior trim. WRBs, also known as building wrap, protect the building structure by providing a barrier between outside moisture and the interior structure. When properly installed, the WRB will shed any water that gets through the outer facade materials and let that water drain out of the assembly if rainscreen materials are applied on top of the WRB. Trim, on the other hand, can tie the exterior panels and other facade materials together while adding to the building aesthetic.

Moisture management also relies on what are known as the 4 Ds: deflection, drainage, drying, and durability.

Deflection, in this context, refers to designs and materials that keep as much precipitation off of the exterior wall enclosure as possible. Roof slope and eaves designs, for example, can deflect water, but so can external cladding. Drainage is important because any water that pools will eventually find a way into the structure. Drainage helps make sure that it is easy for water to get off of and away from the building. Again, roof design is important, especially with adequate overhangs, but so are gutters and a good WRB system in combination with a rainscreen or drainage plane underneath the cladding. WRBs also play an important role in drying the building, and new WRB designs increasingly focus on this critical element. We will discuss how this works a bit later. Another key to drying is the depth of the rainscreen utilized. Finally, an exterior that is durable enough to withstand the elements helps ensure the durability of interior building components. Once moisture gets into a building, the durability of the enclosure is at risk.2

Continues at ce.architecturalrecord.com

Rebecca A. Pinkus, MTPW, MA, is a Torontobased communication consultant, writer, editor, and historian of technology. She has been writing for the green build industry for several years and has contributed to more than 40 continuing education courses and publications through Confluence Communications.



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New and Upcoming Exhibitions

Making Architecture

Bellevue, Washington March 27-September 13, 2020

This exhibition displays American architect Steven Holl's work at the Bellevue Arts Museum, a building he designed. Seventeen of his most recent projects will be shown through watercolor drawings, material fragments, models, sculpture, photographs, and writings both by and about Holl. See more at bellevuearts.org.

2020 AIANY Design Awards

New York

April 16-June 27, 2020

The exhibition at the Center for Architecture features winning projects from AIA New York's annual Design Awards program, recognizing outstanding architectural design by members, other New York-based architects, and work in the city by architects from around the world. The purpose of the awards program is to honor the architects, clients, and consultants who have achieved design excellence. Details at centerforarchitecture.org.

Ongoing Exhibitions

Designs for Different Futures

Philadelphia

Through March 8, 2020

This exhibition is about the role of designers in shaping how we think about the future. It brings together over 80 works that address the challenges and opportunities that humans may encounter in the years ahead, including labgrown food, robotic companions, family-leave policy proposals, and textiles made of seaweed. For more information, go to philamuseum.org.

Nivola in New York

New York

Through March 15, 2020

This exhibition at Cooper Union shows the work of Italian sculptor Costantino Nivola, whose large-scale bas-reliefs, murals, and freestanding sculptural installations were created in collaboration with architects. On view in the Arthur A. Houghton Jr. Gallery, this is the first display to tell the story of Nivola's built New York projects through maquettes and sculptures, original drawings, site-specific photographs, and related ephemera. More at cooper.edu.

Agnes Denes: Absolutes and Intermediates

Through March 22, 2020

This is the first comprehensive exhibition of Hungarian-born artist Agnes Denes's work in New York. The retrospective, at the Shed, includes sketches, drawings influenced by math and science, sculptures, and archival photographs and video. Learn more at theshed.org.

Passages of Light

Mexico City

Through March 29, 2020

A survey of James Turrell's works will be held at Museo Jumex. The exhibition will span two floors and show new pieces by the artist-who uses light as a medium-featuring immersive installations that test the limits of human perception. More at fundacionjumex.org.

Public Works: Reflecting on 15 Years of **Project Excellence for New York City**

New York

Through April 4, 2020

The exhibition at the Center for Architecture highlights the NYC Department of Design and Construction's "Project Excellence" program, established to elevate the design of public

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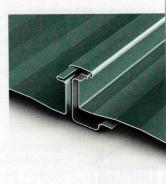
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spaces in New York. Established in 2004, the project works in partnership with experienced design and construction professionals to provide enduring, accessible, and community-oriented spaces that shape the city's neighborhoods. Details at centerforarchitecture.org.

McCormick AfterParti

Elmhurst, Illinois Through April 12, 2020

Visitors to the exhibition by architects and educators Joseph Altshuler and Zack Morrison are invited to explore Mies van der Rohe's McCormick House, with its original 1952 floor plan, for a series of interactive events throughout the space. Open discussions about past and future preservation efforts will take place. See elmhurstartmuseum.org.

Access for All

New York

Through May 16, 2020

This exhibition, at the Center for Architecture, highlights public and private projects in São Paolo that improve the life of its citizens by creating inclusive places for urban society. Through commissioned drawings, films, inter-

views, archival materials, and "infographics," the exhibition illustrates the city's rich architectural history. Visit centerforarchitecture.org.

Eileen Gray

New York

Through July 12, 2020

On view at the Bard Graduate Center Gallery, this exhibition explores Gray's career not only as an architect and designer, but also as a painter and photographer. Nearly 200 of her works will be featured, including furniture, lacquer works, architectural drawings, and archival materials. See bgc.bard.edu.

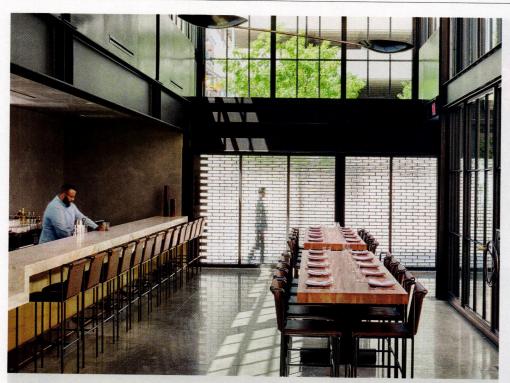
Lectures, Conferences, and Symposia

International Mass Timber Conference

Portland, Oregon March 24–26, 2020

This conference at the Oregon Convention Center explores the supply chain for crosslaminated timber, pail-laminated timber.

laminated timber, nail-laminated timber, glulam beams, mass plywood panels, dowellaminated timber, and laminated veneer lumber, and the opportunities and obstacles



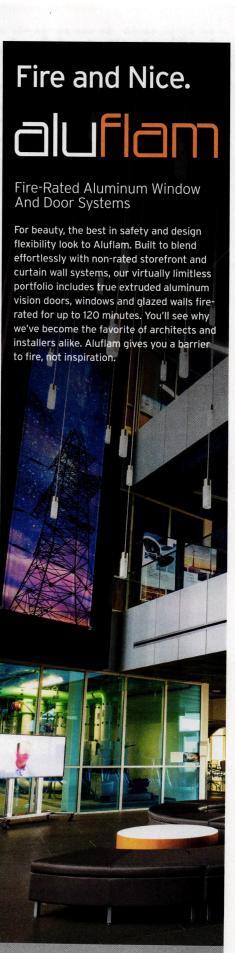


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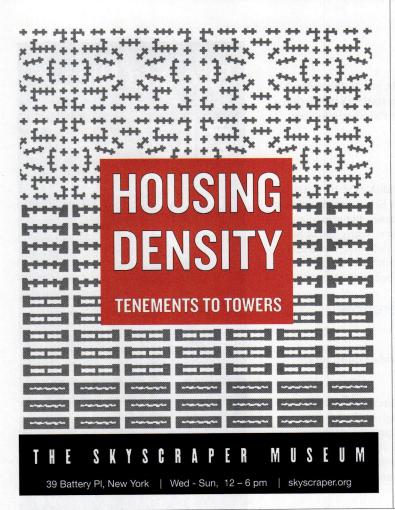
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for mass timber in global manufacturing and construction. This year, Pritzker Architecture Prize–winner Shigeru Ban is the keynote speaker. More information at masstimberconference.com.

Thresholds: Design and Science

Cambridge, Massachusetts

March 27, 2020

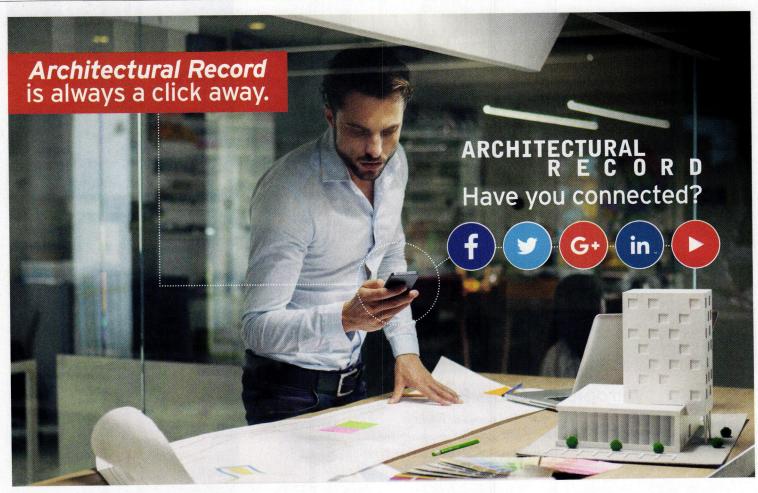
This conference at the Knafel Center at Radcliffe Institute for Advanced Study is an open forum for discussion. The sessions—thematically aligned with the human senses—present many approaches, methods, and techniques, crossing the divide between science and design in projects and explorations ranging from fashion to material science, from perfume creation to building science, and from cooking to cognitive science. More at gsd.harvard.edu.

Kersten Geers and David Van Severen Lecture

Cambridge, Massachusetts

April 7, 2020

As part of the Harvard Graduate School of Design's spring lecture series, founders of the Belgian-based practice OFFICE, Kersten Geers and David Van Severen, will share insight into their idiosyncratic approach to architecture and show recent work that deals with size, scale, and pragmatism. The event, called "American Architecture?", based on the duo's teaching course at Harvard, will be held at the Gund Hall Piper Auditorium at 6:30 p.m. More at gsd.harvard.edu.



Vectorworks Design Summit

San Diego

April 22-24, 2020

Professionals, educators, and students in architecture may attend the annual event, hosted at the Omni La Costa Resort & Spa. The conference includes workshops, product training, keynotes, networking opportunities, and a party. More at vectorworks.net/design-summit.

2020 Wright Plus Housewalk

Oak Park, Illinios

May 16, 2020

The all-day annual architectural experience presented by the Frank Lloyd Wright Trust is held in the Chicago suburb that is home to more Wright buildings than anywhere in the world. For one day, homeowners invite guests into the private living spaces of their restored houses, reimagined for today's lifestyles. Volunteer guides will be on hand to enhance the tours with details about the history and the architectural elements that give each house its unique character. Learn more at flwright.org/wrightplus.

Atlanta Design Festival

Atlanta

May 30-June 11, 2020

The annual week-plus event, held since 2007, will include a series of architecture tours, showroom presentations, talks, and installations around the city. Details at atlantadesignfestival.net.





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Competitions

Urban Confluence Silicon Valley Open Design Competition

Deadline: April 3, 2020

International artists, architects, urban planners, landscape architects, lighting designers, and students may submit ideas for a structure intended to be a symbol of Silicon Valley. The competition seeks a transformative design complete with dramatic lighting, a net zero energy approach, and an impressive physical presence. Three finalist teams will each be given a \$150,000 stipend to refine their proposals. See urbanconfluencesiliconvalley.org.

DETAIL Prize

Deadline: April 30, 2020

This prize, awarded every two years by DETAIL, goes to projects that are groundbreaking due to outstanding architectural-design and technical qualities. Any building types completed anywhere in the world after January 1, 2017, are eligible to win. Construction projects for new buildings, renovations, conversions, and extensions may all be submitted; open to architects, civil engineers, structural engineers, and

students. The three best submissions, according to overall design concept and detailing, will be chosen as prizewinners. See detail-online.org.

dates&events

Landslide 2020

Deadline: May 1, 2020

The Cultural Landscape Foundation (TCLF) released a call for project nominations for the foundation's annual report about threatened and at-risk landscapes. This year's theme, Women Who Shaped the American Landscape, coinciding with the centennial of women's suffrage, will focus on at-risk landscapes created by or associated with female landscape architects. The report will be released in September, along with a website and a traveling photographic exhibition that will debut at the Boston Architectural College, September 8. For more information, go to tclf.org.

Low-Cost House Design Competition

Deadline: June 1, 2020

This competition aims to promote alternative solutions to housing, coming up with affordable and sustainable units of limited size and budget to meet urgent demands for housing urban and low-income residents. Entrants are challenged to conceive a new and original concept for a

low-cost house with expandable units or local materials. Each submission must be for no more than two floors (including the ground floor) with maximum 500 square feet singlefloor plan. Winners receive cash prizes totaling \$1,000-including \$500 for the first-place winner-and will be posted on the official website. More at low-costhouse.com.

Airport of the Future Design Competition Deadline: July 1, 2020

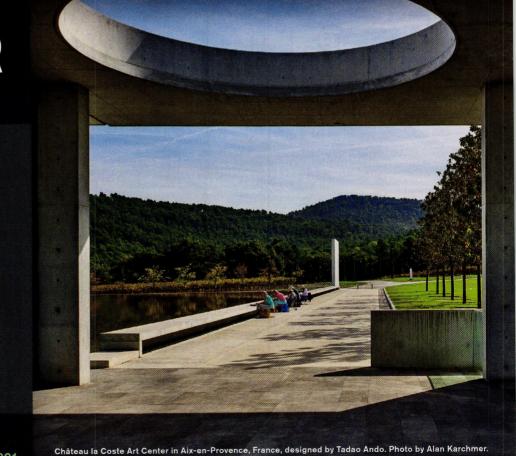
Students and recent graduates from around the world are invited to submit to Fentress Global Challenge's competition as they create a new airport-terminal concept. Entrants are encouraged to utilize forecasts for population, environmental conditions, modes of travel, and potential destinations in the creation of their concept. Submissions will be judged on innovation and creativity, responsiveness to the site, sustainability and resiliency, and functionality. First place will receive \$15,000 in cash and prizes, and four additional entries will also receive awards. See fentressglobalchallenge.com.

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ARTIST

Nestled in a valley among the mountains of Northern China's Chicheng County, MHC Ice Wine Center quietly blends into its surrounding landscape. The cold climate and fertile soil here are ideal for creating this dessert wine that requires grapes to be harvested while frozen on the vine. Designed by Hong Kong-based O Studio Architects, the 9,700-square-foot building supports a matrix of white-painted steel frames—almost like wine racks themselves—which soften the orthogonal concrete structure behind it. The team conceived the latticelike veil in part to accommodate the client's request for a "nonrectilinear building that echoes the mountainscape," says Fai Au, the firm's founding principal. The center contains a cellar tucked into the sloped site for controlled aging, with grape pressing and public tasting rooms at ground level; above, a rooftop terrace offers exquisite views as a backdrop for sipping and socializing. *Kara Mavros*

