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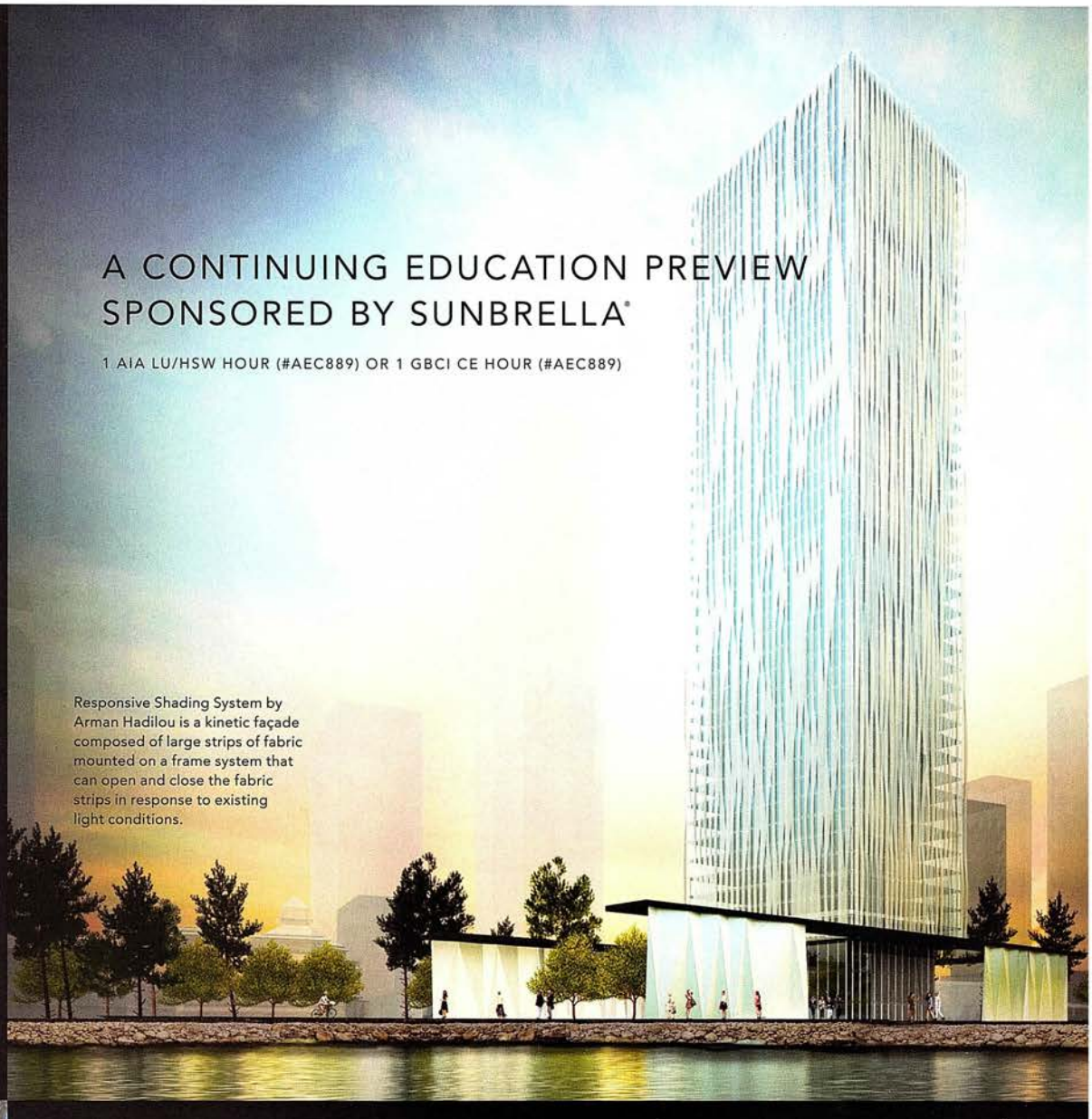
1 AIA LU/HSW HOUR (#AEC889) OR 1 GBCI CE HOUR (#AEC889)

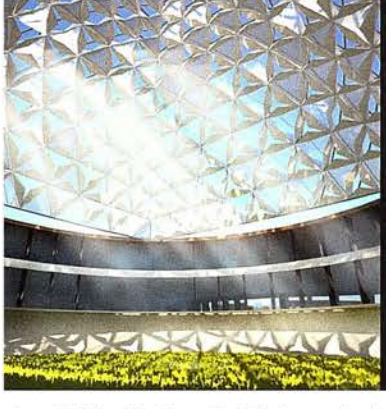
CEU LEARNING OBJECTIVES

1. Discuss innovations and futuristic objectives for using shade structures constructed with fabric in commercial architecture.
2. Explain how shade structures made of fabric can add both appealing design and functionality to building structures.
3. Define the benefits of shade structures for personal health and UV protection.
4. Discuss how the use of textiles in shade structures can positively impact thermal performance and energy efficiency.
5. List LEED® V4 credits to which awnings and solar shades can contribute directly.

Learn more about the future of shade by completing this continuing education course at sunbrella.com/fosceu.



Responsive Shading System by Arman Hadilou is a kinetic façade composed of large strips of fabric mounted on a frame system that can open and close the fabric strips in response to existing light conditions.



SHADE IS ARGUABLY ONE OF THE VITAL ELEMENTS IN MODERN LIFE, THOUGH NOT SOMETHING THAT TYPICALLY TAKES CENTER STAGE IN THE DESIGN DIALOGUE. UNTIL RECENTLY, FABRIC SHADE STRUCTURES WERE AN APPENDAGE TO A BUILDING, AN AFTERTHOUGHT, AN ACCESSORY.

Invertible Shade by Ehsan Fatehifar is a tensile shade system of repeating geometric shapes that can be adjusted to allow varying amounts of light inside the building.

OF SHADE

FABRIC COMPONENTS IN SUSTAINABLE ARCHITECTURAL DESIGN

Increasingly, shade structures begin the design conversation especially for commercial buildings, structures in sunny climates, those which will inhabit a warming planet (this one) and architects looking for new ways to create built environments in harmony with nature's forces. The future includes a conscious intention toward shade structures.

THE EVOLUTION OF SHADING FABRICS

In order to appreciate the future of shade and position oneself on the leading edge of this movement, it helps to review the past, the long history of using fabrics as architectural add-ons and how the practice has evolved.

Prior to the 1960s, most awnings and shading fabrics were made of cotton canvas, which the sun broke down quickly. In 1961, the owners of one of the oldest, most respected fabric brands decided to change the nature of shading materials the company had been making since the 1880s. They replaced cotton with acrylic fibers and pre-extrusion pigments and offered an unheard-of warranty of five years. They were dubbed "performance fabrics."

In the 1970s, performance fabrics got the attention of boaters, and the outdoor furnishings industry exploded with these new, long-lasting yet pliable fabrics. In 1988, BMW became the first car brand to adopt this company's fabrics for its convertible models.

By the early 2000s, as the green building movement gained momentum with the U.S. Green Building Council's LEED rating program, more attention was paid to the sustainable nature of performance fabrics. As high-performing shade fabrics last longer, people use less fabric and thus generate less waste as compared to other fabrics that might fade, lose strength or give in to mildew and atmospheric chemicals. In fact, some fabrics can be recycled through manufacturer recycling programs, reducing impact on landfills.

SIGNAGE AND BRANDING WITH FABRICS

As the use of shading fabric continues its trajectory in modern architecture, its use as a business branding strategy spans the decades. Historically, a print canvas canopy over a cigar shop or beauty parlor signaled the establishment's presence to passersby. While that design practice continues today, modern corporate branding with fabric is often spectacular, with enormous printed banners moving in the breeze. They are a signal to passersby and even passing aircraft that business or cultural events are happening there. The colors of the shading fabric convey their own branding message, tying into the corporate, company, educational or nonprofit organization's identity.

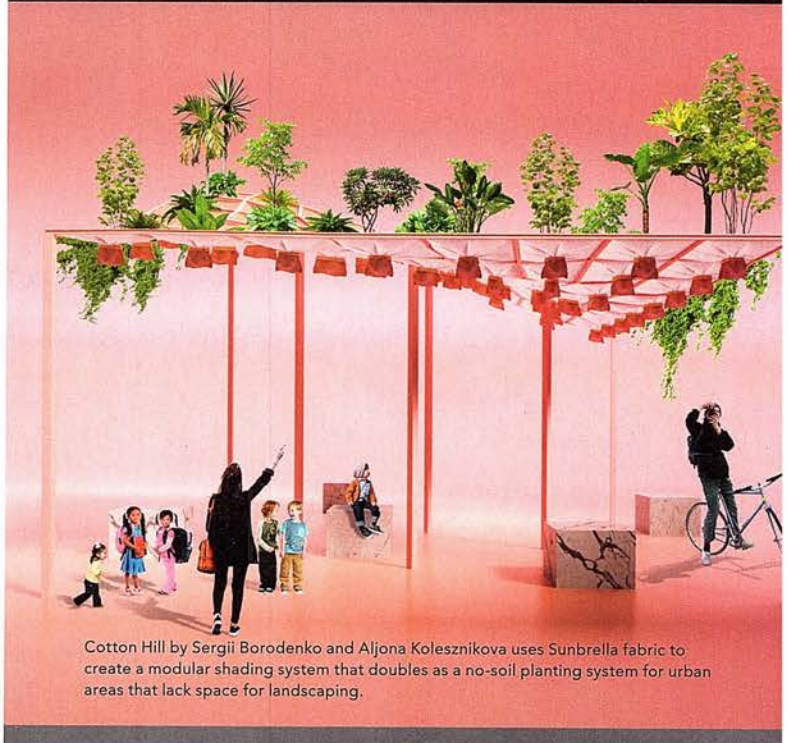
EXPANDING SPACE

Shading strategies in corporate, cultural and residential settings create copious amounts of added space for meetings, gatherings, meals and leisure. While the cost of walls and a roof could be prohibitive, and most likely exceeding a particular lot's allowable square footage of structure, the addition of shaded "rooms" becomes a possible way to expand the amount of usable space. Fabric enclosures in commercial spaces such as restaurants can help boost profits by increasing the amount of outdoor seating available year-round.

SHADE STRUCTURES FOR HEALTH AND UV PROTECTION

Protection from the sun has always been important to humanity, but never so much as it is in modern times, with holes in the ozone layer and the unprecedented speed at which our planet is warming. Whereas natural climate change occurs gradually, giving organisms the opportunity to evolve their own protections, the speed of this man-induced climate change requires man-made protections. Ideally, we don't want sunlight to be totally "on" or "off," and that is where UV-resistant shading fabric (as well as shade itself) comes into play.

Frames to Shams-Ol-Emareh by Nastaran Torabi and Zahra Noori Jamshidi is a series of orange-fabric-covered frames suspended in the forecourt of the historic Shams-ol-Emareh mansion in Tehran. The frames provide shade and seating, while also offering visitors a new framed perspective on the mansion.



Cotton Hill by Sergii Borodenko and Aljona Kolesznikova uses Sunbrella fabric to create a modular shading system that doubles as a no-soil planting system for urban areas that lack space for landscaping.

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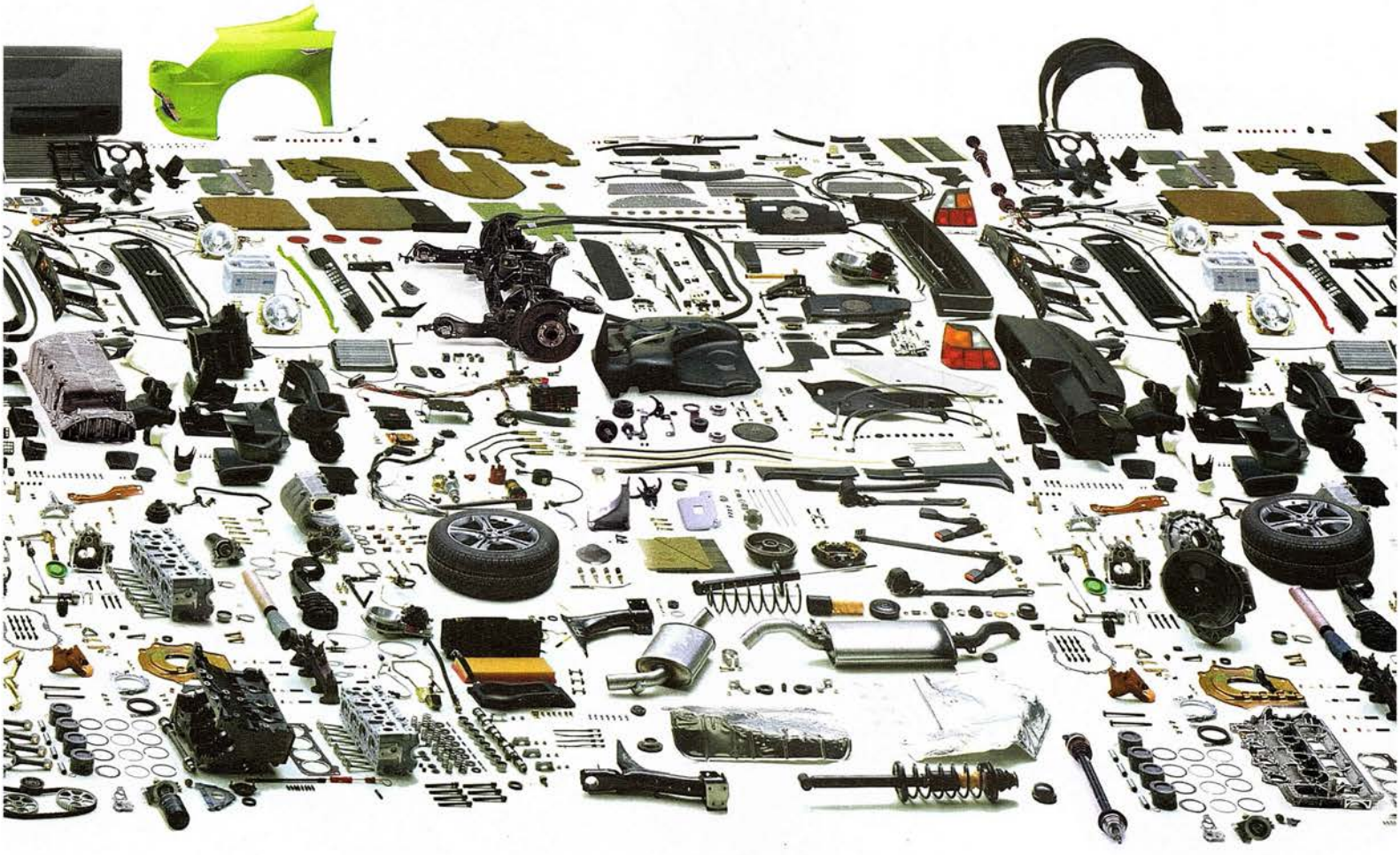

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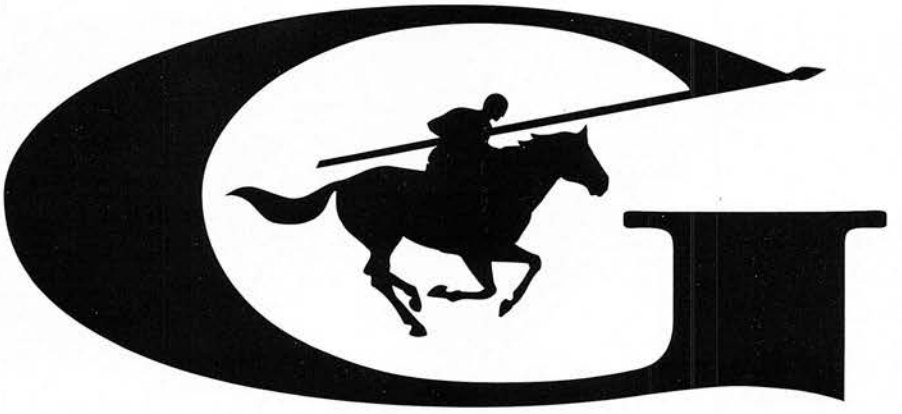

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Building a better wall at the University of Florida

How the University of Florida's O'Dome Beat the Buzzer

Faced with a countdown to basketball season and a LEED Gold requirement, project managers turned to an innovative new wall sheathing system.

UF also wanted to have the project certified as the first Leadership in Energy and Environmental Design (LEED V4 Gold) arena in the country.

Challenge

The Stephen C. O'Connell Center, commonly called the O'Dome, has been a vibrant part of campus life at the University of Florida (UF) since December 1980. It has hosted championship basketball games, sell-out concerts, joyous graduation ceremonies, and more than a few thrilling swimming, gymnastics, and volleyball competitions.

After more than three decades of intensive use, the O'Dome was showing its age. The UF administration approved a $64.5 million renovation that would add a dramatic two-story main entrance, a reconfigured arena, high-efficiency utilities, and new amenities for students, fans, alumni, and patrons.

Alternate Solutions

UF wanted the entire project completed with minimum downtime and ahead of the upcoming basketball season. UF also wanted to have the project certified as the first Leadership in Energy and Environmental Design (LEED V4 Gold) arena in the country.

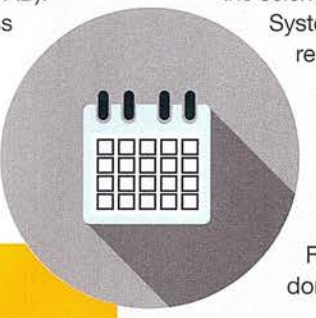
General contractor Brasfield & Gorrie decided a temporary wall would meet these requirements and it issued a request for proposals to install a 14,592 square-foot temporary wall using Georgia-Pacific DensGlass® Sheathing.

"It was a unique, atypical building," said Courtney Pittman, vice president and project manager for Davis Architects. "It was also an aggressive schedule with just eight months to do the majority of the construction work."

Mader Southeast, a Florida-based commercial construction company, won the contract and GP Gypsum field sales manager Alan Zeedyk contacted Mader Southeast senior project manager Jeff Henderson with a suggestion for delivering an even greater efficiency. "DensGlass® Sheathing is an outstanding product," Zeedyk said. "But with this extremely tight schedule, we thought Jeff might benefit from using our new DensElement™ Barrier System."

The DensElement™ Solution

The DensElement™ Barrier System offers an all-in-one water resistive barrier and air barrier (WRB-AB). Its new and technically improved fiberglass mat gypsum sheathing panel has an integrated layer of edge-to-edge material that provides water and air protection when finished with PROSOCO R-Guard® FastFlash® liquid flashing.



"It was a unique, atypical building. It was also an aggressive schedule with just eight months to do the majority of the construction work."

– Courtney Pittman, vice president, project manager, Davis Architects

GP developed the DensElement™ Barrier System to meet the demand for faster construction. It's a further evolution of DensGlass® Sheathing, which has been the industry's most architecturally specified fiberglass mat gypsum sheathing panel for more than three decades.

"It is such a resilient product that GP will warrant the DensElement™ Sheathing against deterioration or delamination for up to 12 months of exposure to normal weather conditions," said Barry Reid, the building envelope technical manager for GP Gypsum. The FastFlash® liquid flashing can also be applied even when the material is wet from rain or other condensation. These are important benefits for project owners who want to minimize delays and downtime and improve the bottom line.

GP offers a 5-year limited warranty for the DensElement™ Barrier System's performance as a WRB-AB with project registration in addition to the 12-month limited exposure warranty of the DensElement™ Sheathing*.

Performance Advantages

After further conversations with Zeedyk and studying the science behind the DensElement™ Barrier System, Henderson agreed it fit the O'Dome requirements and schedule.

"Brasfield & Gorrie had committed to finishing the project before basketball season," Henderson explained. "With this system, you put up the DensElement™ Sheathing, apply the FastFlash® liquid flashing, and you're done. Fewer steps make it faster."

While there was little chance the temporary wall would leak during its approximately six-month service life, the 12-month limited warranty for exposure to normal weather conditions provided the other project participants with significant peace of mind.

"Florida has harsh weather," noted Henderson, "And the temporary wall was going to have a lot of exposure while the facility was still being used for activities. With the DensElement™ Barrier System, we were confident of keeping water out."

Fewer steps make it faster.

System Savings

The system's components eliminate the need for applying building wraps, thin or thick fluid-applied membranes, peel-and-stick membranes, or other additional WRB-AB layers.

"The DensElement™ Barrier System is a great system because it goes up quickly," Pittman said. "It suited our purposes perfectly, and we got great feedback from the installation contractor. I would certainly recommend it on future projects."

The O'Dome's renovation was completed on schedule, in time for UF's fall semester commencement in December 2016.

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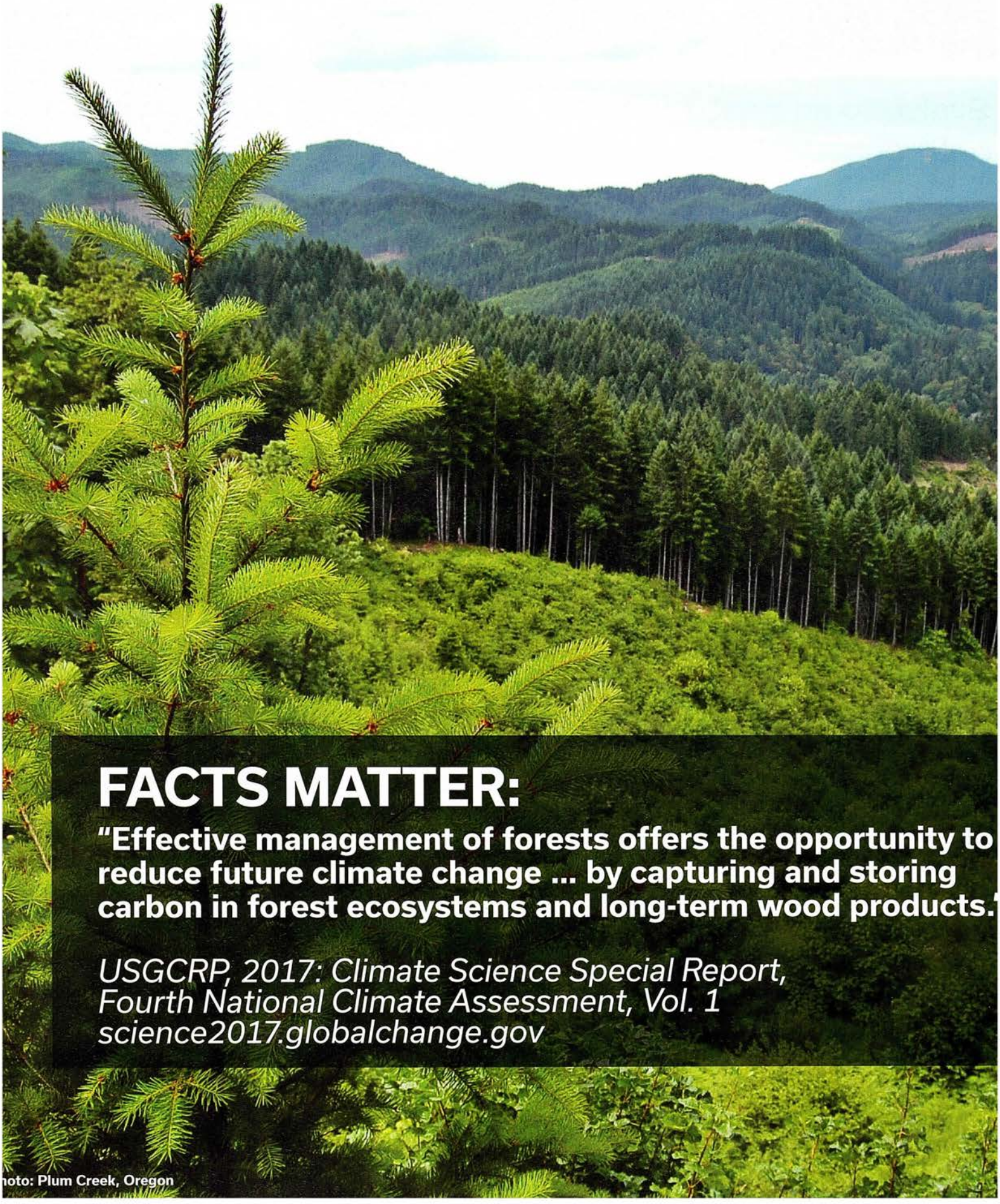

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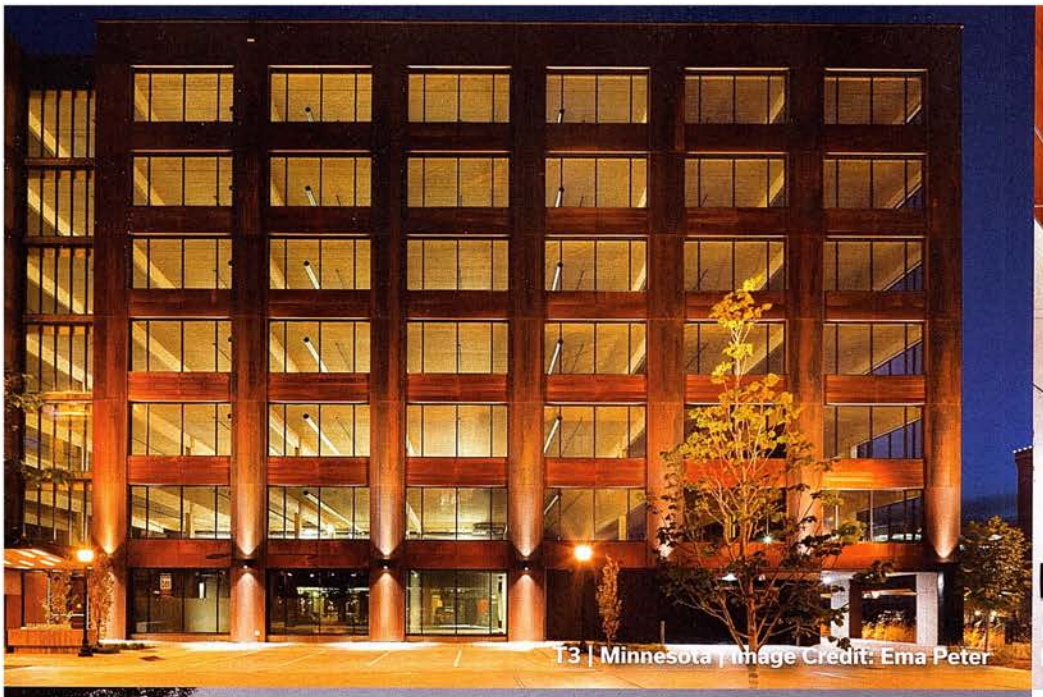

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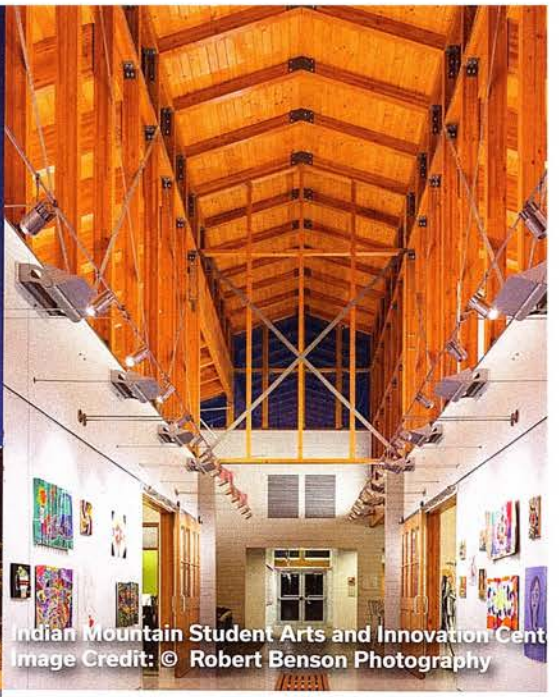

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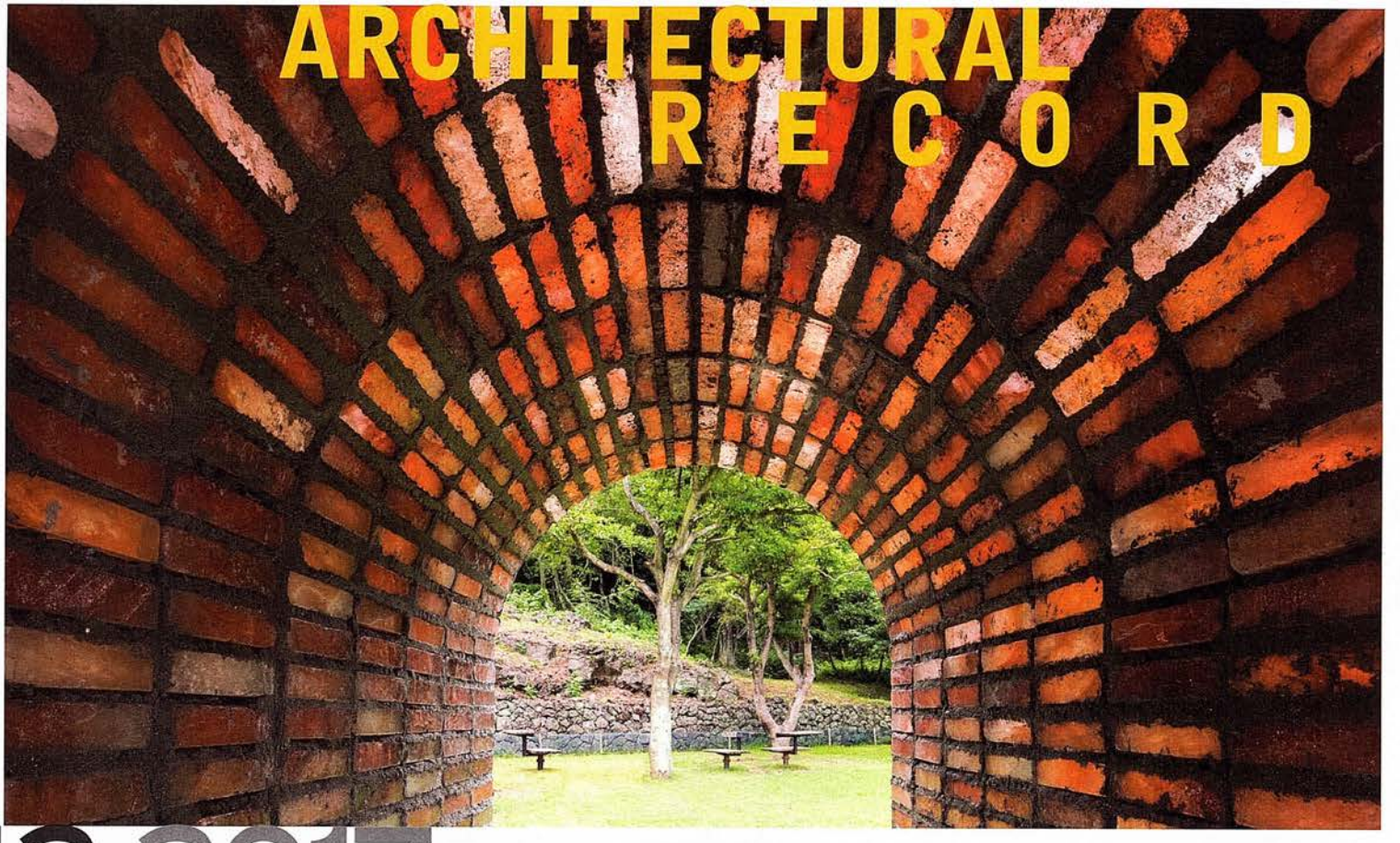

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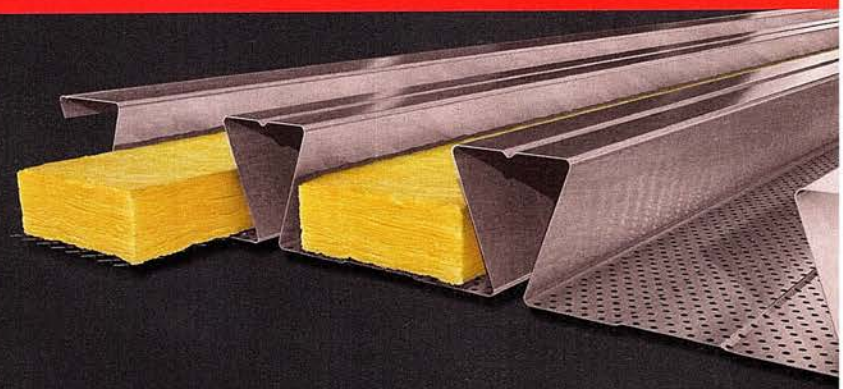

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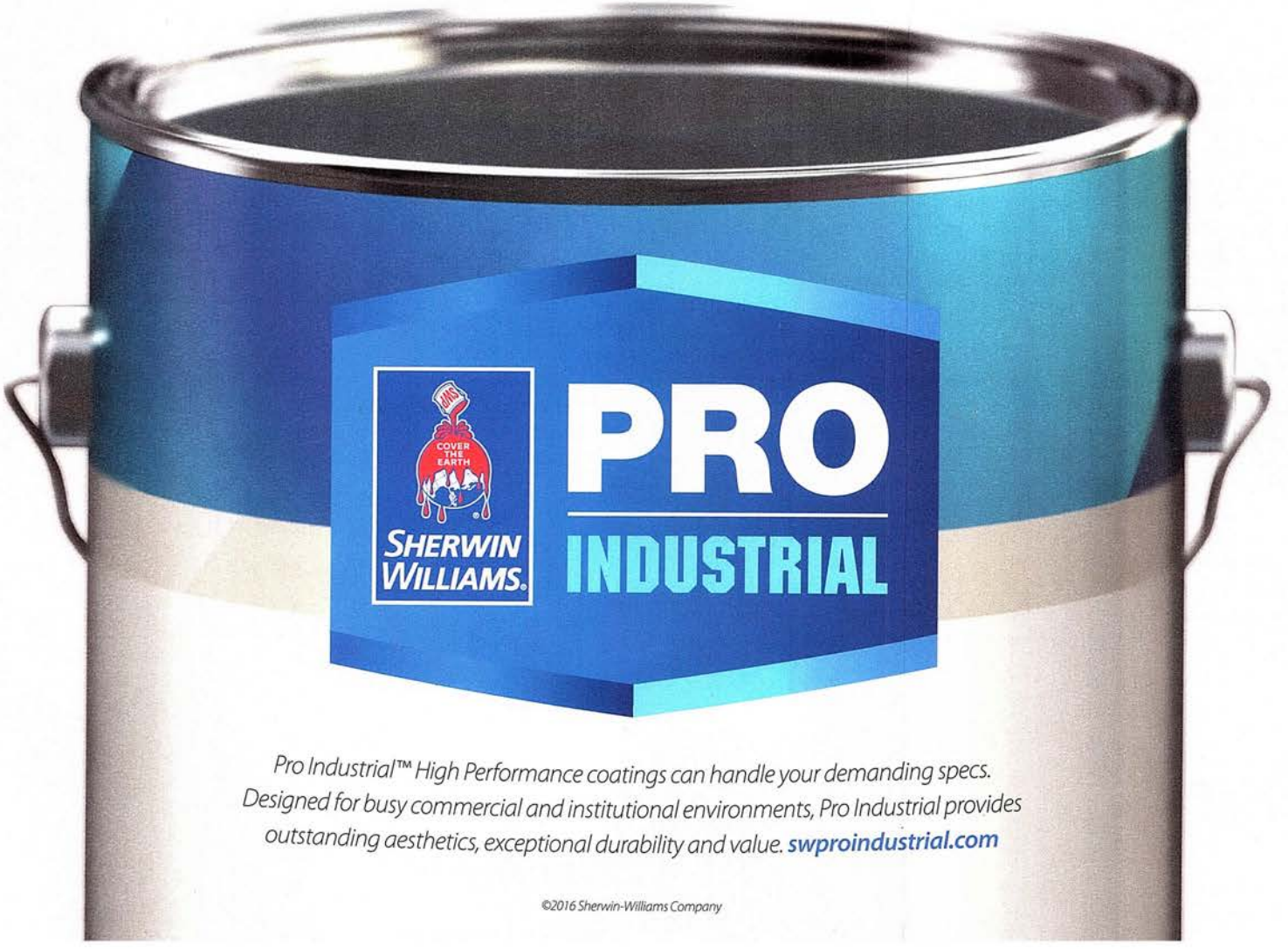

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Cities and Culture

A look at innovative architecture—and an artist's take on the cycles of urban growth.

HERE'S A milestone for you: the Guggenheim Museum Bilbao celebrated its 20th anniversary this fall. Besides launching a major transformation of a sleepy Spanish industrial city, the museum's opening unleashed a global arts race to elevate urban fortunes with radical cultural architecture—a phenomenon still very much with us today. Before Bilbao, there were innovative modern museums, of course—the first Guggenheim (1959), by the first Frank, and Marcel Breuer's Whitney (1966) are just two examples—but Frank Gehry's building was far more influential for the field of architecture at large, prompting a flood of high-profile competitions and game-changing commissions for the many contemporary designers who were scrambling to mount the world stage.

Some of these architectural forays glorified the urban past, converting moribund industrial buildings into arts facilities for the digital age—like the Tate Modern by Herzog & de Meuron (2000)—while others, such as the MAXXI museum in Rome by Zaha Hadid (2009), left history in the dust, though responded to some aspects of the local surroundings.

Now two new, ambitious, far-flung museums reflecting these trends have opened, and in this issue, we are pleased to publish firsthand reports on both of them. In the Middle East, the Abu Dhabi Louvre by Jean Nouvel (page 86), is finally complete after 11 years in the making—the first arts facility on Saadiyat Island in the capital of the UAE, long planned as a cultural destination (though the other anticipated facilities, designed by Gehry, Hadid, Ando, and Foster, seem to be on indefinite hold). Nouvel can be hit or miss with cultural buildings—it's not easy to square his exquisite Parisian jewel, the Fondation Cartier (1994), with the dreary Musée du Quai Branly (2006). But in Abu Dhabi, the architect has reinterpreted an Arab idiom, creating an immense, magnificent dome, made of thousands of metal elements installed in a lattice-like pattern, that hovers over the lavish galleries like the mother ship in *Close Encounters of the Third Kind*, sprinkling the public spaces with beautifully dappled light.

In Cape Town, South Africa, Thomas Heatherwick has transformed an early 20th-century industrial-scale granary on the waterfront into the dramatic Zeitz Museum of Contemporary Art Africa (page 94). At the core of his design is one extraordinary move: he cut into the clusters of poured-in-place-concrete grain silos—some as high as 200 feet—to create a towering atrium of immense vaults and curves, an awe-inspiring space that is both elegant and a bit eerie. The London-based designer is deeply engaged in making architecture these days, though he is the first to point out that, as a student, he avoided architecture school and studied 3-D design at Manchester Polytechnic and the Royal College of Art. His crossing of disciplines—and cutting up of an obsolete old building—has echoes of the late conceptual artist Gordon Matta-Clark, though Heatherwick's work at the Zeitz is grand, refined, and dependent on sophisticated engineering.

Matta-Clark (1943–78), on the other hand, who crossed the other way, from a Cornell architecture degree to art, was an outlier—a renegade artist with a political and social agenda. He possessed a Duchampian sense of humor (the son of artists, he had as his godmother Marcel's wife) and a capacity for outrageous behavior: he once shot out some windows at the Institute of Architecture and Urban Studies in New York with an air rifle—a comment, some said, on contemporary architectural practice.

Still, he remains a touchstone and inspiration for many architects, including Eric Rosen of Los Angeles, who designed RECORD's House of the Month (page 35). A new exhibition at the Bronx Museum of Art, *Gordon Matta-Clark: Anarchitect* (page 41), explores the artist's work: with his toolbox of chainsaw and chisels, he cut voids, holes, and slices into derelict buildings in the Bronx and elsewhere, letting in light and revealing their naked innards. The city was his canvas—and his work a kind of protest against the inevitable urban cycle of decay and rebirth.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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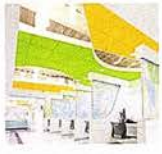

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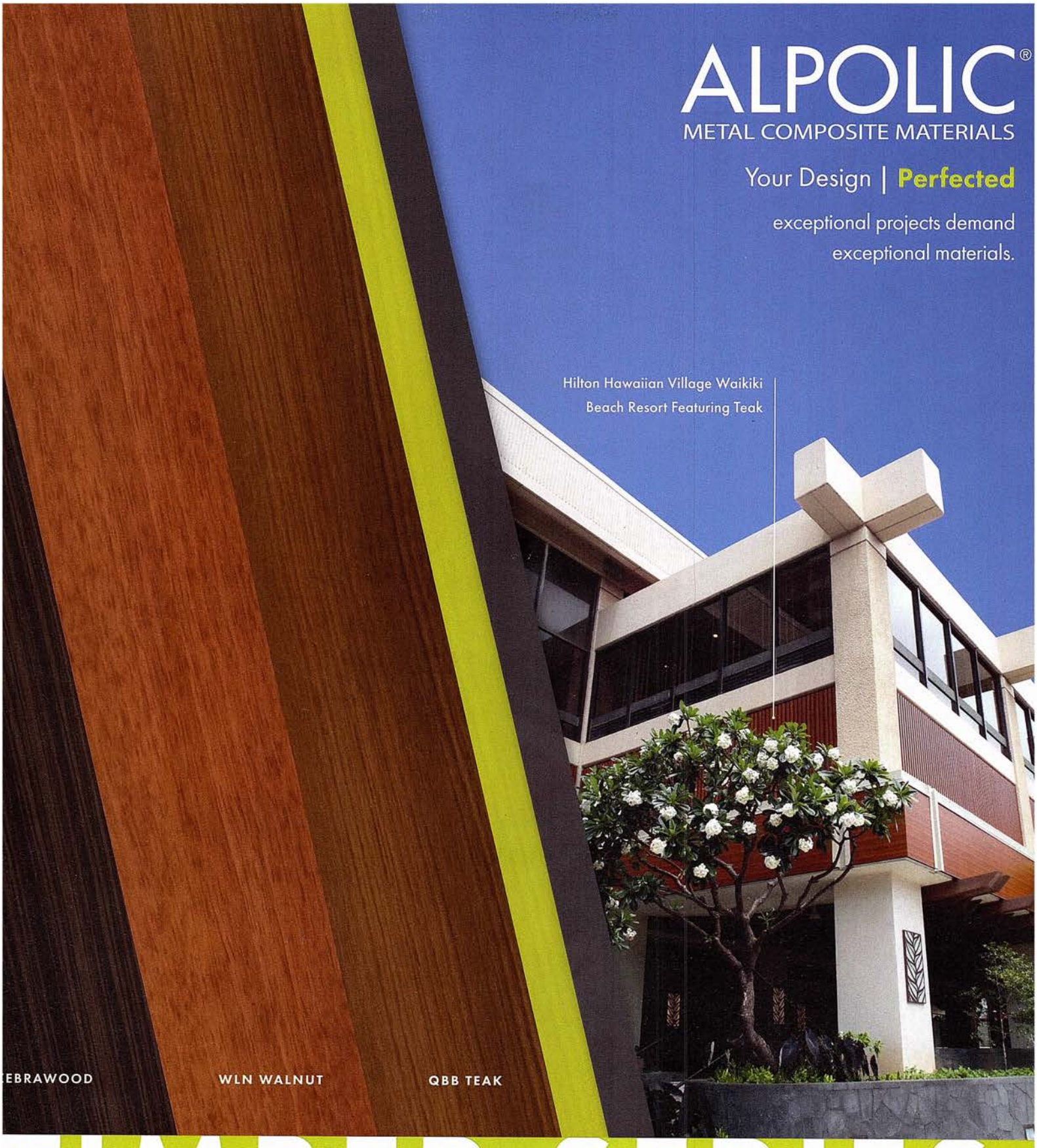

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perspective

We have to be vigilant, even when the world today is a cowardly place.
—Mahesh Ramanujam, president and CEO of the U.S. Green Building Council, speaking about sustainability at Greenbuild 2017 in Boston.

New Bloomberg HQ by Foster + Partners Opens in London

BY CHRIS FOGES

BLOOMBERG'S NEW London headquarters, designed by Foster + Partners, reflects a concern for neighbors, both near and far. It is billed as the world's most sustainable office building, and, "in the 21st century, being a good neighbor means being a good steward of the environment," says Mike Bloomberg. As a "guest" in the city, being a good neighbor also means making an effort to "fit in," he notes, which has informed the character of the 1.1 million-square-foot building.

Its 3.2-acre plot lies in the heart of the City of London financial district. Though it was possible to build up to 22 stories on part of the site, Bloomberg opted to conform to the 10-story height limit imposed elsewhere to protect views of St Paul's Cathedral; in fact, the top two floors are set back, so only eight are visible.

Within the tight urban grain, where streets follow ancient patterns, "we were very conscious of the need to deliver some breathing space," says project architect Michael Jones. The building is split into two, reinstating a public route through the site along the line of an old Roman road. Cutbacks at the corners form public plazas, edged by restaurants.

A deep sandstone frame lends a "classic" scale and order to the facades while reflecting the materiality of nearby buildings. Bronze fins are inset within the frame, angled to give an impression of solidity when viewed obliquely and oriented to provide solar shading. For Norman Foster, the project represents "a new kind of balancing act between the use of weighty materials—of layering, depth and solidity—and the quality of lightness which has been a preoccupation of the office over decades."

While the building's exterior might be as sober as a well-cut City suit, "Mike Bloomberg was clear that the interior should reflect the dynamism of the company," says Jones. Bloomberg also wished to avoid the grandiosity of typical office foyers, preferring a "gradual reveal, in which the building emerges as visitors move through it." The double-height lobby comprises a ring of three curving, oak-clad shells, each leaning on the next. Overhead, a work of art by Olafur Eliasson is one of many site-specific commissions in the building.

A pedestrian street divides the building, which contains 1.1 million square feet of office and retail space for Bloomberg's 4,000 London-based employees (above). At its core, a spiraling, triple-helix ramp spans 700 feet and six floors (left).

The so-called "Vortex" lobby disperses visitors to banks of elevators located against the facade. On the upper floors, the reason for perimeter cores becomes clear: in the heart of the building, where cores would conventionally be found, a giant void allows clear views across floors and vertical circulation via elliptical ramps. "I've always been a believer in open offices," says Bloomberg. "Walls get in the way of people coming together to solve problems."

The serpentine coil of the ramps also provides a point of visual interest that is vital to a building with limited outward views, says Michael Jones. "You need something to visually and 'spiritually' elevate the place. Everyone focuses on one place in the interior, rather than looking out at different things—it's a communal experience."

The skylit void is a vital part of the natural ventilation system, funneling stale air to rooftop vents. Fresh air is admitted through the

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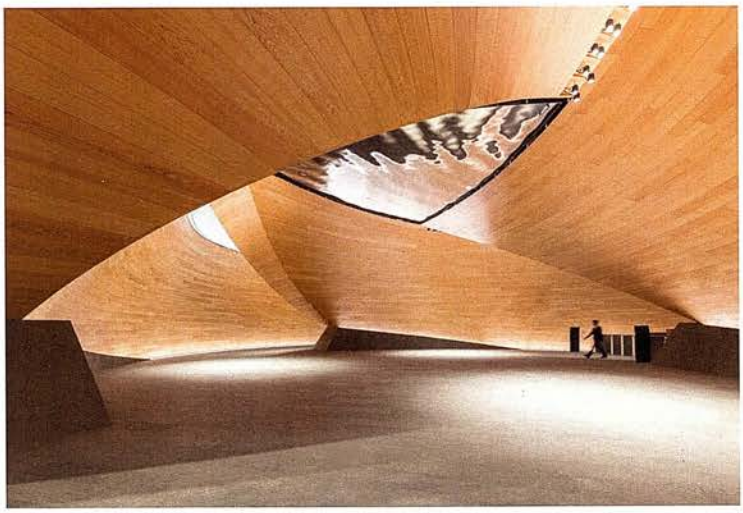
bronze facade fins, which contain attenuators to remove traffic noise. Norman Foster refers to these breathing wall elements as "gills," and another organic metaphor is clearly suggested in the office ceilings, which comprise 2.5 million polished aluminum "petals." Arranged like flowerheads, in tessellating clusters of six, they are folded to reflect light from integral LEDs and to modify acoustics. Integrated cold-water pipes allow the ceilings to chill incoming air in an energy-efficient way without creating condensation. Compressing all services into this 4-inch-deep layer made it possible to fit 10 stories within the building's permitted envelope, each with floor-to-ceiling heights of at least 9½ feet.

Technological ingenuity is expressed only subtly: to minimize visible lifting gear within glazed elevator enclosures, glass cars are cantilevered from the inside of the stone facade, and rise as if by magic. "The building is the tip of an iceberg," says Foster. "What you don't see is the enormous amount of teamwork and research that has gone into it." Technical studies were extensive and, no doubt, expensive (no costs have been released). Ventilation calculations included the construction of a full-scale prototype of a piece of the building, large enough for 30 workstations, which was subjected to Arctic and tropical temperatures.



"We tried to reinterpret some quintessentially British details that you find around the City of London," says project architect Michael Jones about the Vortex. "This is literally a wood-paneled lobby with a twist."

While a double-height social space dubbed "the pantry" serves coffee and snacks, the building otherwise offers few of the amenities with which similar companies try to keep staff on their premises. Instead, the 4,000 occupants are encouraged to venture outside for lunch or entertainment: helping local businesses is another part of being a good neighbor, says Michael Jones.

The public is also invited in, to visit a basement museum where the subterranean remains of the Roman Temple of Mithras will be presented alongside some of the 14,000 archaeological items recovered during construction. In restoring Roman heritage and responding to context, the Bloomberg building shows itself conscious of history while writing the next chapter. In its material weight and crafted character, this well-behaved "guest" gives a clear indication that it will be around for a long time to come. ■

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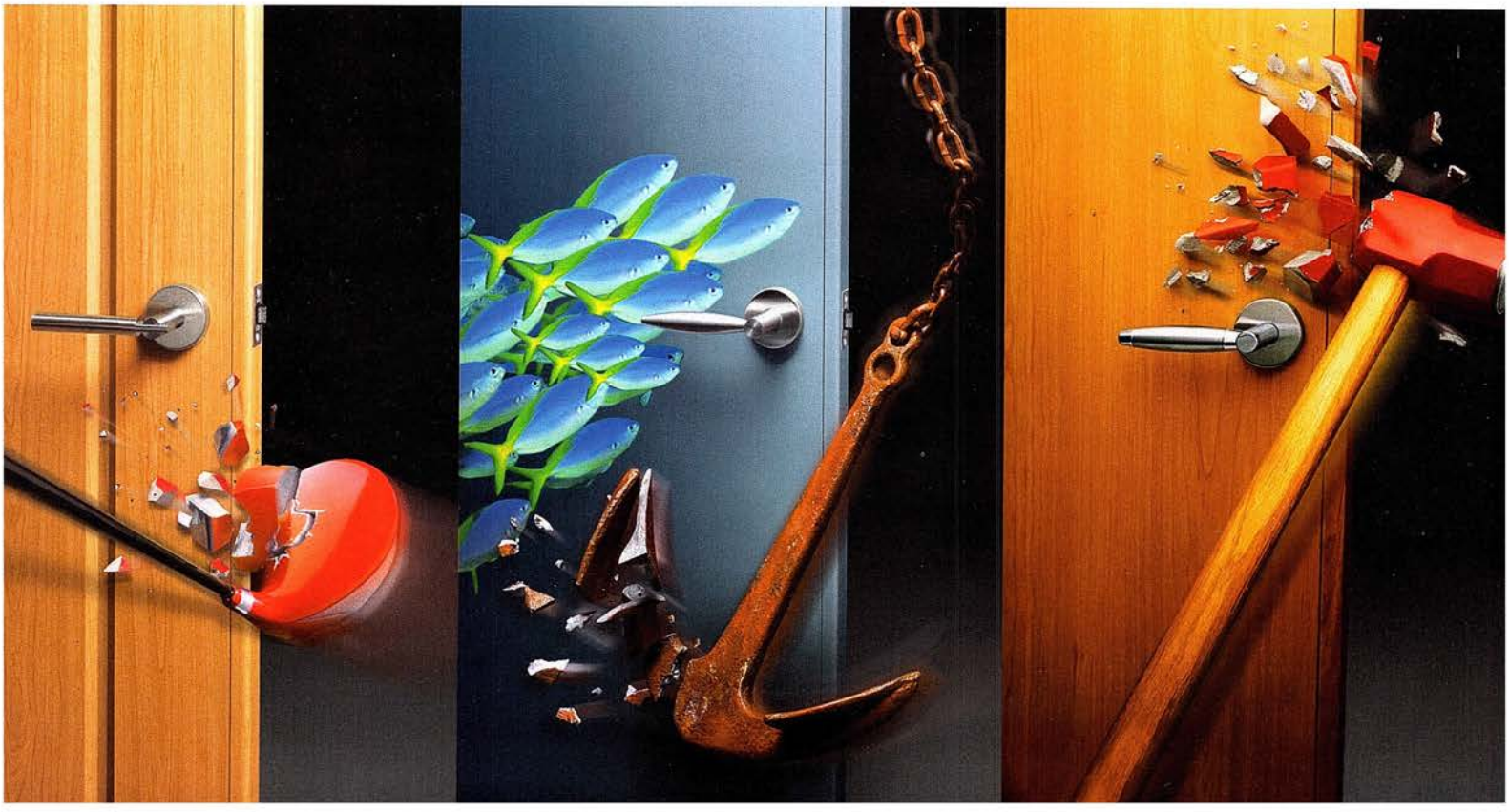


Strategies for Public Design at Innovation Conference in NYC

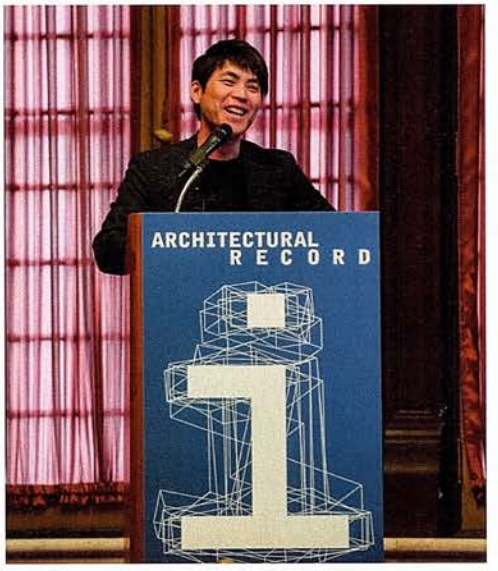
BY FRED A. BERNSTEIN

THE SETTING, an ornate auditorium in Manhattan's Masonic Hall, was designed for semi-secret rituals, but ARCHITECTURAL RECORD's latest Innovation Conference was the opposite, focusing on ways that architecture can benefit society at large—the public.

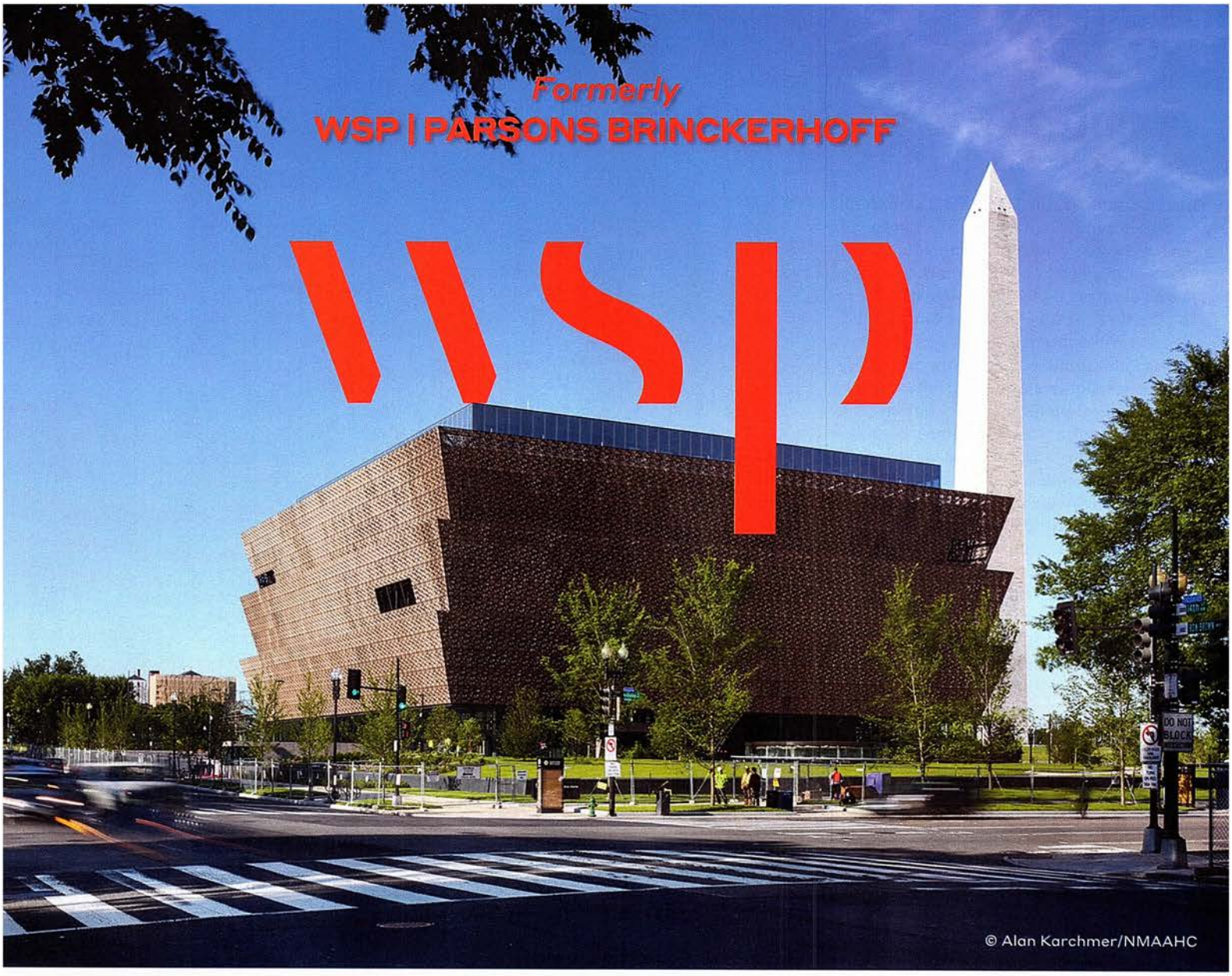
Michael Kimmelman, the architecture critic for *The New York Times*, articulated some of the challenges of what he called "the first urban century," including climate change and environmental devastation. "These are problems we designed our way into and can design our way out of," he said, adding that "the world has a profound appetite for the problem-solving skills that only architects can offer."

Those problem-solving skills were demonstrated by Brendan MacFarlane, Marion Weiss and Michael Manfredi, Sharon Johnston and Mark Lee, and other speakers. Rob Rogers, the founder of New York–based Rogers Partners Architects + Urban Designers, showed a series of projects for pedestrian zones around important public buildings. "You can solve the specific demands of counterterrorism while preserving the public realm," said Rogers. Chris Reed, the founding director of Stoss Landscape Urbanism, presented work that similarly folded functional solutions into public amenities—including the Plaza at Harvard University, built on an overpass, and part of a post–High Line crop of public spaces that make the most of their entanglements with infrastructure.

But to pursue such projects, a city first needs to survive. Amy Chester, the managing director of Rebuild by Design, spoke with Simon David of Bjarke Ingels Group about the "Big U," the firm's plan for protecting Lower Manhattan from storm surges, and with David Waggonner about Waggonner & Ball's resiliency plans for New Orleans and Bridgeport, Connecticut. In each case, Waggonner said, the projects require meetings with countless agencies. His description of those meetings could just as easily have applied to the RECORD conference: "If we're in the room, it's because we want to make a difference through design." ■



Shohei Shigematsu, who runs the 85-person New York office of OMA, is master-planning a new campus for Facebook that eschews suburban office-park conventions. "We are trying to create urban fabric, to stitch this back into the city," he said.



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Architects Bring Solar to Hurricane-Battered Puerto Rico

BY JAMES RUSSELL

ON OCTOBER 22, the Buena Vista community center in San Juan, Puerto Rico, switched off one of the many noisy generators that became an inescapable part of life after Hurricane Maria devastated the country on September 20. For the first time in weeks, fans in the center turned through the blessed silence. A refrigerator hummed and lights glowed.

This small miracle on an island staggering to recover was powered by a 5-kilowatt photovoltaic (PV) solar array and battery pack. It was the first installation by an ambitious nonprofit called Resilient Power Puerto Rico that aims to rapidly restore electrical service by installing permanent solar arrays on the island, which lost almost its entire grid to the hurricane. Full restoration of the electrical system could take years.

Puerto Rico's economy was spiraling downward before the storm, a plight largely ignored by Congress and the rest of the U.S. The local power company, PREPA, which had discouraged solar and largely depended on costly imported oil, declared bankruptcy in July.

Resilient Power Puerto Rico launched only a week after the hurricane, when the full extent of the tragedy became evident. Its principals are architect Jonathan Marvel, urban designer Walter Meyer, landscape architect Jennifer Bolstad, and attorney Christina Roig. Though all are New Yorkers, each has close ties to the island.

The partners are targeting community facilities including health clinics, food kitchens, and nonprofit service providers, to increase each installation's impact. The group raised $150,000 in days, permitting rapid deployment of solar-panel and battery-pack kits to the island.

With at least 25 PV arrays nearing completion by press time, the organization is ramping up fund-raising and training to bring 100 sites all over the island online in 100 days, according to Meyer, a cofounder with Bolstad of Local Office Landscape and Urban Design. To attract larger funders, "We had to take the fear factor out" by showing they could deliver the installations quickly, said Marvel, principal of Marvel Architects, which has offices in Manhattan and San Juan.

This plan was not unprecedented: in 2012, Meyer directed the installation of solar generators at neighborhood facilities in the Rockaways, an ocean-side community of New York hard hit by Hurricane Sandy.

Community centers in Puerto Rico, such as the long-established Buena Vista in the Caño Martín Peña area of San Juan, play a critical role in storm recovery: each serves from 20,000 to 50,000 people. Volunteers share information, help storm victims apply for aid, and give out tarps, food, medicines, and other necessities.

More than two months after Hurricane Maria pummeled Puerto Rico (above), millions of residents still lack electricity. New solar arrays, like this one on the roof of a community center in San Juan (right), provide a sustainable power source.

The PV arrays charge phones and operate computers, water purifiers (since all the reservoirs have been polluted by the storm), and refrigerators that store medicines and make ice. With battery packs supplied, "the centers can operate on three shifts if they want," said Meyer, since volunteers are abundant.

The sun-drenched climate makes the island a perfect candidate for PV at large scale. Local people, working with a licensed electrician, are being trained to mount the arrays on the flat concrete roofs that top most nonresidential buildings. The arrays can resist 150-mile-per-hour winds, according to Marvel.

With donated labor and materials acquired at cost, Resilient Power Puerto Rico can deliver the 5-kW solar arrays for around $25,000, less than half the market rate.

Meyer and Marvel expect the development of solar hubs to grow rapidly, linked together to form microgrids that could mix solar with other renewable sources. The road to energy independence could be a source of skilled jobs—sorely lacking before the storm—as well as a clean-energy alternative that can survive future hurricanes.

"When they see the installations on the community centers," said Marvel, "people will say, 'I could have that.'" ■

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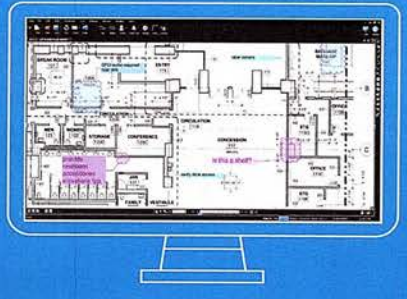

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The Biennial Monterey Design Conference Hosts 750 Architects

BY JOSEPHINE MINUTILLO

ENTERING ITS fourth decade, the highly regarded Monterey Design Conference (MDC) bills itself as an intellectually vibrant weekend that promotes casual conversation among attendees and its illustrious presenters, which in the past have included Pritzker Prize laureates Rem Koolhaas, Shigeru Ban, and Thom Mayne. This year's MDC did not disappoint.

The three-day event, organized by the AIA California Council, took place in October at a historic Monterey Peninsula conference center, where a number of the structures were designed by Julia Morgan. Over 900 attendees, 750 of them architects, were treated to thought-provoking, inspiring, and often amusing lectures by some of today's leading practitioners from around the world, including Copenhagen-based Dorte Mandrup and Paris-based Dominique Jakob. Tokyo-based Sou Fujimoto, along with New York–based Shohei Shigematsu of OMA, brought the house down with respective presentations that, in both cases, were visually stunning as well as hilarious. Emcee Reed Kroloff set the tone for the relaxed affair, which also included fireside festivities, a film screening, house tours, and a reception sponsored by ARCHITECTURAL RECORD honoring 2017 AIA Architecture Firm Award winner Leddy Maytum Stacy Architects of San Francisco.

As it always does, MDC carved out time within that busy schedule to look back on the careers of the elder statesmen and -women of design—this year honoring Beverly Willis and hosting talks by Ed Fella and Gere Kavanaugh. Looking ahead to the future of design, it also showcased emerging talent from throughout California, including 2017 RECORD Design Vanguard winner Alan Tse (page 80).

Attendees gather in the Julia Morgan-designed Merrill Hall, located on the beachfront Asilomar Conference Grounds, originally built for the YWCA.

While there was no theme to the conference, one that emerged from the works presented is the growing importance of integrating landscape design into the design of buildings—in some cases, the two becoming indistinguishable. The focus on landscape was all too present during MDC as the catastrophic fires of Northern California raged on throughout that weekend, affecting a number of attendees and communities within a three-hour drive from the conference grounds.

The next MDC will take place from October 25 to 27, 2019. ■

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[NEWSMAKER]

Christiaan Dinkeloo

BY SUZANNE STEPHENS

THE NEW DOCUMENTARY, *Kevin Roche: The Quiet Architect*, shown last month at the Architecture and Design Film Festival in New York (RECORD, November 2017, page 30), naturally brings up *the* question about the future of the firm, Kevin Roche John Dinkeloo and Associates. Roche is 95. What plans for succession are in place at the Hamden, Connecticut, office? It has been functioning since 1966, although partner John Dinkeloo died in 1981 at age 63. Dinkeloo, trained as an architect and engineer, was instrumental in establishing the firm's reputation for such technical advances as the use of metal deposit mirror glass and of Cor-Ten steel in its buildings. After his death, there were fewer similar innovations, although Roche Dinkeloo continued garnering important commissions for cultural institutions, universities, and office buildings.

Kevin Roche (left), with Christiaan Dinkeloo

Currently another Dinkeloo has emerged at the helm. A recent reorganization of the almost 50-person practice led to John's son Christiaan's returning to the firm after almost 20 years to assume the role as principal along with Roche. He supervises design through construction of their projects—the biggest one currently is for two buildings in Capitol Crossing, a mixed-use complex in Washington, D.C., along with Skidmore, Owings & Merrill (the master planner) and Kohn Pedersen Fox.

Christiaan Dinkeloo was born in Detroit in 1956, when his father and Roche were with Eero Saarinen's office in Bloomfield Hills, Michigan. The son went to the University of Michigan, as had his father, and graduated in 1981 with a B.Arch. Immediately after school, Christiaan headed to Roche Dinkeloo in Hamden. RECORD recently talked with the younger Dinkeloo about the firm's future.

You joined the firm right after your father's death. It must have been daunting to arrive at this time.

I had been working with the office since the seventh grade. This was my architectural home.

However, you left in 1989 to start your own practice in New Haven. Why?

I felt I had a wealth of experience and wanted to apply that to differently scaled projects, with a small firm—we started with four and expanded to 10. The size has advantages: projects get executed more rapidly, and we developed a real hands-on experience with residential, office, retail, and university work.

Then you came back to Roche Dinkeloo in 2013. What happened?

Kevin and I had been talking for a number of years about my returning. Two of his partners were almost 80 and looking to retire, and I wanted to practice again with him.

But 80 is young in your firm! How is it working with a 95-year-old?

Kevin is amazing. He comes to work every day, five days a week. I enjoy collaborating with him. With our level of experience, we have a wonderful synergy in spite of the 35-year age difference. In terms of his design approach, each project is unique. No matter what the commission, the solution starts with the end user. Kevin spends a long time on the concept. Then the staff develops it, and he critiques it.

And your role?

I execute Kevin's designs to the best of my—and everyone's—ability. This is much the same as my father, who knew how to turn Kevin's concepts into reality.

There will be a day when Kevin is not here. What is the plan then?

We have a handful of designers who have worked closely with him. I can't name names now, but some have been working with Kevin—and the clients—for years, as part of the design process. We look on our place as a palimpsest, where you can see the underpainting beneath the newly painted surface.

You have an unusual situation. What are the challenges you see?

This is really one of the few postwar firms to still operate under a founding partner. When this firm started, getting work depended on relationships and reputation—a chairman of the board would just call Kevin. Now real-estate and facilities people do that. Many firms are in their second and third generations, but there is no personality guiding them or the vision. Firm names are given initials instead of the names of the principals, and marketing and publicity people handle getting new commissions, which come shaped by the market. It's a different world, but we plan to make it work.

noted

Frank Gehry to Design a New Youth Orchestra Center in Los Angeles

The facility will house a 10-year-old program, established by the L.A. Philharmonic's artistic director, Gustavo Dudamel, that provides musical training to students in underserved neighborhoods. The program is modeled on a similar one in Venezuela, through which Dudamel first received training.

Oregon Adopts Broad Mandate for Net Zero Energy Buildings

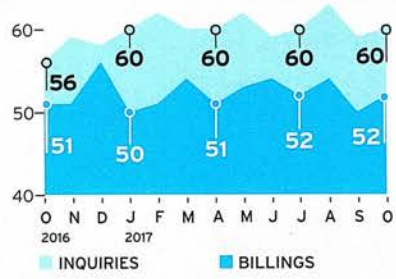
Governor Kate Brown has signed executive orders, starting in the fall of 2020 and 2022 respectively, requiring that new homes and commercial buildings must be equipped for solar panel installation. Brown has also directed the state's building codes division to require by fall 2023 that all new homes be zero-energy-ready.

Diller Scofidio + Renfro to Design 2018 Costume Institute Exhibition

The New York–based firm will design the Metropolitan Museum of Art's 2018 Costume Institute exhibition *Heavenly Bodies: Fashion and the Catholic Imagination*. Opening May 10, the show will take place at the Met Fifth Avenue and the Met Cloisters in upper Manhattan.

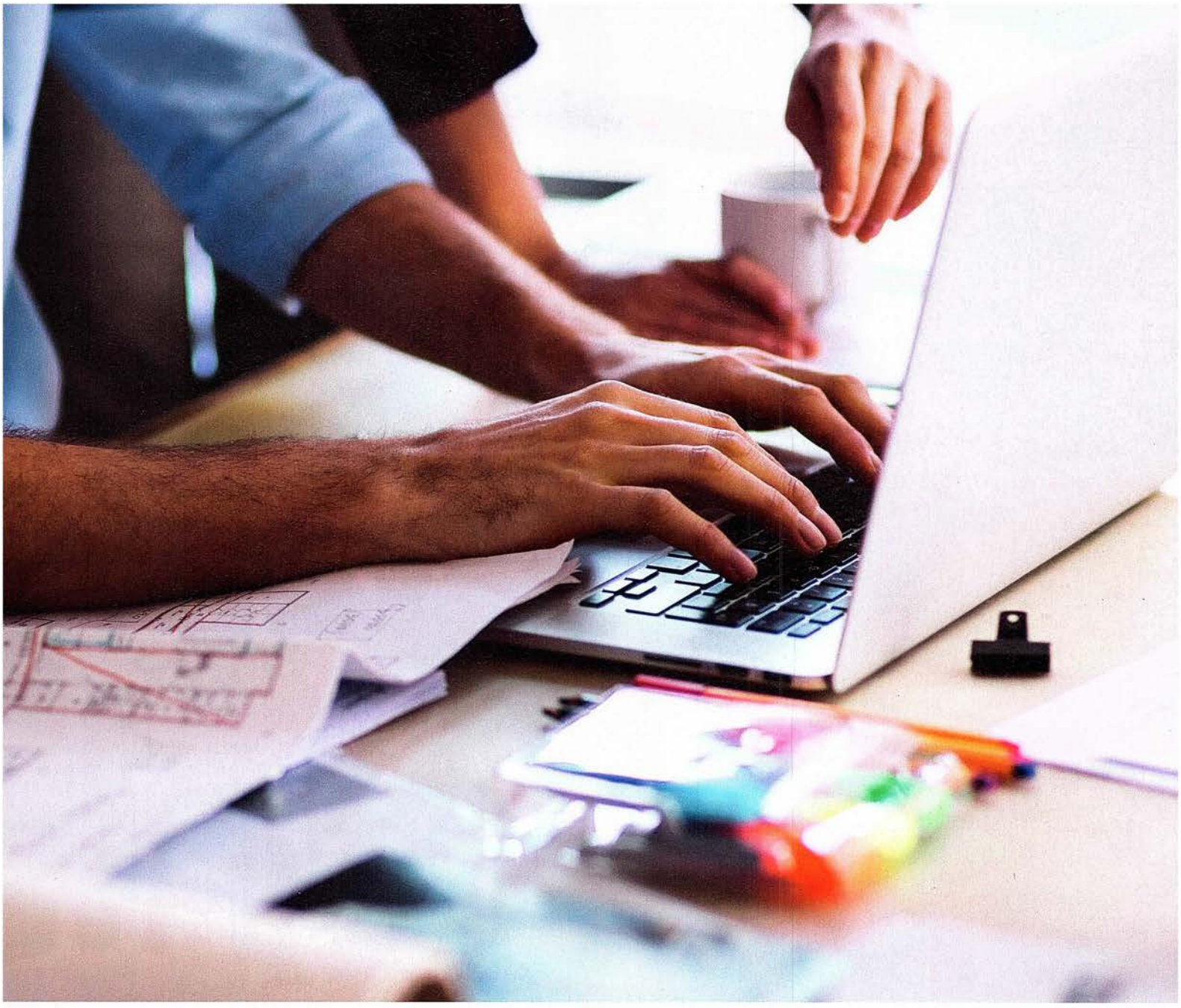
dRMM's Hastings Pier wins RIBA Stirling Prize

The Royal Institute of British Architects has recognized the London-based practice for its restoration of a dilapidated historic pier in the English Channel. The firm added a visitors center and observation deck to the 145-year-old structure, and reinforced existing ironwork.



After Small Dip, Demand for Design Services Sees Slight Uptick

The AIA reports signs of greater demand for design services, as the October Architectural Billing Index (ABI) increased to 51.7 from 49.1 in September. (Any score above 50 indicates an increase in billings.) The new projects inquiry index also increased slightly, while the new design contracts index eased. AIA chief economist Kermit Baker predicts that construction conditions should remain healthy through 2018.



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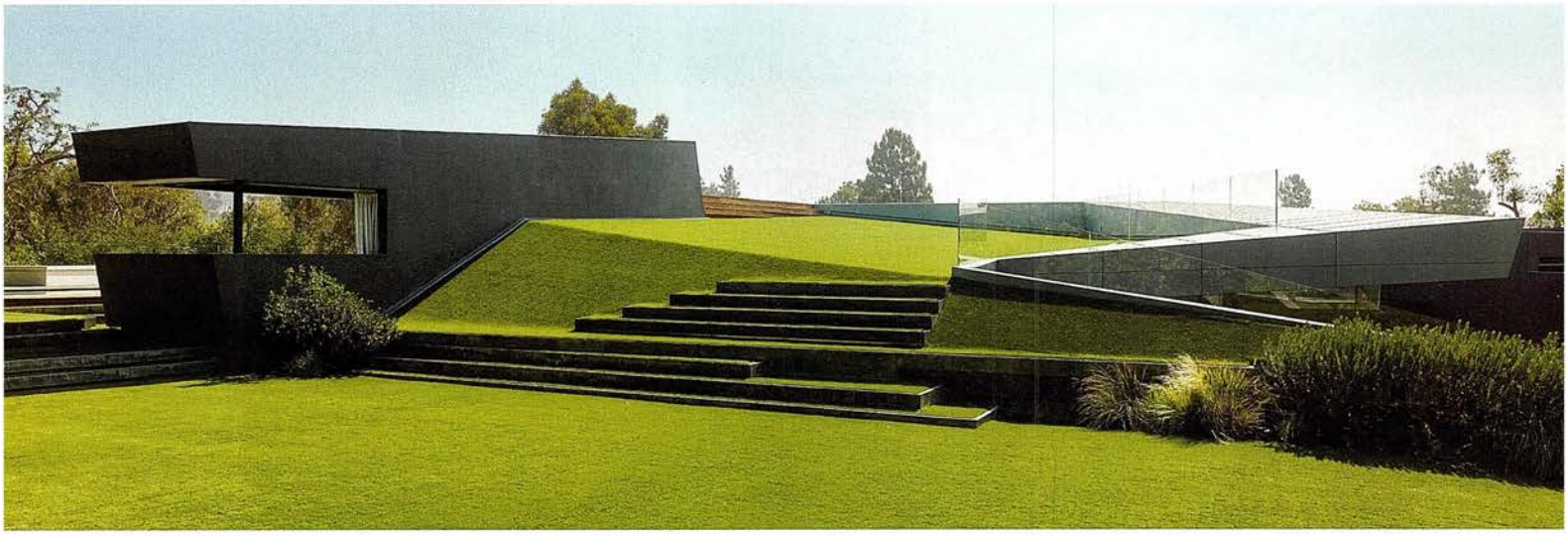
perspective **house of the month**

INSPIRED BY ITS SITE, A SURPRISING LOS ANGELES HOUSE IS DESIGNED TO BE EXPERIENCED FROM THE TOP DOWN.

BY DEBORAH SNOONIAN GLENN

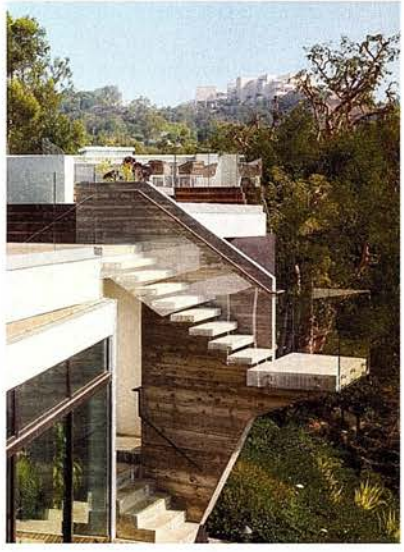


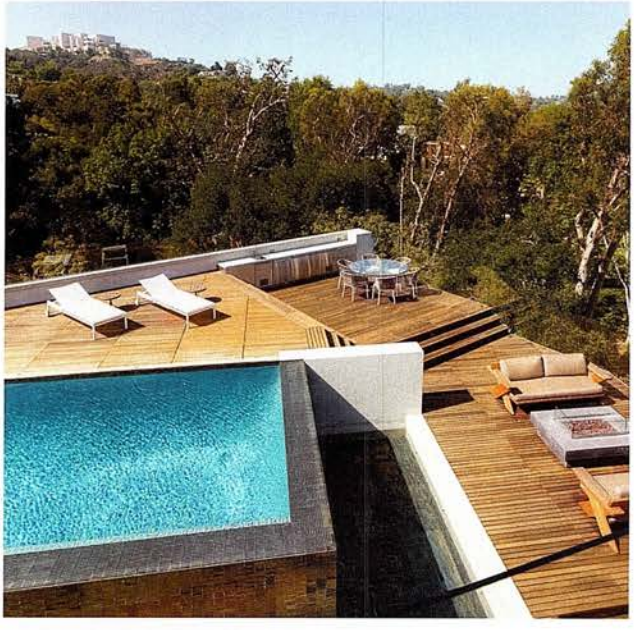
IT'S NOT OFTEN that a house tour begins on the roof. But as you step past the entry gate of the Barrington residence in Los Angeles's Brentwood neighborhood, you find yourself facing several artificial-turf-covered steps leading to the structure's summit, which boasts a commanding view of the Getty Center, the mountaintop museum complex designed by Richard Meier. "This vista wasn't accessible at all from the original house," says architect Eric Rosen, who designed its surprising, multiterraced replacement for a couple and their two children.

A combination of site, context, and the work of a 1970s conceptual artist inspired Rosen to develop the new house's zigzagging form and counterintuitive massing. As the steep lot was cleared, exceptional sight lines to the east and north emerged. Rosen saw an opportunity to cut a deep east–west channel into the hillside to permit a view clear through the structure, echoing Gordon Matta-Clark's "Splitting," a photo series documenting an abandoned house the artist had sliced through with a chainsaw (see Exhibitions, page 41). The channel became the floor plan's organizing principle, and its placement allowed Rosen to reuse existing pool footings and a retaining wall running roughly north–south.

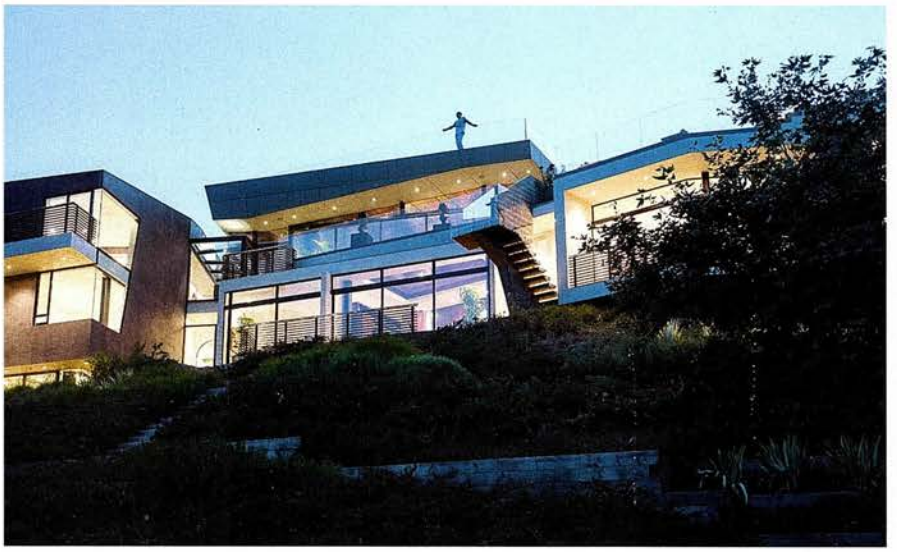
The new pool and its surrounding decks, perched on the northern portion of the property, pinwheel outward from the roof, counterbalancing the new three-story dwelling carved into the hillside. These outdoor spaces step down gradually in elevation to meet the house's top floor on its fully glazed east side. Their staggered heights and crisp orthogonal motifs echo both the land's rugged contours and the massing of the Getty Center on top of the mountain to the north.

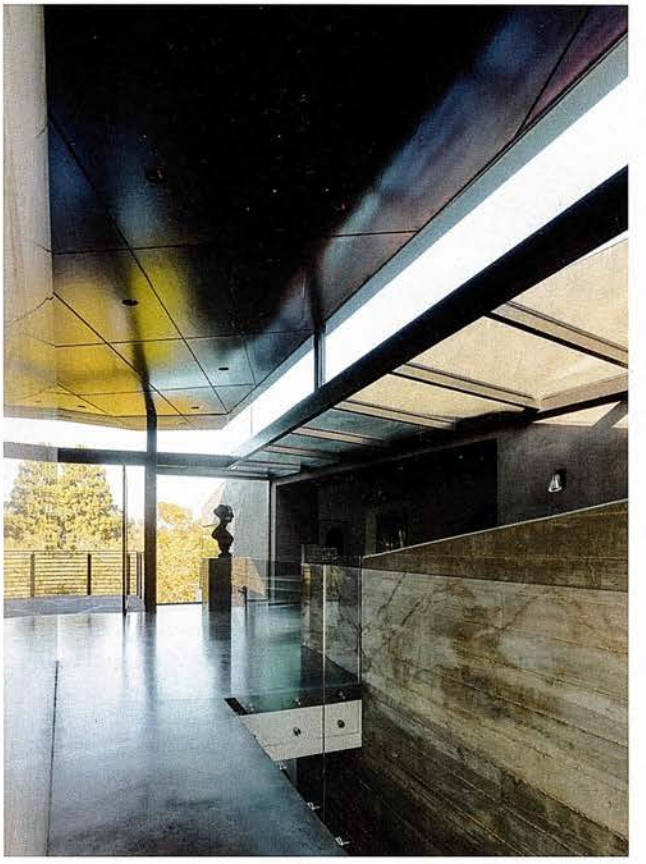
The house's three floors were also shaped by terrain and function. On the west, street-facing elevation, the main entry to the top floor follows the line of the channel cut: a gentle descent down floating concrete steps to a glass door that opens onto a skylit vestibule. This transitional space separates two zones: a generous kitchen and the family room that flows seamlessly into the adjacent deck, and a more intimately scaled dining room, bar nook, and living room. Balancing the daylight that spills indoors, dark-toned ceilings and floors in mahogany and concrete





The house's small turf-covered presence at grade belies its true size (top). A light well off the lower-level guest bedroom is formed where two concrete walls meet (above, left). A cantilevered concrete stair descends from the roof deck (above). The pool and its surrounding decks are perched on the northern portion of the property (left).





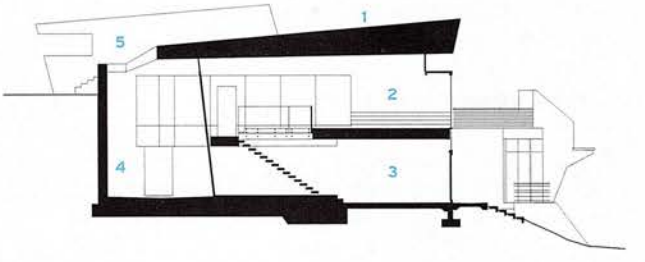
The house's three stories are fully visible from the sloping rear yard (above). Skylights, light wells, and clerestory windows bring daylight into all parts of the residence (right).

create a welcoming sense of enclosure.

From the channel-cut area of the top floor, a handsome cantilevered concrete stair descends one flight, ending at a gathering room. The master suite, kids' bedrooms and bathrooms, and guest suite spill into this area, giving the family and guests a multipurpose hangout spot that's secluded from the open, public rooms above. Houseguests also enjoy an outdoor sitting nook off the guest bedroom, at the bottom of a light well where two deep, board-formed concrete walls meet. The third and lowest level contains living quarters for household help, and a playroom that opens onto a terraced backyard. It's from the yard that the stucco- and zinc-clad assembly becomes fully visible. While the interiors maintain an intimate, domestic scale, from this vantage point, the 9,500-square-foot structure looms large on the hilltop.

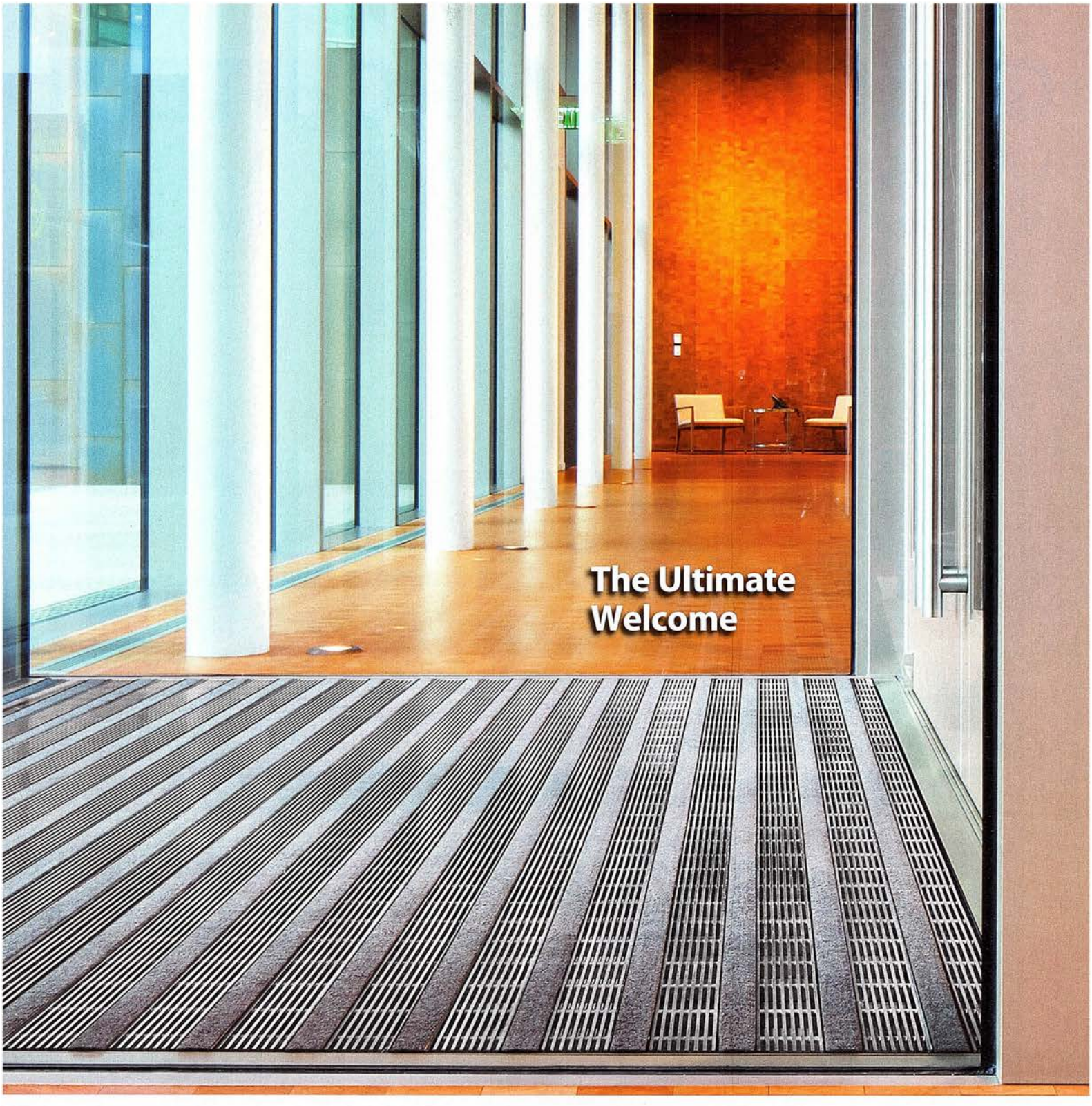
Rosen is quick to credit top-notch subcontractors for their painstaking work on the challenging site, including a concrete sub who carried the architect's physical model of the cantilevered stair in his truck as he figured out how to sequence the pours. But the key project role here was Rosen's dual one as architect and general contractor, which gave him full responsibility to build the bold structure he designed. Construction began simultaneously on the house's northern and southern edges, moving inward toward the channel—a risky technique, but one that would enable the house to take shape as envisioned. "There came a point where we had to jump in, trusting that all our work would pay off," says Rosen. "When the two sides came together within a ⅛-inch tolerance, we all breathed a sigh of relief." For a house so obviously inspired by and sprung forth from its site, it was a singular achievement. ■

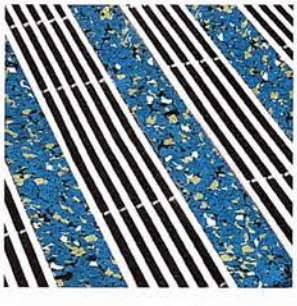
MIDDLE-FLOOR PLAN



SECTION A - A

1 GREEN ROOF/ENTRANCE
2 UPPER FLOOR
3 MIDDLE FLOOR
4 LIGHT WELL
5 POOL HOUSE BEYOND
6 LAUNDRY
7 KID'S BEDROOM
8 LOWER DEN
9 GUEST BEDROOM
10 BATH
11 MASTER SUITE
12 LOWER DECK





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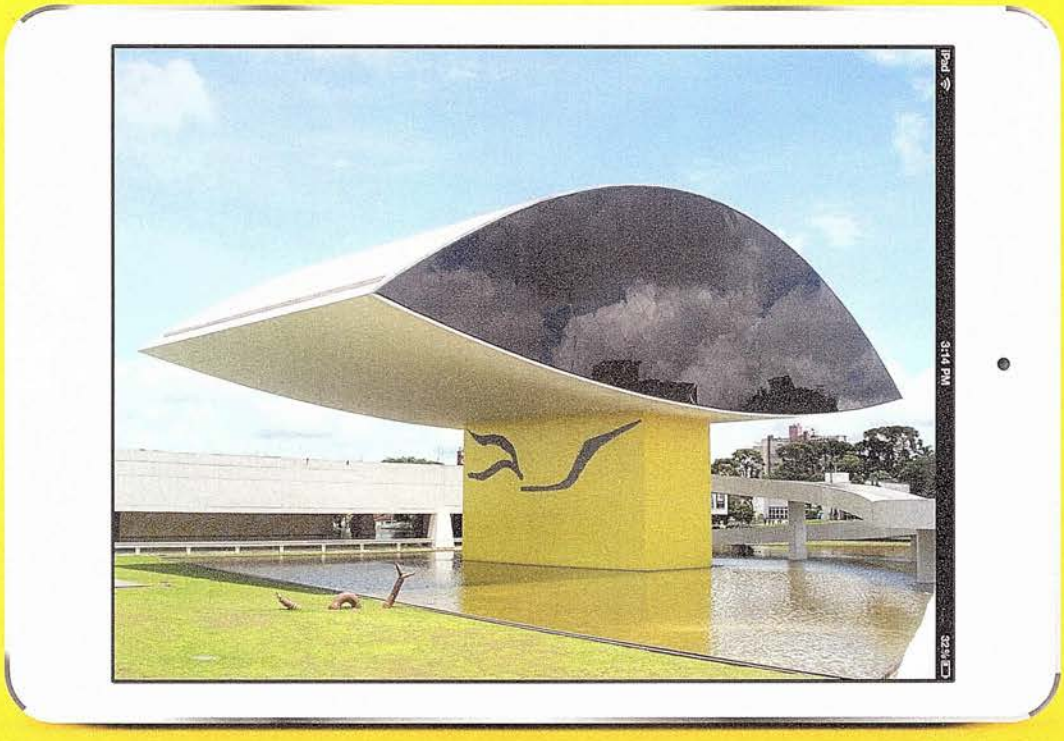

PHOTOGRAPHY: © BETH CASTELO/FLICKR

▶ TAKE A LOOK ON PAGE 45

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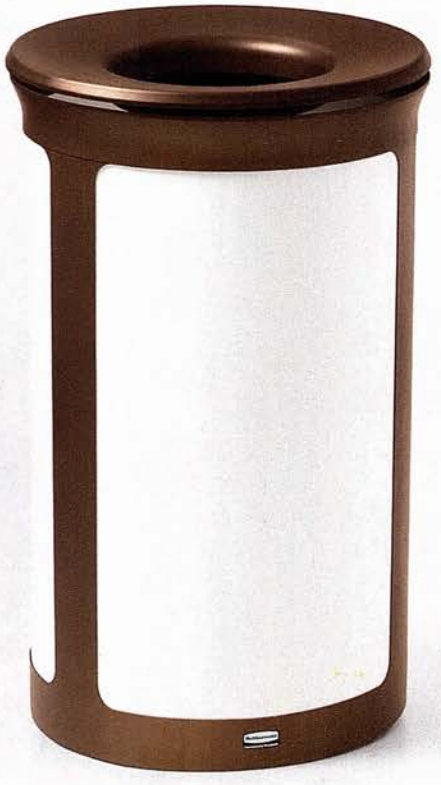

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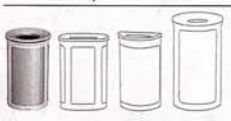

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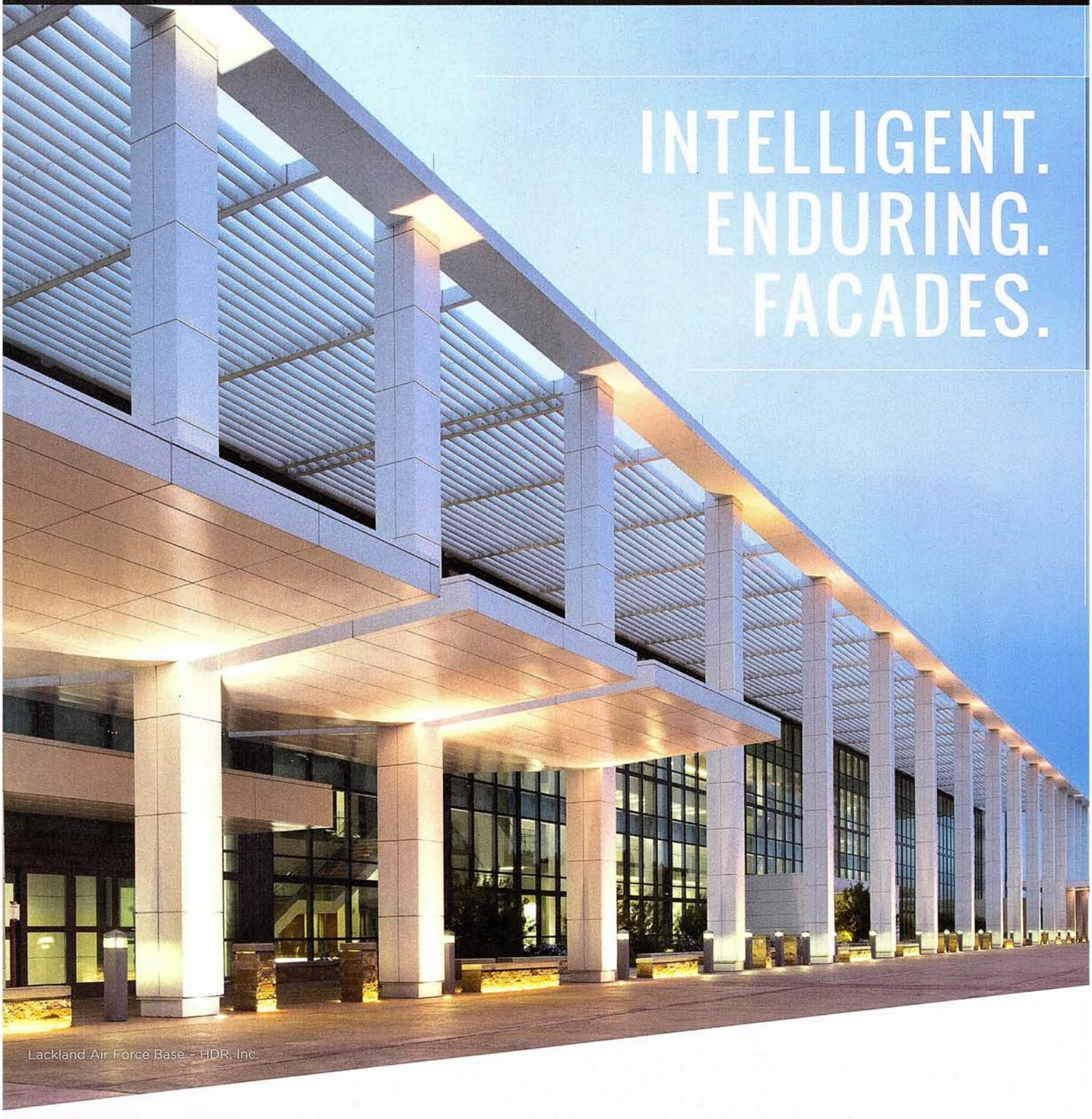

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Cut Loose in the Decaying City

A new exhibition on Gordon Matta-Clark underscores his enduring artistic and social relevance.

BY PETER PLAGENS

IN 1971, I came to New York to have my first solo art exhibition at the Reese Palley Gallery in SoHo. The neighborhood seemed to me—an L.A. boy—a war zone, its gritty streets only recently colonized by a few galleries and artists, many of whom were living on the edge. I was fascinated by a communal artists' restaurant called Food that was about to open near the gallery, though I knew nothing then of the subversive proprietor behind it, Gordon Matta-Clark.

That was only a year after Matta-Clark had made his first *Garbage Wall*—trash embedded in concrete as a cheap and handy guerilla building material, and just a year before he'd begin working—as an "anarchitect"—in the desolate borough of the Bronx, rife with condemned buildings.

The son of the Chilean surrealist painter Roberto Matta and an American artist, Anne Clark, Matta-Clark earned an architecture degree from Cornell in 1968 (and studied Deconstructionist literary theory in Paris) before turning to art. His canvas was always the city and its detritus of abandoned buildings—from a mundane frame house in New Jersey, which he sliced in two, to a pair of 17th-century houses in Paris, into which he cut a huge conical void before they were razed, near the site of the controversial new Pompidou Center. A new exhibition at the Bronx Museum of Art, *Gordon Matta-Clark: Anarchitect*, documents that period of the artist's work (on view through April 8, the show will travel to the Rose Art Museum in Waltham, Massachusetts; the Jeu de Paume in Paris; and the Kumu Art Museum in Talinn, Estonia). It makes a wonderful case for Matta-Clark's artistic and social importance.

The anchors of the exhibition are the first chainsaw-and-chisel "cuts" Matta-Clark made in the Bronx. At first, he excised chunks of floor (e.g., *Bronx Floor: Threshole*, 1972) and, as with his later *Conical Intersect* in Paris (1975), his genius was to see that openings sawed and chopped in the walls and floors of derelict buildings could be a two-way signaling system saying, in effect, "Here's what the powers that be have done to your neighborhood, and here's what we can do back."

Selected by Antonio Sergio Bessa, curator at the Bronx Museum, and Jessamyn Fiore, co-director of Matta-Clark's estate, and daughter of the artist's widow, the works now on view range from a few actual three-dimensional art objects (including a chunk of that Bronx flooring and a brick made from melted beer bottles) through a plethora of photographs, short films, offset prints, and documents demonstrating Matta-Clark's pioneering work in what are now called architectural "interventions." It's a brave story of an outside-the-box artist working in the face of a nearly bankrupt New York City and, through his art, casting a light on disastrous social policies that led to the marginalization and displacement of thousands of people.

Matta-Clark's working parameters, Bessa says, were "we make places" versus "places make us." *Day's End* (1975)—involving five Ellsworth Kelly–type shapes cut into the empty Pier 52 building on the Hudson River in Manhattan, through which the play of sunlight shifted—was perhaps his best manifestation of that working philosophy. He made the work without permission, left the building open as a kind of people's park, and absconded with a rowboat from Central Park to photograph the results from the water. The building is long gone, but the Whitney Museum has recently commissioned a work of public art by MacArthur recipient David Hammons (born the same year as Matta-Clark) that will be a steel outline-in-the-air duplicating the pier building's dimensions.

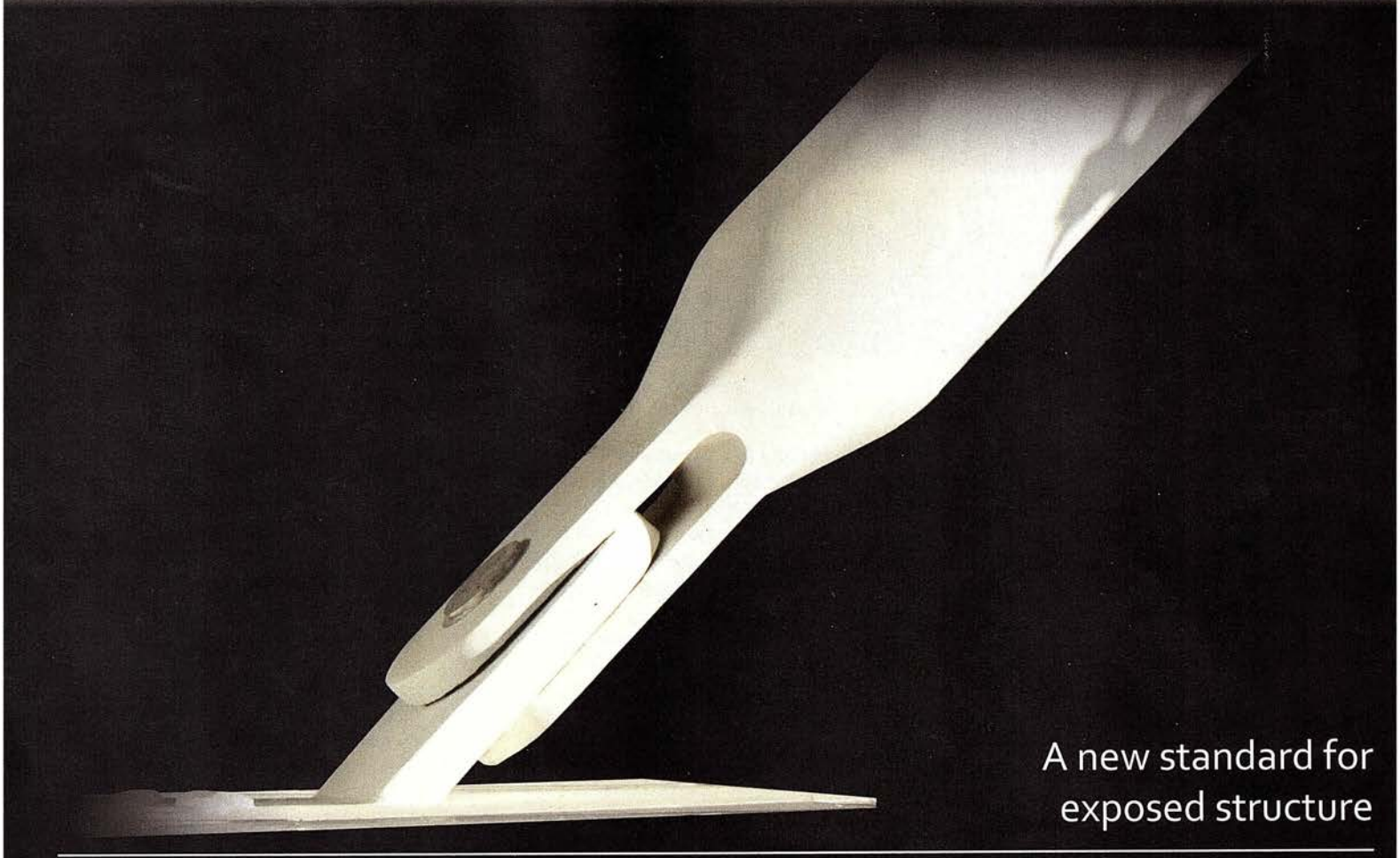
The Bronx Museum's iteration of *Garbage Wall*, originally made for the first Earth Day, in 1970, is the most elegant object in the exhibition, with its lovely bits of Lego-block walls and a vintage portable cassette player poking through the concrete. Matta-Clark's ever-present wit—a necessary leavening of his social earnestness—comes through most in a small graffitied metal panel from his van. When his art was rejected from a Washington Square show, he parked his vehicle as a "protest van" nearby, allowed all comers to graffiti it, then blowtorched segments of the body and gave them away.

Gordon Matta-Clark (above) working on *Conical Intersect*, his installation at the Paris Biennale in 1975, for which he drilled a telescope-like hole so people could peer inside two derelict 17th-century houses.

New York has transformed itself mightily since Matta-Clark's guerilla art of nearly a half-century ago. Galleries have been priced out of SoHo, and gentrification is the villain that desolation once was; even in the once-burning South Bronx, rents are rising, faster than anywhere else in the city. Yet the precedent of *Day's End* laid the way for the recycling sensibility that gave us New York's High Line and many recent public artworks. It makes one wistful to ponder what Matta-Clark might have gone on to do had he not died so young—of pancreatic cancer, in 1978, at age 35.

Still, he remains a powerful and provocative figure. Although, nominally, he deconstructed neglected architecture, his most salient contribution to our sense of the built environment is a heightened consciousness of who and what gets bulldozed by the endless tide of new building—and of the aesthetic possibilities hidden in what we are about to destroy. ■

Peter Plagens is an artist and critic whose last book was Bruce Nauman: The True Artist *(Phaidon).*



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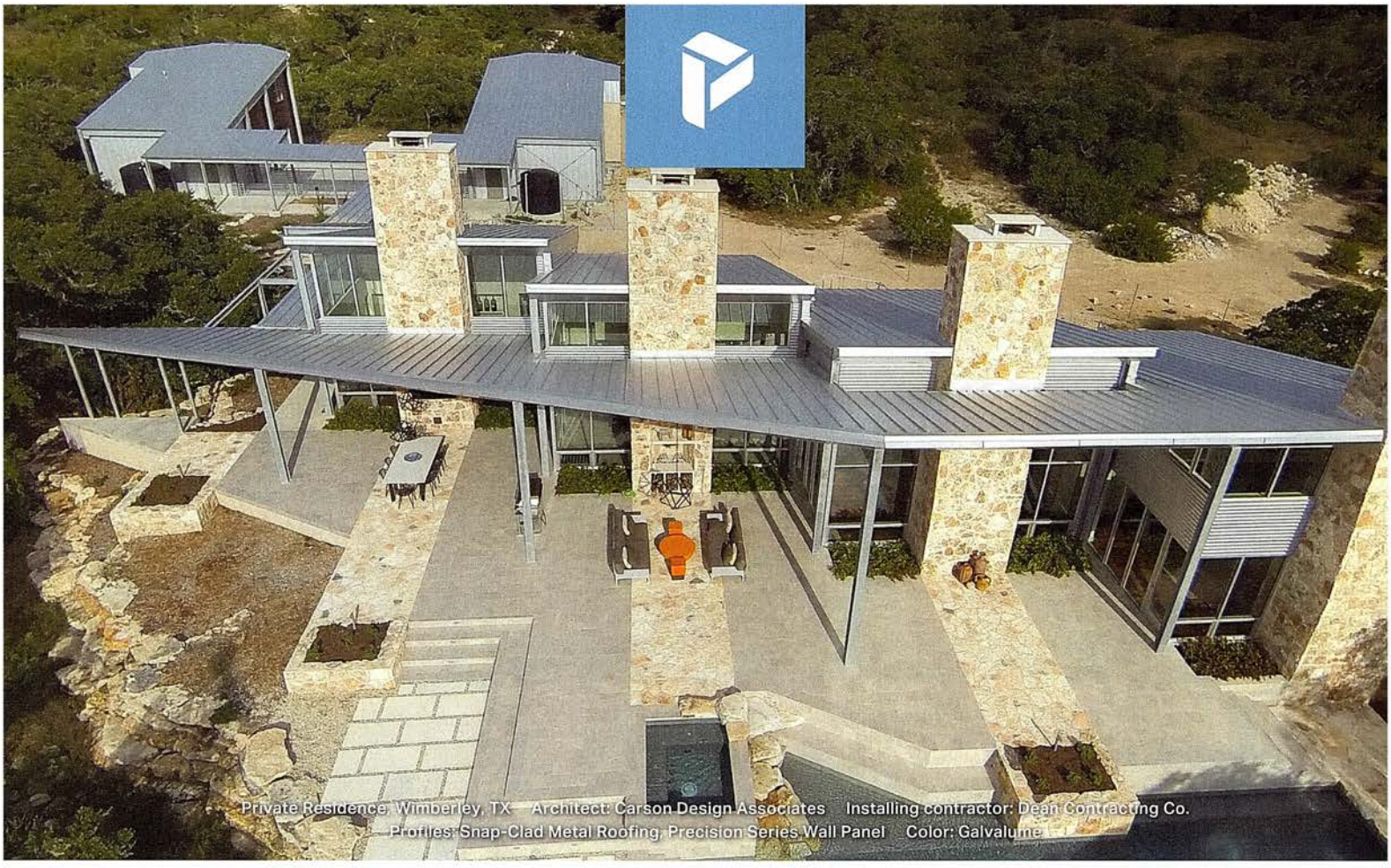

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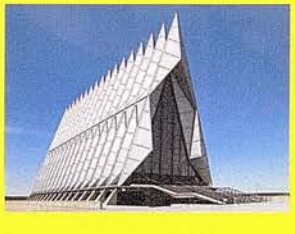

The architect for the November issue's contest is **WALTER ANDREW NETSCH JR.**, a partner at Skidmore, Owings & Merrill when the firm was hired in the 1950s to design a new U.S. Air Force academy in Colorado Springs. His tetrahedral Cadet Chapel (left), with its aluminum and stained-glass cladding, opened in 1963 and quickly became the campus highlight.

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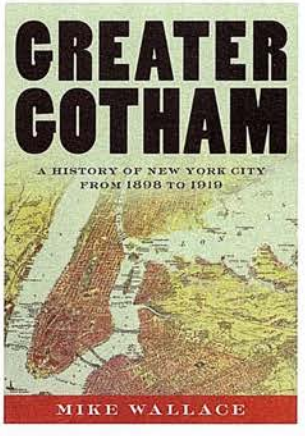
If You Can Make It There

Greater Gotham: A History of New York City from 1898 to 1919, *by Mike Wallace. Oxford University Press, 1,182 pages, $45.*

Reviewed by Anna Shapiro

THIS BOOK, about the radical transformation of New York in the early 20th century, makes you exclaim of the result, "Nothing's changed!" For today's New Yorkers, the names of the main players in that metamorphosis are part of daily life, if only because of Rockefeller Center and Carnegie Hall, not to mention J.P. Morgan Chase banks everywhere. Less obviously but more consequentially, New Yorkers of Morgan's class and era invented the American corporation and engendered the structures of government that support its power. The primary reason the boroughs were consolidated into New York City—the celebration of which, in 1898, opens the book—was essentially so that these robber barons could have more efficient hegemony over their means of shipping (the harbor in particular), much as they had amalgamated myriad companies in order to centralize and control their copper, sugar, steel, or railroad businesses.



This volume, a sequel to the Pulitzer Prize–winning *Gotham: A History of New York City to 1898*, which covered 375 years, uses nearly as many pages for its 21. The book's many sections range in topic from commercial-political finagling to the changes in planning and building type that resulted, as well as to public transportation, including bridges and tunnels; zoning; housing; factories; retail; and cultural centers from libraries to opera houses. *Greater Gotham* also goes into popular culture, crime, and the organization of labor. Reformers, radicals, and feminists are not neglected either. It ends with the aftereffects of World War I.

The plutocrats' most visible effect was the skyscraper, which they made the iconic building type of the city in this period. Though high-rise structures also developed in Chicago, their rampant growth in New York was a means of branding for the gargantuan corporate businesses. And as residences became vertical, such development increased the value of real estate—which in turn became an outsize force on city government. The same fights were being fought then as now, of preservationists versus developers and the pols who enabled them; of those who wanted zoning to shape the city for beauty and ease of living and those who wanted it bent in the direction of immediate monetary profit—"capitalist urbanism undermining civic patriotism," as Wallace puts it. The Municipal Arts Society, still engaged today on the civic side of these battles, has been at it for more than a century.

Though beautifully organized, and written with grace and humor, the author does not build stories so much as compile compendious chronologies. The pictures are as skillfully researched as the text but convey their information with considerable punch, as with a photograph of little boys playing on the curb next to a dead horse (ca. 1903) or a shot of Ota Benga, an African Pygmy who found himself exhibited in a Bronx Zoo cage, with a baby orangutan. These tell stories indeed—and, thankfully, are a measure of some change for the better. ■

Anna Shapiro has reviewed books for The New Yorker, The New York Times, The Guardian, *and others.*

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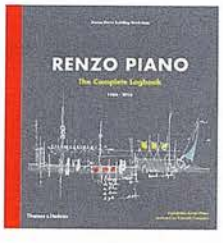
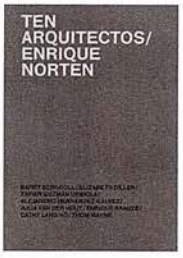
BY SUZANNE STEPHENS

SOME OF US think architectural monographs are vestiges of days gone by: now potential clients—perhaps the most important readers—along with students and colleagues, can just go to a website. Yet the monograph lives on. Its physical robustness seems to lend credibility to the work—especially if it is a weighty, glossy compendium bolstered by essays from leading historians such as Kenneth Frampton and Barry Bergdoll. Nevertheless, most publishers can't afford the high costs of paper, printing, fees for photographers, writers, editors, and graphic designers, especially when the print run is not more than a few thousand copies. "Since monographs are expensive, publishers need financial support from the firms," says Andrea Monfried, the senior commissioning editor of Images Publishing Group. So they often arrange for architectural offices to kick in with photos, writers' stipends, and/or buy a number of copies, with some firms paying more than the list price per book. Gordon Goff, publisher of Oro Editions, calls the joint process "a collaboration" that can generate "experimental and beautiful books expressing the character of the practice." With that in mind, RECORD presents a glimpse of selected monographs that arrived during the banner year of 2017.

Not Neutral: For Every Place, Its Story, *by Rios Clementi Hale Studios. AMMO, 612 pages, $200.*
The first question you might ask is "Why?" Why does this 16¼ by 12¼ inch book weigh 16 pounds? (The deep pink cover visually blimps it up a bit.) The architects say they wanted to make a statement about the firm's "transdisciplinary" work created since its founding in 1985. This collaborative effort (many members of the studio wrote essays) features lively photos, sketches, and charts.



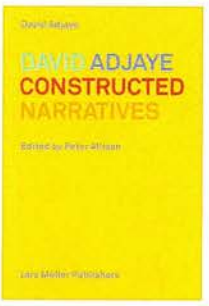
Renzo Piano: The Complete Logbook, 1966-2016, *by Renzo Piano. Thames & Hudson, 420 pages, $70.*
An impressively comprehensive book, this has room for large photos and a range of drawings (and a foreword by Kenneth Frampton). In case you wonder what buildings Piano completed between his breakthrough Centre Georges Pompidou in Paris (finished 1977) with Richard Rogers, and his own Menil Collection in Houston (which opened in 1987), the answer is, not a whole lot. But he then made up for it in spades.



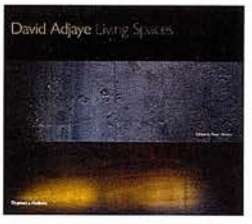
Ten Arquitectos/ Enrique Norten: Lines of Investigation, *by Enrique Norten. Princeton Architectural Press, 320 pages, $60.*
Enrique Norten's clean-machine aesthetic is shown by photos of built and unbuilt cultural facilities in Mexico and the U.S. executed in the last decade or so. A conversation between Norten, Thom Mayne, and Liz Diller on design matters is supplemented with an essay by Barry Bergdoll about the influence of Mexico City and New York on Norten's work.

Allied Works Architecture: Dwelling, *by Brad Cloepfil and Joseph Becker. Rizzoli, 224 pages, $55.*
Luscious photographs of country and city houses, which Allied Works completed between 2000 and 2012, qualify this as a picture book bar none. Firm founder Brad Cloepfil writes about his interest in craft, materials, and detail, and an essay by museum curator Joseph Becker provides a poetic overview.

Krueck + Sexton: From There to Here, *by Krueck + Sexton Architects. Images Publishing, 272 pages, $75.*
Large, seductive photographs unsullied by captions focus on selected work from the Chicago firm formed in 1981 by Ronald Krueck and Mark Sexton. An introduction by John Morris Dixon and other essays discuss the various formal strategies that evolved over the years, from use of rectangular geometries to both curved and faceted ones.

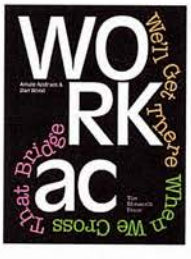


David Adjaye-Constructed Narratives, *edited by Peter Allison. Lars Müller Publishers, 320 pages, $49.*
In clear, unpretentious prose, Adjaye explains his views on topics such as architectural form, materials, and urban context. Selected projects are well illustrated—including the Smithsonian National Museum of African American History and Culture—enhanced by Adjaye's own backstories.



David Adjaye: Living Spaces, *edited by Peter Allison. Thames & Hudson, 304 pages, $60.*
In focusing on the private residence, Adjaye gives prominence to expansive photographs and simplified drawings, with text taking a background role. Nevertheless, his writings still address formal issues (scale and scalelessness, void, manipulation of the section) that are of interest to architects.

Ennead Profile Series 7, *by Ennead Architects. Oro Editions, 260 pages, $40.*
The box set of four booklets—each one devoted to a separate building designed by Ennead—may not jump off the shelves of the dwindling number of bookstores. But potential clients, colleagues, and students can find ample photos, drawings, and details—along with short, straightforward explanations.



WORKac: We'll Get There When We Cross That Bridge, *by Amale Andraos and Dan Wood. Monacelli Press, 360 pages, $50.*
Lively, colorful graphics and an interesting, conversational writing style are combined with glossy photos of unbuilt and built work around the globe. Andraos and Wood take you from their first project—a doghouse—to a sustainable "green house," and, most recently, a library in Queens.

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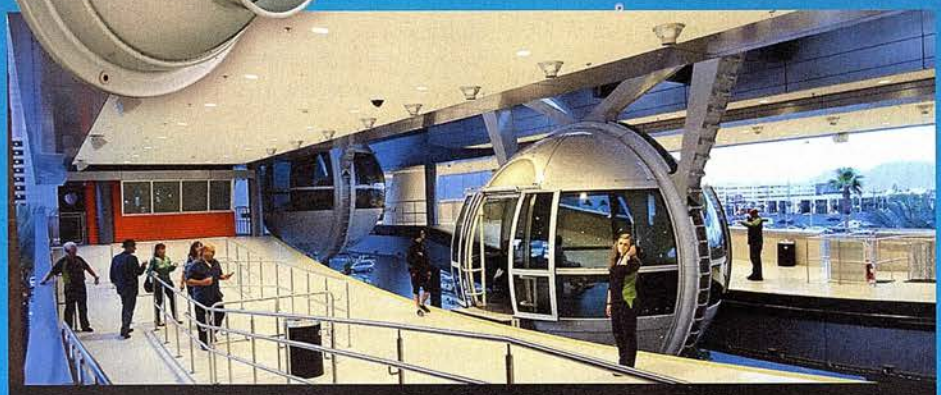

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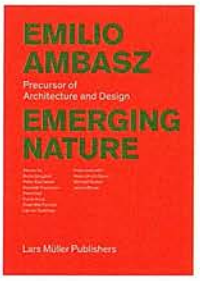
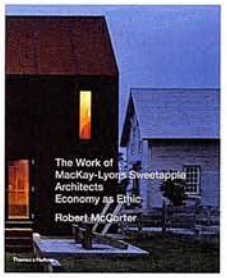


Emilio Ambasz/ Emerging Nature: Precursor of Architecture and Design, *essays by 11 authors. Lars Müller Publishers, 312 pages, $39.* Decades ago, before "living walls" were the rage, Ambasz incorporated vegetation into his architecture. He is still at it, as recent work shows. Also shown are the polymath's industrial, graphic, and furniture designs, plus installation shots from his acclaimed MoMA exhibitions in the 1970s. Essayists include Kenneth Frampton and Barry Bergdoll.



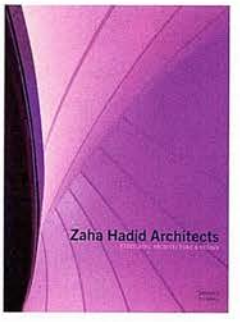
The Work of MacKay-Lyons Sweetapple Architects: Economy as Ethic, *by Robert McCarter. Thames & Hudson, 416 pages, $70.* The rigorously crafted modernist architecture of Brian MacKay-Lyons and Talbot Sweetapple is illustrated by photos of their vernacular wood houses and straightforward public buildings in Nova Scotia—often shown against the spectacular coastal landscape. Essays by Juhani Pallasmaa, Kenneth Frampton, and McCarter add varied insights.

LOT-EK: Objects + Operations, *by Ada Tolla and Giuseppe Lignano, with Thomas de Monchaux. Monacelli Press, 400 pages, $50.* LOT-EK founders Ada Tolla and Giuseppe Lignano show a commitment to the industrial nonaesthetic with this book-as-manifesto. The bold type, brash color, and black-and-white photos underscore their partnership as "a design practice that believes in being unoriginal, ugly, and cheap."

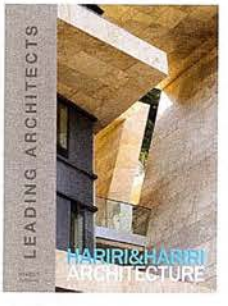
Koning Eizenberg Architecture: Urban Hallucinations, Part 1,2,3, *text by Frances Anderton, Cana Cuff, and Alissa Walker, Oro Editions, 96 pages, $24.95.* Architects Hank Koning and Julie Eizenberg wanted a monograph that would reflect their design ethos, which embraces affordable housing and community facilities. Three tabloid-type publications packaged in a cardboard box convey the no-frills approach almost too well, even though color photos, drawings, and charts are informative.

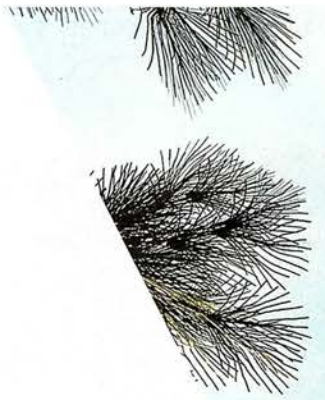
The Complete Zaha Hadid, *introduction by Aaron Betsky. Thames & Hudson, 320 pages, $40.* Beginning with Hadid's early unbuilt projects (including the competition-winning scheme that thrust her into the spotlight—the Peak, in Hong Kong, of 1982–83)—this expanded and updated edition handsomely displays architecture, products, and furniture, and provides a detailed project list. The introduction brings in references to Walter Benjamin and Gilles Deleuze, for theoretical garnishing.

Zaha Hadid Architects: Redefining Architecture & Design, *by Zaha Hadid Architects. Images Publishing, 284 pages, $75.* This collection of eye-popping work covers major buildings executed between 2010 and 2016—the year Hadid died—as well as a number of works in progress. The monograph shows the firm's commitment to keeping the formidable founder's flame alive with principal Patrik Schumacher's manifesto defending formal architecture, and short profiles of the numerous directors and associates.



Hariri & Hariri Architecture: Leading Architects, *introduction by Andrea Simich. Images Publishing, 256 pages, $65.* The lavish compendium of recent built and unbuilt houses and office towers by the sisters Gisue and Mojgan Hariri is supported by plans, sections, and details. The text is informative, and efficient; the introduction by the architecture chair at Cornell University discusses both the work's rigor and its experiential qualities.





THE FUTURE *of* SHADE IS NOW

Architects play a unique role in shaping our world: Each design decision influences how people perceive where they live, work and play. But steel, stone, brick and wood aren't the only materials in an architect's toolkit. Intangibles, such as light, air and temperature, also affect the way people feel in a space.

Shaping light through the use of shading devices should be central to the design process because without shade, life can quickly become unbearable. Think of the worker whose office suffers from overheating and glare. Or the retailer whose customers don't linger because the pedestrian-oriented shopping district is too hot. Or the restauranteur who can't fill her patio seating because it's totally exposed to the sun.

Shade can boost commerce and improve worker productivity, not to mention it can protect people from health risks related to UV exposure. Shade design should be a priority whether the project is a streetscape, shopping area or high-rise office building.

LIGHT CONTROL = COST SAVINGS

Building energy efficiency and worker productivity can be tied directly to effective shading systems in office structures. People need natural light for emotional and physical health, but researchers are finding that control of these daylighting features is a key element in the performance of buildings and the people who work in them.

Electric lighting in buildings consumes 17 percent of all electricity generated in the United States, according to the U.S. Department of Energy.[1] Research into worker comfort and productivity shows glare reduction and automated systems that optimize shade and natural light can contribute to improved worker productivity and reduced energy costs.[2]

DRESS UP THE SKYLINE

Two architects recognized for innovative building shade designs in the Sunbrella® Future of Shade competition conceived of fabric shade systems as a way to upgrade building performance, improve occupant comfort and give buildings a distinctive presence in a city's skyline.

Puerto Rico-based architect and industrial designer Doel Fresse saw a need for automated shade in glass façade high-rise buildings, especially those located in the Caribbean. His conceptual design, "Helicon," is inspired by the shape of heliconia flowers ubiquitous to the island nation. Helicon's fabric panels create an intriguing geometric pattern on the building's exterior. The panels can be adjusted to create interior shade, reduce glare or allow more light into the building when desired.

Helicon, which is designed as a retrofit shade solution for existing glass façade buildings, improves the building's overall energy performance by blocking light before it enters the building. The system can also be flattened to the building's exterior to prevent damage during hurricanes or tropical storms.

Responsive Shading System by Arman Hadilou – United States

Helicon by Doel Fresse – Germany

For architect Arman Hadilou, the intense summer heat in Austin, Texas, spurred him to conceptualize the "Responsive Shading System," a kinetic façade of massive strips of fabric mounted on adjustable arms on the building's exterior. The system responds to the elements, twisting the strips to create bigger or smaller openings depending on the angle of the sun and the time of year. In this way, Responsive Shading System balances building energy efficiency with the need to maintain views.

The air gap between the building's glass façade and the fabric façade allows for ventilation created by natural convection.

CONCLUSION

Given rising global temperatures, creating energy-efficient buildings is more important than ever before. With shade at the center of the design process, architects can ensure energy efficiency is a priority, while also creating aesthetically pleasing buildings that promote occupant comfort.

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"Trends in Lighting in Commercial Buildings." EIA, U.S. Energy Information Administration - EIA - Independent Statistics and Analysis, 17 May 2017.
L Roche, "Summertime Performance of an Automated Lighting and Blinds Control System," Lighting Research & Technology, vol. 34, Issue No. 1 (2002) 11-25. Ossama A. Abdou, "Effects of Luminous Environment on Worker Productivity in Building Spaces," Journal of Architectural Engineering, vol. 3, Issue No. 3 (1997).


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- Arlan Collins, principal and co-founder, CollinsWoerman
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Second Course

Peter Marino and Allied Works redesign two of New York's favorite dining spots—both in landmark buildings.

THE LOBSTER CLUB, BY PETER MARINO

The Lobster Club

Peter Marino reimagines the space of a favorite Seagram Building haunt.

BY PILAR VILADAS

THE BLACK-LEATHER-CLAD architect and art collector Peter Marino is known for his glamorous interiors and buildings for such luxury retail clients as Chanel, Louis Vuitton, and Hublot. He has also designed houses for the ultra-rich, as well as striking bronze furniture, and a collection of glass for Venini. But the Lobster Club may be among his highest-profile recent projects. The new Japanese-seafood-themed eatery occupies the space of the former Brasserie, the casual (but no less chic) downstairs sibling of the legendary Four Seasons restaurant designed by Philip Johnson and interior designer William Pahlmann in Ludwig Mies van der Rohe's Seagram Building. The latter moved out of its landmarked space in 2016 and has been replaced by two restaurants, the Grill and the Pool (RECORD, September 2017, page 52), which, along with the Lobster Club, are operated by the Major Food Group.

The Brasserie opened in 1959 and was located on the building's ground floor beneath the Four Seasons, with an entrance on East 53rd Street. It too was designed by Johnson and Pahlmann. Open 24-7, it was, in its heyday, a late-night watering hole for New York's glitterati. After a fire closed the restaurant in 1995, it reopened in 1999 with a new, futuristic design by Diller Scofidio + Renfro (RECORD, July 2013, page 67); that version closed in 2015. Enter Marino, brought in by Aby Rosen of RFR Holding, the building's owner, and Major Food Group. The architect was charged with giving the space a complete makeover, and he did not disappoint, designing an interior that is substantial and elegant, with subtle references to the Four Seasons and the first Brasserie. Yet it is entirely contemporary. (The Lobster Club won't be open 24-7, but will offer breakfast, lunch, dinner, and late-night drinks.)

The layout of the restaurant's main room, with an onyx-and-bronze bar along the east wall near the entrance, is closer to that of the original Brasserie than to its second iteration. Marino liked the earlier version's hybrid counter seating/lounge/table–service approach. His design echoes the "square within a square" of the pool designed for the Four Seasons in the plan of the Lobster Club's lounge, which has colorful upholstered furniture and a precast-concrete tile floor, painted by the artist Laura Bergen with a Jackson Pollock–inspired pattern. The bronze dividers that flank three booths on the room's south wall are inspired by the Seagram Building's facade. Marino—who studied painting and sculpture at Cornell before turning to architecture—also offers riffs on Picasso in the sheet-metal sculptures that stand atop the banquettes in the adjoining Red Room dining area. Picasso and Pollock are not only idols of the architect, but both artists' work once adorned the Four Seasons. Ceramic plates by Picasso, part of Rosen's personal collection, hang above the new bar, echoing the plates by the artist that hung above the banquettes in the original Brasserie's counter area.

FLOOR PLAN

0 12 FT. 4 M.

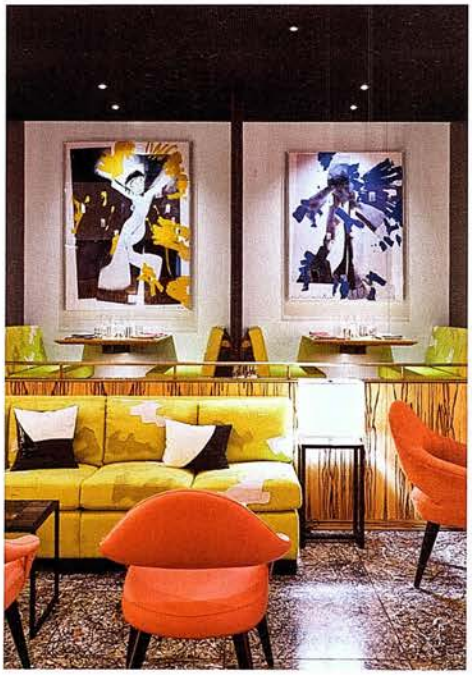
1 ENTRANCE
2 RECEPTION
3 BAR
4 LOUNGE
5 BOOTHS
6 CURTAIN ROOM
7 RED ROOM
8 PRIVATE DINING
9 RESTROOM
10 SERVICE CORRIDOR
11 SEAGRAM STAIR
12 KITCHEN

PALATE CLEANSER Black-leather draperies wrap a banquette behind the main space (opposite). The bar, near the entrance, borders the lounge (above). A row of booths (right) line the south wall, which leads to the Red Room dining area (far right).

The material palette—including oiled bronze, terrazzo, and white ebony (a nod to the Four Seasons' French walnut paneling)—is meant to evoke the Seagram aesthetic. Even the black-leather draperies that line the main room's west wall—and can be extended to create a private dining area—have a Modernist pedigree. Marino points out that Mies van der Rohe and collaborator Lily Reich used curtains in a 1927 café, although he notes that the choice of black leather refers to "my fun, cutting-edge, biker side."

Marino's design gives the the Lobster Club a luxe golden glow, but its sumptuous finishes and details don't weigh down its quirky, modern vibe. It's also something of a self-portrait of the architect, and not just because of the black leather; he even drew the lobster that's painted on dinner plates. "I like doing the whole nine yards," he says. "It's where I always wanted to be." ■

Pilar Viladas, a design and architecture writer, has an essay in Ward Bennett, *a monograph published by Phaidon in November.*



Eleven Madison Park

Allied Works renovates a New York restaurant with elegant panache.

BY WENDY MOONAN

WHEN YOU first enter the newly reopened Manhattan restaurant Eleven Madison Park, on 24th Street and Madison Avenue, you are awestruck by the grandness of the interior, with its 24-foot-high ceiling, the magisterial steel case windows and vast, cavernous space. It looks like what it is, a three-Michelin-star temple to haute cuisine.

Since 1998, the restaurant has occupied the Art Deco lobby of the landmark 1928 Metropolitan Life North building, with 2,250 square feet in the main dining room and 650 square feet in the adjacent low-ceilinged bar. In 2011, the original owner, restaurateur Danny Meyer, sold it to Will Guidara and his partner, the celebrated chef Daniel Humm. Five years later they hired Brad Cloepfil, a restaurant regular, longtime friend, and principal of Allied Works Architecture, to reimagine the space. "It's one of the most beautiful rooms in New York, with light streaming in from Madison Square Park on the west," Cloepfil says. "I wanted to make it feel as if it was intended to be a restaurant, with its own character."

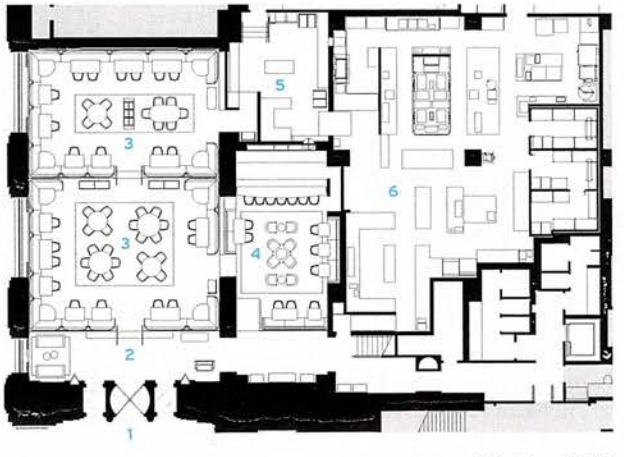
Cloepfil kept the volume, the nickel-plated bronze windows, the light fixtures and ornamental plasterwork on the ceiling, but gave the restaurant a whole new identity—one more sedate than the previous more colorful interior executed by Bentel & Bentel.

To do this, he slightly reconfigured the dining room by creating a central aisle extending from the entrance foyer to two existing stepped levels enclosed by low, bronze screens. As you walk through the dining areas, your eye is immediately drawn to the back wall, with an enormous blue painting by Rita Ackermann. "I wanted a ceremonial rising up, a formal procession, so you can see all the people in the room," Cloepfil says, about this "stage set for food and service." The architect wanted the space "enriched but simple," like the cuisine. Similarly, he gave the bar a new gold-foil coved ceiling, which is less jazzy than its folded gold-leaf predecessor.

Cloepfil is a modernist: the look is clean, and the palette mostly neutral—white, tan, and dark brown. The architect was afforded the chance to also design the furniture, lighting, tableware, and textiles. Like the efforts of many early modern architects, it is a *gesamtkunstwerk*.

A one-time botany student, Cloepfil has created custom pieces inspired not by the Art Deco building but by nature and the park outside. The bronze screens separating the dining areas allude to the spines of gingko leaves. The brownish pattern in the hand-tufted silk and wool rug is meant to look "like the ghosts of leaves on a sidewalk."

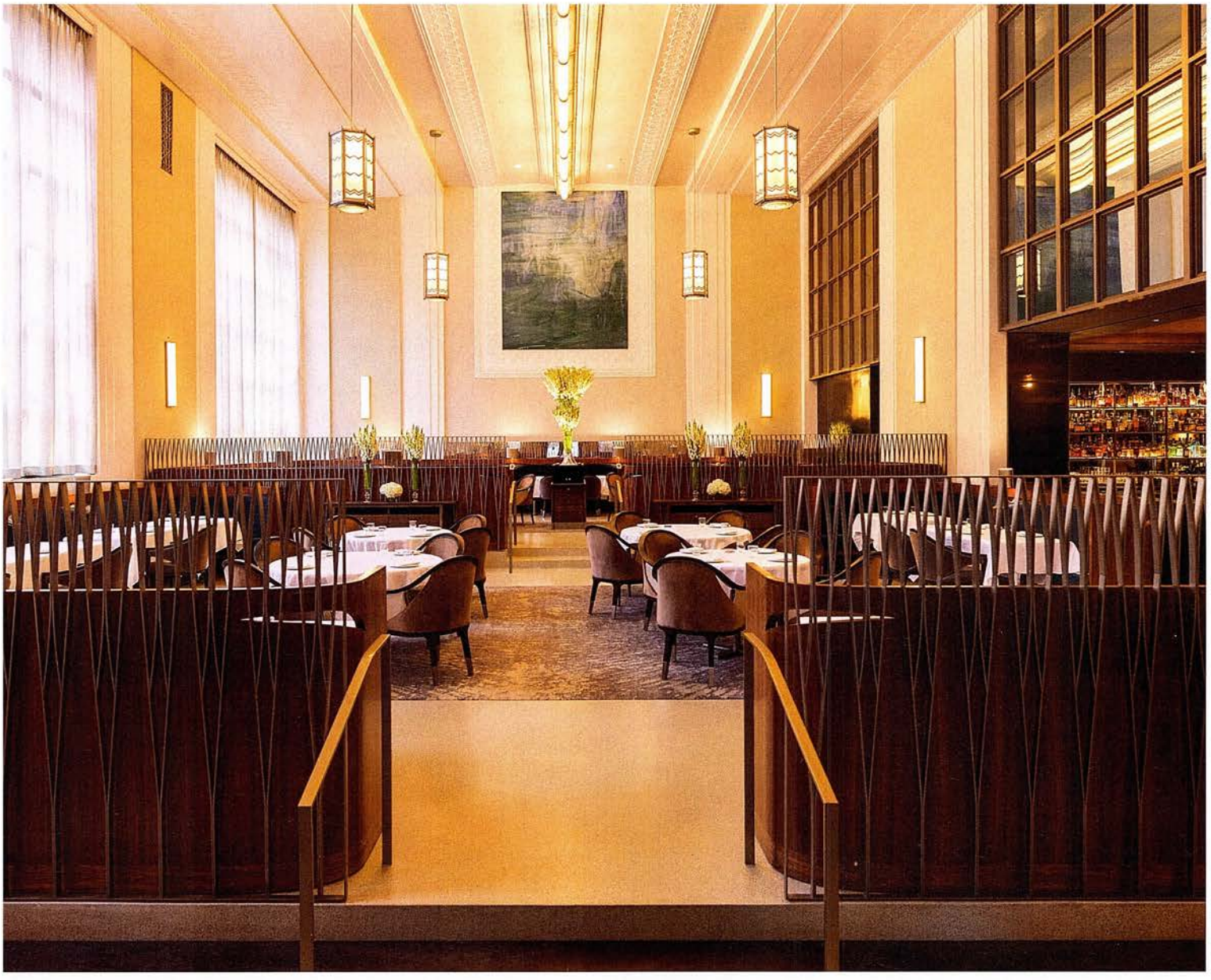
And for the seating, "the big idea was comfort," the architect says. "We are inviting people to dine for three and a half hours." The figured walnut banquettes lining the room are upholstered in dark blue mohair and made to look like individual pieces of furniture, with curved backs. Small metal wall lights between the banquettes add a cozy, old-



FLOOR PLAN

0 12 FT. 4 M.

1 ENTRANCE
2 VESTIBULE
3 DINING ROOM
4 BAR
5 SERVICE STATION
6 KITCHEN



LUXE, CALM, CRAFT Allied Works' nickel-plated bronze screens enclose terraced dining areas (above). They also designed the furniture, fittings, and tableware (opposite), including the bar (right) with its new gold-foil ceiling.

fashioned, Parisian note. "I don't do ornament on buildings, but I could here, and I wanted a lot of ornament, to bring the scale down," he says.

Cloepfil is particularly proud of his porcelain service, inspired by research at London's Victoria and Albert Museum. "I always wanted to design plates," says the architect, who collects midcentury European ceramics. The ones at Eleven Madison Park have raw porcelain rims, glazed centers, and sit on a raised base so that they appear to float on the tablecloths. They are off-white, like much of the space—and even the huge floral arrangements.

If, in the end, the décor is bland, it is because the dining experience and hospitality are the focus. "I wanted the atmosphere to be calm, warm, inviting," Cloepfil says. He has succeeded. Nonetheless, this visitor misses the old yellow bar and the festive, colorful bouquets of flowers. ■

Wendy Moonan is a New York writer on design, architecture, and the decorative arts.

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DESIGN VANGUARD 2017

For a profession of late bloomers, the notion of a "young architect" has always been the subject of debate. When exactly is one too old to be a young architect? Since 2000, Record has showcased promising practitioners who have led their own firms for 10 years or less, in our annual Design Vanguard issue. This year's winners range in age from 33 to 48, each with a surprising portfolio of built work and on-the-boards projects. Each also has a personal, crafted, and nuanced approach to architecture that has come to define their generation.

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Ambrosi Etchegaray

Mexico City

FOUNDED: 2011

DESIGN STAFF: 8–12

PRINCIPALS: Jorge Ambrosi and Gabriela Etchegaray

EDUCATION: *Ambrosi*: National University of Mexico, B.Arch., 2008. *Etchegaray*: Columbia University GSAPP, M.S. Critical, Curatorial, and Conceptual Practices in Arch., 2018; Universitat Politècnica de Catalunya and Iberoamericana University, M.S. Creative Management and Transformation of the City, 2012; Universidad Iberoamericana, B.Arch., 2008

WORK HISTORY: *Ambrosi*: Fabric (founding partner), 2003–08; JS[a] (formerly Higuera + Sanchez), 1999–2003. *Etchegaray*: Collaborations with Rojkind Arquitectos, Isaac Broid, Esrawe Studio, 2006–11; TALLER|Mauricio Rocha + Gabriela Carrillo, 2008–10

KEY COMPLETED PROJECTS: Tamosura Park, Cananea, 2017; Children's Museum Chapultepec, Mexico City, 2016; IT Building, Mexico City, 2016; Fair for Culture Friends, Mexico City, 2016; Milagrito Mezcal Pavilion, Santiago de Matatlan, 2015; Nacozari Square, Nacozari de García, 2014; AS Town Houses, Mexico City, 2014 (all in Mexico)

KEY CURRENT PROJECTS: Mexican Pavilion for the International Architecture Exhibition at the 2018 La Biennale di Venezia, Venice; Grupo Habita Hotel, Mexico City; Guayacan Pavilion, Puerto Escondido, Mexico

AMBROSIETCHEGARAY.MX

Local culture helps shape a firm's diverse portfolio.

WHEN A 7.1-magnitude earthquake shook Mexico City on September 19, architects at the office of Ambrosi Etchegaray were already working as part of a multidisciplinary team helping to rebuild the Unión Hidalgo community, one of the areas along Mexico's southern Pacific coast most affected by an 8.1-magnitude quake earlier that month. The studio, which is located in Condesa, a stylish Mexico City neighborhood that was one of the hardest hit by the second quake, is now working with several institutions on plans for repairing significant historic buildings throughout the capital as well.

"We were busy, but you find the time," says Gabriela Etchegaray, 33, who, with Jorge Ambrosi, 40, founded the studio in 2011. Even with more work, Ambrosi and Etchegaray prefer to have fewer than a dozen staff, allowing the office to be nimble and collaborative. A steady stream of residential projects, largely led by Ambrosi, make it financially possible for the team to take on smaller-scale work that explores different programs and materials.

Making use of locally available resources has been a constant in the studio's work. At the Casa Wabi Foundation, a nonprofit established by Mexican artist Bosco Sodi to support young artists, the team is designing a nursery to cultivate the nearly extinct Guayacan tree. The plan involves an excavated walkway that allows workers to stand upright while caring for seedlings. Nearby, they are also designing a small house composed of three pavilions and a pool. The site was piled with burned brick used by Sodi in the production of his large-scale ceramic works, so the architects found a way to incorporate the discarded materials, along with red concrete, into the house's structural elements.

For a Grupo Habita hotel in downtown Mexico City, the studio is adapting a colonial structure at the back of the Metropolitan Cathedral, adding patios to each room. "It's like a puzzle," says Etchegaray. Another puzzle is the project's fast timeline (projects in Mexico often operate at a breakneck speed that forces design and construction phases to overlap). "Every week, we have to take plans to the site in order for the construction team to work," says the architect. "We have less time to think and experiment with ideas, but it's always good to have different processes; you need to be pragmatic."

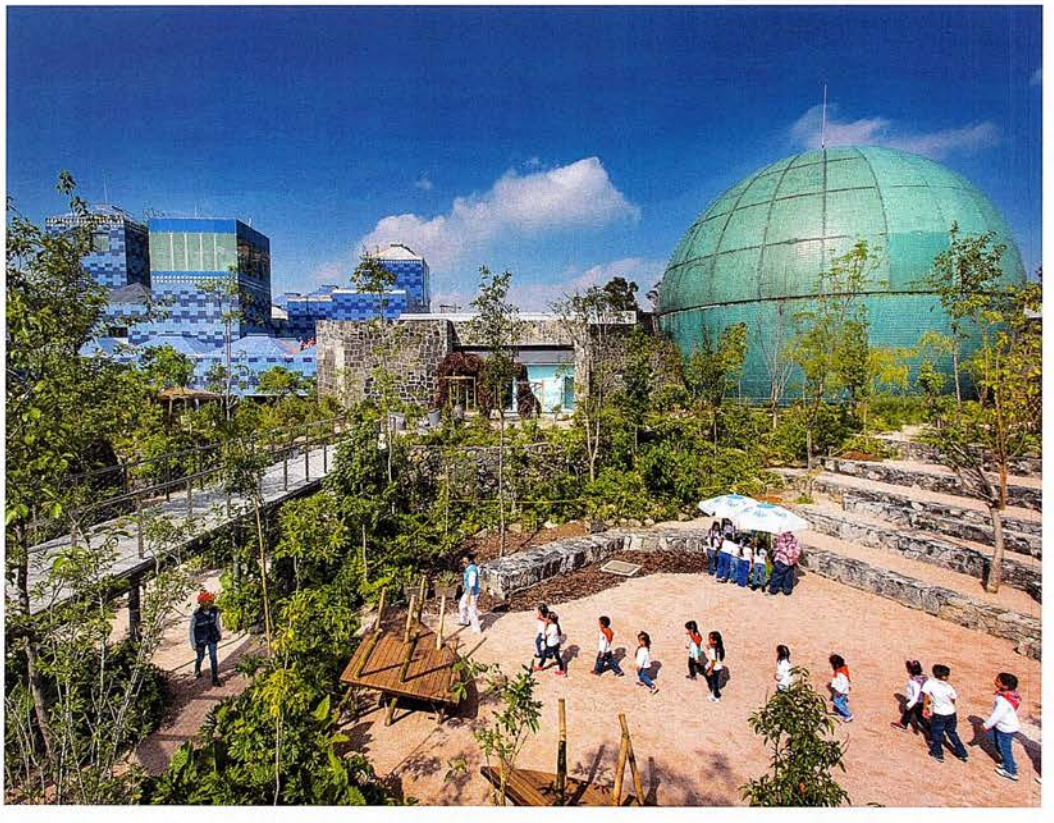
Mixed with that pragmatism is an attention to local culture and heritage—for now, in Mexico, and, hopefully, in the future, beyond. "I fantasize about building projects in different countries, to prove ourselves in different conditions, with different human resources and materials, and see what results," says Etchegaray. Even as the team aims for more international work, including its design for the Mexican Pavilion at the 2018 Venice Biennale, it is steadfastly connected to the local community, both professionally and personally. The studio recently took in another architecture office whose space was destroyed in the earthquake, and, along with about 20 other nearby studios, they play soccer in a league organized by Tatiana Bilbao. And as sometimes seems inevitable in the architecture world, Ambrosi and Etchegaray became partners outside of the office after they started working together. If they weren't sharing a studio, they might have to choose between family life and office life, between community and international recognition. But like many successful couples, for now they find a way to have both. *Jennifer Krichels*

Mezcal House

With demand for the agave liquor growing, this renovation expanded a production facility in the state of Oaxaca to provide more space while following a traditional layout. An oven occupies the center of the building, while adjacent areas are separated by concrete-framed walls made with rammed earth from the site.

Culture Fair Pavilion

This 8,450-square-foot temporary structure was designed for Mexico City's annual international cultural fair to create a marketplace-like atmosphere in the city's historic center. The aluminum structure supported scaffolding and tarps; burlap sacks hung around the inner and outer circumferences were a nod to the role of trade and commerce.



Children's Museum Chapultepec

Providing new outdoor exhibition spaces in Mexico City's Chapultepec Park, the exterior component of this museum expansion creates five distinct landscapes mimicking various environments in the Valley of Mexico. The spaces seek to touch the ground lightly by employing permeable gravel surfaces and elevated walkways.

IT Building

Situated in Mexico City's Condesa neighborhood, this six-unit residential building is constructed of stacked concrete slabs. A gridlike front facade is punctuated by terraces filled with greenery to create a buffer between the apartments and the city.

LEVER Architecture
Portland, Oregon

FOUNDED: 2009

DESIGN STAFF: 18

PRINCIPAL: Thomas Robinson

EDUCATION: Harvard Graduate School of Design, M.Arch., 2000; University of California, Berkeley, B.Arch., 1991

WORK HISTORY: Allied Works Architecture, 2003–09; Herzog & de Meuron, 2000–03; Esherick Homsey Dodge and Davis, 1991–96

KEY COMPLETED PROJECTS: footwear innovation lab, 2017; *Quest for Beauty*, Portland Art Museum, 2017; Albina Yard, 2016; L'Angolo Estate Winery, Newberg, Oregon, 2016; TreeHouse, 2015; animation studio renovation, Burbank, California, 2015; global apparel headquarters, Baltimore, 2015; Academy of Motion Picture Arts and Sciences, Beverly Hills, California, 2014; Union Way, 2013; ArtHouse, 2013; creative studio and campus, Glendale, California, 2011 (all in Portland, Oregon, except as noted)

KEY CURRENT PROJECTS: Framework; Grand Avenue housing; environmental-nonprofit offices; Guild's Lake creative office; the Range, Bend, Oregon; Flex (all in Portland, Oregon, except as noted)

LEVERARCHITECTURE.COM

Innovation in materials and fabrication prompts an architect to reconsider how buildings are made.

LEVER Architecture has received considerable attention since the fall of 2015; that was when its scheme for Framework, a 12-story mixed-use building, won the U.S. Department of Agriculture's Tall Wood Prize. If all goes as planned, the 145-foot-high building, slated for completion in early 2019 in the firm's home city of Portland, Oregon, will be the country's first wood high-rise and the tallest all mass timber building in North America. But for Thomas Robinson, the 48-year-old architect who founded the office in 2009, the significance of the project is broader than the adjectives "first" or "tallest." Framework speaks to the essence of LEVER's work, which reconsiders how buildings are made.

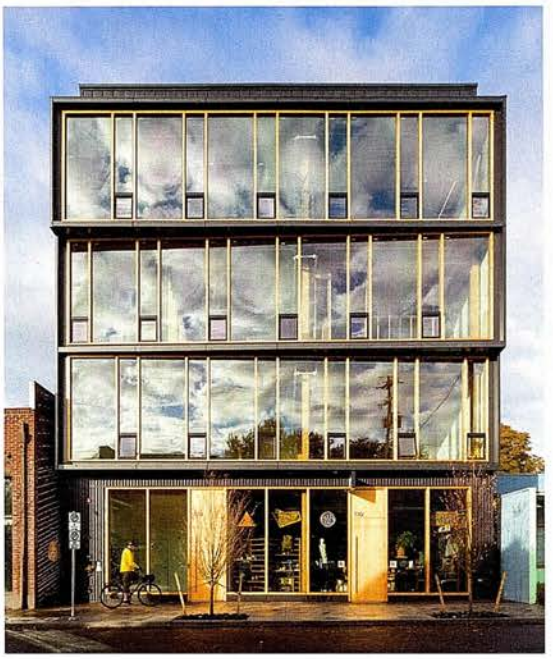
The tower follows on the heels of Albina Yard (RECORD, June 2017, page 120), a four-story mass timber multiuse building in North Portland where LEVER has its offices. On the front facade, each floor appears subtly skewed and cantilevers slightly beyond the one below. It served as the testing ground for many of the technologies and concepts that will be used at Framework, including the off-site precision fabrication of glulam and cross-laminated timber elements.

Although Robinson is partial to timber, since "people connect with it on an elemental level," his investigations are not solely focused on that material. The firm's first stand-alone building, an apartment complex for students at the Pacific Northwest College of Art completed in Portland's Pearl District in 2013, is enclosed in metal panels that are standard except for their accordion folds. The play of light and shadow on the silvery pleats elevates the cladding type, "making it seem like more than it is" despite a limited budget, says Robinson.

Regardless of the material or the commission, Robinson maintains that a common thread in his projects—and those of the firms he has worked for, including Eshrick Homsey Dodge and Davis, Herzog & de Meuron, and Allied Works—is a desire to enrich the public realm. He points to Union Way in Portland's West End, a project that transformed a 1920s structure, built as a garage and then home to a nightclub, into a small retail complex. Its most unusual aspect is a covered public passage with walls of regionally grown poplar and a skylit roof supported by the structure's original timber trusses, giving the shopping arcade a uniquely Pacific Northwest twist.

Although most of LEVER's projects are in the Portland region, the firm regularly works in Los Angeles and has done projects on the East Coast. A recently completed winery in Newberg, Oregon, is its lone rural project, but Robinson maintains that the same principles apply whether the site is in the city or the country. As with Union Way, he was trying to address a larger context. Its long and low winglike roof, and glazed facades that open onto the vineyards, tie the winery to the landscape.

Robinson hopes to have the chance to tackle a library or school. These are the kinds of projects that, he says, "can demonstrate the value of architecture to the widest audience and bring richer experience to people's everyday lives." *Joann Gonchar, AIA*



Albina Yard and Framework

Many of the mass timber technologies employed in the four-story Albina Yard (right), will be used in another Portland project: Framework (far right). It is slated to become the country's first wood high-rise.

L'Angolo Estate

A long, low-slung roof and glazed facades that provide views of the surrounding vineyards merge a tasting room in Oregon's wine country with the surrounding landscape.

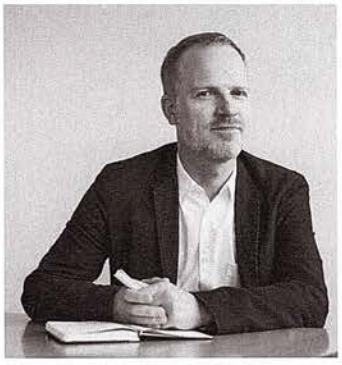
ArtHouse

The firm's first stand-alone building was ArtHouse, a six-story, 50-unit apartment complex for students at the Pacific Northwest College of Art. Completed in Portland's Pearl District in 2013, the accordion folds of its metal skin elevate the building's otherwise standard exterior cladding material.

Union Way

LEVER transformed a structure—built in the 1920s as a garage, and then home to a nightclub—into a small retail complex in Portland's West End. A sheltered public passage through the building has walls of regionally grown poplar and a skylit roof supported by the original trusses.

David Kohn Architects
London



FOUNDED: 2007

DESIGN STAFF: 17

PRINCIPAL: David Kohn

EDUCATION: University of Cambridge, Dip.Arch., 1997; Columbia University, Fulbright Scholar, 1995–96; University of Cambridge, M.A., 1995; University of Cambridge, B.Arch., 1994.

WORK HISTORY: Caruso St. John, 2002–06; Hawkins\Brown, 2001–02; Zombory-Moldovan Moore (ZMMA), 2000–01; East, 1997–2000

KEY COMPLETED PROJECTS: Sanderson House, London, 2014; Carrer Avinyó, Barcelona, 2013; Sotheby's, London, 2013; A Room for London, 2012; The White Building, London, 2012; Stable Acre, Norfolk, U.K., 2010; Royal Academy Restaurant, London, 2009

KEY CURRENT PROJECTS: Quadrangle for New College, Oxford, U.K., 2015–22; Victoria and Albert Museum Photography Centre, 2017–20; Greenwich Design District, London, 2017–20; refurbishment of the Institute of Contemporary Arts, 2012–20

DAVIDKOHN.CO.UK

The pleasure of creating and experiencing architecture informs a British firm's varied work.

A FEW YEARS AGO, David Kohn, who founded David Kohn Architects (DKA) in London in 2007, drew up a list for his office—which currently numbers 17 designers—of 10 points in regard to architecture. As enumerated by the 45-year-old Kohn—who got his architecture degree at Cambridge and worked for the art-world favorite Caruso St. John Architects before going out on his own—they describe a design philosophy that is refreshingly humanistic. For instance, his point No. 3, "Comfort," tells us, "Architecture should be so comfortable as to allow people to focus entirely on life," while No. 5, "Craft," states, "The more pleasure had in making architecture, the more pleasure there is to be taken from using it."

As promised, DKA's completed buildings and interiors—from contemporary art galleries and exhibition spaces to residential projects—are as pleasing as they are precise. They have no signature "look," instead taking their cues from program and place. The long, narrow form of Stable Acre, a weekend house in the English county of Norfolk, conforms to the footprint of the 19th-century stable that once stood on the site. The building's emphasis on natural light and connection to the outdoors makes its minimalist contours and restrained palette of brick, wood, glass, and corrugated metal feel luxurious. A more exuberant color scheme—a nod to the saturated tones of Adolf Loos's Villa Müller, says Kohn—prevails at the Sanderson House, an addition to the garden side of a Victorian home in London. In Barcelona, a two-story apartment was turned into a layered, loftlike volume, and its colorful encaustic floor tiles (by a maker Antoni Gaudí used) are painted with triangles that echo the shape of the building and the adjacent Plaça de George Orwell.

DKA is best known for A Room for London, a 2012 collaboration with the artist Fiona Banner that produced a boat-shaped dwelling perched atop a concert hall at London's Southbank Centre. The office is now at work on much larger projects, like a photography center for the Victoria and Albert Museum, and the renovation of London's Institute of Contemporary Art that will reinstate much of the 1968 interior design by architects Jane Drew and Maxwell Fry. A nearly 53,800-square-foot, limestone-clad quad for Oxford University's New College will contain housing with diverse room layouts to make a student's annual move "a pleasurable experience, in contrast to housing as a system that sees homogeneity as a virtue," Kohn says. And for the Greenwich Design District (to be completed in 2020 as part of Knight Dragon's 150-acre, mixed-use Greenwich Peninsula development across the Thames from Canary Wharf), DKA was asked, as were seven other firms, to design two buildings for rent-capped creative studios. One incorporates a massive colonnade, and the other is crowned by a large "Design District" sign, alluding respectively to Mannerist architecture and to historic guild houses, the exteriors of which refer to the crafts practiced within. Kohn believes that "architecture shouldn't be the subject of experience," but rather "should create the opportunity for a rich experience." While that isn't one of his 10 points, it certainly could be. *Pilar Viladas*

Quad, New College, Oxford

The architect's new quad includes student housing as well as facilities for the adjacent New College School, a lecture theater and a music hall. The curved limestone facade of the student housing is punctuated with fixed windows flanked by anodized aluminum ventilation panels.

Sanderson House

A 2014 brick addition to a 19th-century Victorian house in London was designed to feel like a pergola that connects its new kitchen and dining room to the garden. An arched window offers views and transmits borrowed light into the living room of the original house.

A Room for London

Commissioned by Living Architecture and Artangel, and designed with the artist Fiona Banner, A Room for London—a boat-shaped structure perched atop Queen Elizabeth Hall at London's Southbank Centre—was created as a residence for visiting artists, writers, and musicians during London's 2012 Olympic year.

Greenwich Design District

For London's new Greenwich Design District, DKA and seven other firms (including local 6A Architects and Madrid's SelgasCano) have each designed a pair of buildings for creative studios. DKA's brick and glass-block designs are covered with green grids, a reference to the work of James Stirling.

Stable Acre

For a three-bedroom weekend house in the English county of Norfolk, DKA created a narrow structure that conforms to the footprint of the 19th-century stable that once occupied the site. The "tentlike" living room has a south-facing wall of glass doors that can open completely to the garden and views beyond.

LAND Arquitectos

Santiago, Chile

FOUNDED: 2007

DESIGN STAFF: 4–6

PRINCIPALS: Angela Delorenzo Arancibia and Cristóbal Valenzuela Haeussler

EDUCATION: *Delorenzo Arancibia:* University of California, Berkeley, master's in Landscape Architecture, 2013; Universidad Finis Terrae, B. Arch., 2007. *Valenzuela Haeussler:* Universidad Finis Terrae, B.Arch., 2007

WORK HISTORY: *Delorenzo Arancibia:* Sebastián Irarrazaval Arquitectos, 2013; Christian de Groote Associated Architects, 2007. *Valenzuela Haeussler:* Wedeles & Manieu Arquitectos, 2006–07

KEY COMPLETED PROJECTS: Almost Cube House, 2017; Santa Rosa School, 2014; Las Palmas Bike Park master plan, 2014; Rambla House, 2012; Catch the Light Classrooms, 2011; Spa Las Palmas, 2007 (all in Chile)

KEY CURRENT PROJECTS: Desafío Rural School; Erizo House; ORIGAMI Office & Commerce Building; Apart Hotel Providencia; master plan Bahia Volcanes; concept master plan Maule Coast; concept master plan Los Islotes de Matanzas (all in Chile)

LANDARQUITECTOS.COM

These partners in life and design promote collaboration between client and community.

FOR THE FOUNDERS of LAND, the practice of architecture is as much about building relationships as designing buildings. Cristóbal Valenzuela Haeussler, 36, and Angela Delorenzo Arancibia, 35, who are married, established their Santiago, Chile–based firm in 2007. With a small team, ranging in size from four to six, LAND has built up a diverse portfolio of projects at a variety of scales. But the unifying theme of their work is an ability to leverage connections among their clients and like-minded organizations, corporations, and authorities, pressing on toward a mutually beneficial end while respectfully considering each project's context. Whether building a school with donations from a cement company or securing funding for public projects from nonprofit groups, the firm consistently demonstrates a dedication to collaboration. "Buildings can be just buildings, or they can add value in the long term to the place and the community," says Delorenzo. "We always try to identify and promote something of specific value in our work."

After an earthquake and tsunami struck the central coast of Chile in 2010, LAND built two schools, both public-private hybrids common in Chile, to replace ones that had been destroyed. Years later, the education ministry came calling again, asking the firm to design a public school for the rural community of San Javier, located in the geographic center of the country. LAND connected the local school authority to Desafío Levantemos Chile, a nongovernmental organization (NGO) established after the earthquake for the purpose of rebuilding schools. The NGO ultimately provided funding for the project, which LAND designed as a prototype school cum community center to replace a building destroyed by wildfires earlier this year. With construction starting soon, the architects hope to build similar facilities in other remote, underserved places, where schools need the flexibility to provide social functions beyond the academic.

Flexing different muscles, the firm has also designed offices, high-end beach houses, and personal spas. But even with these private endeavors, LAND's schemes carefully consider their context through thoughtful siting, landscaping, and material choices. Delorenzo, who is trained as both an architect and landscape architect, chose to use aromatic and edible plants in gardens at a forthcoming office building in the upscale Santiago neighborhood of Las Condes. "It refers to the history of the place," she says, noting that the entire city is situated in a fertile valley known for its rich agricultural past. In residential beachfront projects, the firm focuses on preventing erosion, through landscaping as well as siting. "A big part of it is educating people, changing the way they see and relate to the landscape."

The couple owns a plot of land in a coastal town near Santiago that they hope to one day develop for themselves. It's an ideal location, given Valenzuela's passion for kitesurfing. With a national championship title and a top-10 rank in the 2007 world championship competition, it is not surprising that the architect has developed an interest in building near the water. "I love the idea that the coast can be more inclusive, while also protected," says Valenzuela, who, with Delorenzo, is working on four large master plans for regions along the Pacific coast and on the shore of Panguipulli Lake in southern Chile. In these, the firm is aiming to shift the paradigm for large developer-driven projects by mitigating erosion through landscaping and siting; rehabilitating wetland areas to help treat water and preserve ecosystems; and creating clear paths and trails allowing public access to the beaches. "Wherever we can, we seize the opportunity to create a public place through a private project," says Delorenzo.

"We don't see projects as objects," she says; "we see them as part of systems. We try to understand the physical and social impact they will have—their bigger context. We believe we can approach every project in that way." *Miriam Sitz*

Catch the Light Classrooms

LAND designed the playful Catch the Light Classrooms for the Santa Matilde School in the city of Til Til, located within the Santiago metropolitan region, for victims of the 2010 earthquake and tsunami. It was funded by Holcim and Cemento Polpaico.

Santa Rosa School

After the 2010 earthquake and tsunami, LAND learned about the need for a new school in Constitución, a seaside city on the central coast that was one of the hardest-hit. The architects designed an elongated quad of pine-clad buildings with a chapel, facing the historic city center, that serves as a memorial to those who lost their lives.

ORIGAMI Office & Commerce Building

LAND developed the plan for an office tower and its surrounding landscaping for the real-estate company Centinela in the upscale Santiago neighborhood of Las Condes. The project is slated for completion in May 2018.

Desafío Rural School

LAND designed a public school in central Chile as a prototype that could be modified and deployed in other remote areas, where schools host multiple programs, including agricultural training and activities for elders.

stpmj Architecture
Seoul and Brooklyn, NY

FOUNDED: 2015

DESIGN STAFF: 4–6

PRINCIPALS: Seung Teak Lee and Mi Jung Lim

EDUCATION: *Lee*: Harvard GSD, M.Arch., 2009; Korea University, B.Eng., 2004.
Lim: Harvard GSD, M.Arch., 2009; Rhode Island School of Design, B.Arch., 2007; Yonsei University, B.S., 2003

WORK HISTORY: *Lee*: LevenBetts, 2011–14; nArchitects, 2009–11; Herzog & de Meuron, 2008; Systemlab, 2005–06
Lim: Andrew Berman Architect, 2009–15

KEY COMPLETED PROJECTS: The Masonry, Kwangkyo, 2017; Nara Cellar Office, Seoul, 2017; Stratum House, Icheon, 2017; Dissolving Arch, Jeju Island, 2017; Chail Renaissance, Seoul, 2017; Shear House, Yecheon, 2016; Invisible Barn, Truckee, California, 2015 (all in Korea, except as noted)

KEY CURRENT PROJECTS: Red Chimney, Jeju Island, Korea; Kkotbit (subway passage), Seoul; Brick Church, Gwangju; Arches, Seoul

STPMJ.COM

A prolific husband-and-wife team builds projects that are not as straightforward as they seem.

IN THE WORK of stpmj Architecture, things reveal themselves incrementally. The familiar becomes surprising as you turn a corner or come back a month later. The simple becomes complex as you move around or through it. When one approaches Shear House from the west, it appears as a straightforward, gabled elevation, made somewhat intriguing by an asymmetrical roof and a trio of rectangular punched openings. Nicely done, but we've seen this before—in Herzog & de Meuron's concrete House in Leymen, for example, and hundreds of imitations. Walk around it, though, and you discover a more sophisticated geometric game being played, as the roof slides over the south facade to form an angled eave that protects the glazed dining area below it and then shifts on the north side to create a second-story balcony. What seems at first to be monolithic turns out to be much more complex. A different kind of transformation happened this past summer on Jeju Island, where Seung Teak Lee and Mi Jung Lim, the husband-and-wife team behind stpmj, erected a freestanding barrel vault made of rock-salt bricks. In the warm and humid climate, the rock salt slowly dissolved, leaving just an arching framework of cement mortar.

Educated in both the U.S. and Korea, Lee, 40, and Lim, 37, split their time between New York and Seoul. Not surprisingly, they often aim to resolve seemingly contradictory forces in their work. "We are interested in pursuing two goals, both boldness and efficiency," say the architects. They call this "Provocative Realism," a term they coined to bring together the divergent demands of innovation and low budgets. Simple forms and everyday materials help them keep costs down, while a penchant for experimentation pushes them toward strong formal gestures—such as the roof displacement in Shear House.

The firm's name comes from the first initials of Seung Teak and Mi Jung connected by a "p" for "plus." It also stands for "five values that we pursue: speculative, trailblazing, playful, materialized, and judicious," they explain.

For a firm that has been around for less than three years, time and history unexpectedly serve as critical elements in several projects. A few months before Dissolving Arch debuted, stpmj completed Stratum House, which grabs attention with its boldly striated concrete walls that look like geological layers formed over eons. The architects produced the irregular strata by varying the ratio of water to cement, the types of aggregates, and the amount of pigment in each pour. In Chail Renaissance, the architects reinterpreted an old Korean sunshade, or *chail*, attached to a recently built traditional house that serves as an exhibition and conference space for a nonprofit foundation. And in The Masonry, they slyly refer to Robert Venturi's house for his mother, Vanna, while making the iconic gabled facade their own by using a striking combination of brick and concrete block meeting at a dramatic angle. Call it a Modern take on a Postmodern classic.

Studying and working in both the U.S. and Asia has pushed Lee and Lim to be "nimble and resilient in order to react quickly and properly to different contexts, economics, politics, and environmental conditions." While the firm has built mostly in Korea, it is exploring notions of form, scale, materiality, and time that should resonate across borders.
Clifford A. Pearson

Invisible Barn

Described by stpmj as an architectural folly, the 72-square-foot Invisible Barn was built at the Sagehen Creek Field Station, a research and teaching facility of UC Berkeley. The mirror-finished structure loses its architectural presence in nature by reflecting the trees around it. Openings, however, allow visitors to experience the space by moving through it.

The Masonry

This house for two families plays with scale in dual ways—in the building itself, and in the masonry units used to construct it. The juxtaposition of bricks with concrete blocks creates a singular facade while making two units of program discernible in one mass.

Shear House

Responding to sun orientation, this small house, just under 1,000 square feet, has two different ends within a monolithic structure—a typical gable on the west, and a sliced and shifted east elevation that produces a deep eave and a terrace.

Stratum House

Seeking to simulate a geologic formation, the striations on the facades of this 10,000-square-foot house were created by changing the water-cement ratio, aggregates, and pigments in each layer of concrete, poured on different days.

Dissolving Arch

This seemingly simple temporary installation of a brick archway took on new meaning over time. The redbrick-colored rock-salt units that comprise it eroded in the humid climate of Jeju Island in summer, leaving just the mortar skeleton at the end.

Uufie
Toronto

FOUNDED: 2009

DESIGN STAFF: 4-6

PRINCIPAL: Irene Gardpoit and Eiri Ota

EDUCATION: *Gardpoit*: University of Toronto, B.Arch., 2002.
Ota: Musashino Art University, B. Arch., 2002

WORK HISTORY: *Gardpoit*: KPMB, 2011-13; Arata Isozaki and Associates, 2003-08.
Ota: Yabu Pushelberg, 2011-13; Jun Aoki and Associates, 2002-08

KEY COMPLETED PROJECTS: Printemps Haussmann Atrium, Paris, 2016; Ports 1961, Shanghai, 2015; Lake Cottage, Ontario, 2013; Nagi, Tokyo, 2009

KEY CURRENT PROJECTS: Ports 1961, Hong Kong; mixed-use building, Ontario; Valhalla Residence, Michigan; Georgian Bluff residence, Ontario; Senzoku House, Tokyo

UUFIE.COM

A design duo probes visual perspective and materiality to generate the unexpected.

SINCE ESTABLISHING the design and architecture studio Uufie in 2009, Irene Gardpoit, 38, and Eiri Ota, 37, have undertaken an eclectic mix of commissions around the world, from an apartment renovation in Tokyo to the atrium design for the Paris department store Printemps. Their most recent project, an outdoor installation at the University of Toronto, where Gardpoit received a B.Arch, comprises over 100 security mirrors arranged in a ring on the ground in a historic courtyard. The piece is called *Wa-Wa* after the Japanese concept of *Wa*, which connotes a peaceful unity. "It was a subtle way to create spontaneity," says Gardpoit. "People see these objects that appear like water droplets, and they become curious about the site."

Uufie's roots formed in Japan. (The couple are secretive about the origin of the name.) Gardpoit, who is Canadian, and Ota, who is Japanese, met in Tokyo in 2007 when she was working for Arata Isozaki, and he for Jun Aoki. Each was about to embark on a solo career, and they decided to team up and tackle their separate commissions together. Since then, the two have been personal and professional partners.

One of the pair's first projects, a small cottage near Kawartha Lakes in Ontario, completed in 2013, presented the opportunity to relocate to Toronto, which, according to Ota, has been a more culturally diverse place to develop the practice. "There's also the luxury of space here," adds Gardpoit, "and that allows us to create and store large-scale prototypes that would be hard to do in Tokyo." These mock-ups include furniture, ranging from an acrylic chair resembling a peacock to wood and metal tables that look like natural stones.

For the cottage, designed to be a flexible space for reading and sleeping, the two riffed off traditional forms and motifs. A sharply gabled roof is clad in black steel, the walls in charred cedar, and the entrance wall and soffit of the porch—formed from a deep cut in the volume—surfaced in mirrors to reflect the surrounding woods. "We wanted to create a new relationship between nature and the building," explains Ota.

Inside, the designers cut out squares on the underside of the roof; on one side, these slots are glazed, while on the other, blue-stained shingles were inserted, creating an eccentric allusion to the sky. This inventive use of materials and attention to visual perspective are common in Uufie's practice.

For the 2009 Nagi apartment renovation in Tokyo, for instance, the designers found that melting rayon onto velvet curtains gave both weight and transparency for diaphanous partitions in a railroad-style space. In Shanghai, they used glass block to transform the facade of a retail store, completed in 2015, into a three-dimensional iceberg-like structure that glows at night.

Going forward, Gardpoit and Ota hope to take on projects with a range of programs, but are intent on keeping a small studio, which allows them to collaborate closely with clients and a regular roster of international consultants, such as textile designer Yoko Ando and lighting designer Izumi Okayasu. While "our consultants are always taking the designs to the next level," says Ota, the designers also find that new ideas often come from clients. "If the client has a vision and can bring something that we don't know," says Gardpoit, "that motivates us."

Alex Klimoski

Ports 1961 Shanghai

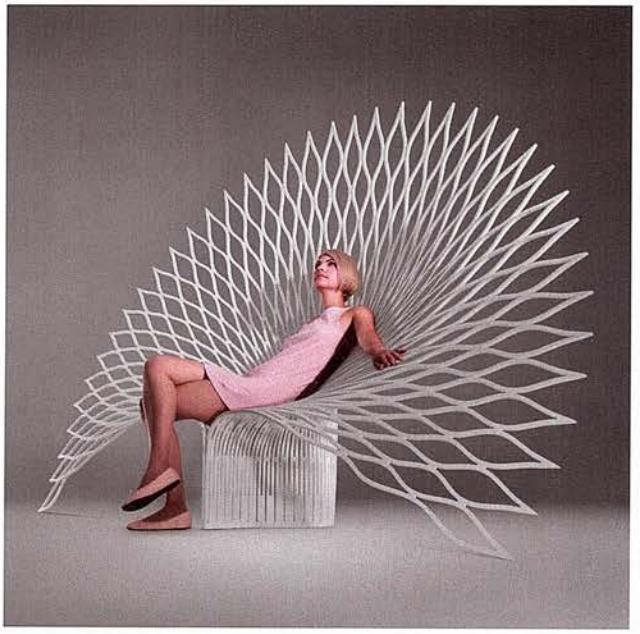
Uufie transformed the facade of the Ports 1961 flagship store in Shanghai with a dynamic arrangement of glass block. The crystalline structure stands out on its busy intersection. At night, its translucent material emits a soft glow.

Lake Cottage

The designers created an 860-square-foot multiuse space, located in a wooded area near Ontario's Kawartha Lakes, for a single family. The interior is fashioned in stained plywood. Skylights and generous glazed apertures create a robust connection to the outdoors.

Printemps Haussmann Atrium

The design for the Paris department store's atrium allows visitors to see into all levels of the building. A vertical dome, or veil, was created from aluminum panels perforated with a floral motif that alludes to the store's iconic stained-glass dome.



Peacock Chair

Creating furniture is an integral part of Uufie's material research practice. The design process for the Peacock chair originated with paper cutouts and ended with an organic, lattice-like form made from acrylic composite.

FreelandBuck

Los Angeles and Brooklyn, NY

FOUNDED: 2010

DESIGN STAFF: 6

PRINCIPALS: David Freeland and Brennan Buck

EDUCATION: *Freeland*: University of California, Los Angeles, M.Arch., 2004; University of Virginia, B.S. Arch., 1999.
Buck: University of California, Los Angeles, M.Arch., 2004; Cornell University, B.S. LArch., 1997

WORK HISTORY: *Freeland*: Michael Maltzan Architecture, 2005–07; Roger Sherman Architecture and Urban Design, 2005; AGPS Architecture, 2004–05; Resolution: 4 Architecture, 1999–2002; Peter Eisenman Architects, 1998. *Buck*: Neil M. Denari Architects, 2004; Johnston Marklee & Associates, 2002; Walker Macy Landscape Architecture, 1999–2001

KEY COMPLETED PROJECTS: Parallax Gap, Washington, D.C., 2017; Hungry Man Productions, Culver City, CA, 2017; Nike SF, retail installation, San Francisco, 2013; Earl's Gourmet Grub, Los Angeles, 2010

KEY CURRENT PROJECTS: Paradise Plaza, Miami; Stack House, Mt. Washington, CA; Urban Putt, miniature golf course, Los Angeles; Second House, Culver City, CA

FREELANDBUCK.COM

The bicoastal team's distinctive designs are informed by an interest in cellular structure and graphic patterning.

MOMENTUM IS BUILDING for FreelandBuck, founded in 2010 by David Freeland, 40, based in Los Angeles, and Brennan Buck, 42, who heads the firm's East Coast outpost in Brooklyn. The past two years have been the busiest yet for the duo, who first met in a "difficult sites" workshop during grad school at the University of California, Los Angeles.

An ongoing installation at the Smithsonian's Renwick Gallery, on view through February 11, 2018, has raised their profile considerably. Parallax Gap is a 10,000-square-foot fabric composition of 19th-century ceiling designs, cut on a CNC machine, stretched over aluminum frames and hung in layers from the ceiling of the museum's Grand Salon, producing shifting views as visitors walk beneath it. "That work belongs neither to the architectural realm nor to art—it's up for debate," Freeland says. "We make architecture, but we spend a lot of time thinking about art," adds Buck. "Parallax Gap was about trying to make a drawing in three dimensions." Most recently, the firm was selected as a finalist for MoMA P.S. 1's Young Architects Program 2018 installation.

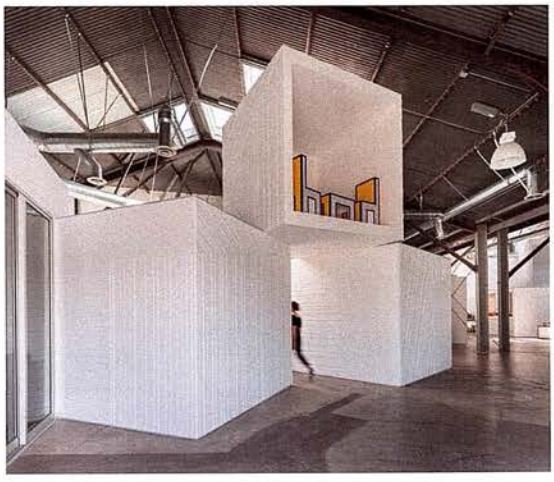
All FreelandBuck projects evince an abiding interest in cellular structure and graphic patterns. Their design for Paradise Plaza in the Miami Design District, slated to open this month, stitches together multiple building facades and circulation elements with a dining space under a canopy of vividly colored triangular facets inspired by the work of Israeli sculptor Yaacov Agam.

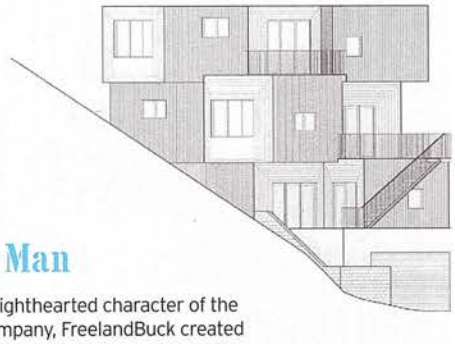
Three residential projects in the Los Angeles area are also steaming toward completion: the 1,500-square-foot Second House, made up of three distinct, wedge-shaped volumes around an interior courtyard; Stack House, a loose pile of rotated boxes on a steeply sloping site; and Mountain View House, an expansion of a 1920s Craftsman house, with two new shed roofs rotated at 45 degrees, producing a dramatic increase in interior ceiling height. "We love doing stand-alone work, but it was an interesting challenge to work within the constraints of an existing type and still be inventive," Freeland says.

In the firm's recent design for the offices of Hungry Man, a Los Angeles video production company, the "cells" are cubes that look "kind of strewn," as Freeland puts it, across the floor of an existing warehouse, though in fact they are carefully calibrated to facilitate connections between users.

That Freeland and Buck are architects for the future was especially evident in their 2016 proposal for a temporary installation at the base of New York's Flatiron Building, reimagining the iconic structure as a collection of fractured views printed on layers of translucent fabric. "There's no longer a single privileged point of view from which we look at buildings, but a plethora," Freeland says of the new ease of photographing buildings and posting images to be consumed by others.

"We think about form as a way to produce programmatic opportunity, possibility, and variety," Buck says. While he and Freeland are both glad to expound on conceptual theory, and do so in their teaching positions at Yale and SCI-Arc, respectively, their architecture-making boils down to one essential thing. "What we are interested in," says Buck, "is how people engage with our buildings." *Cara Greenberg*



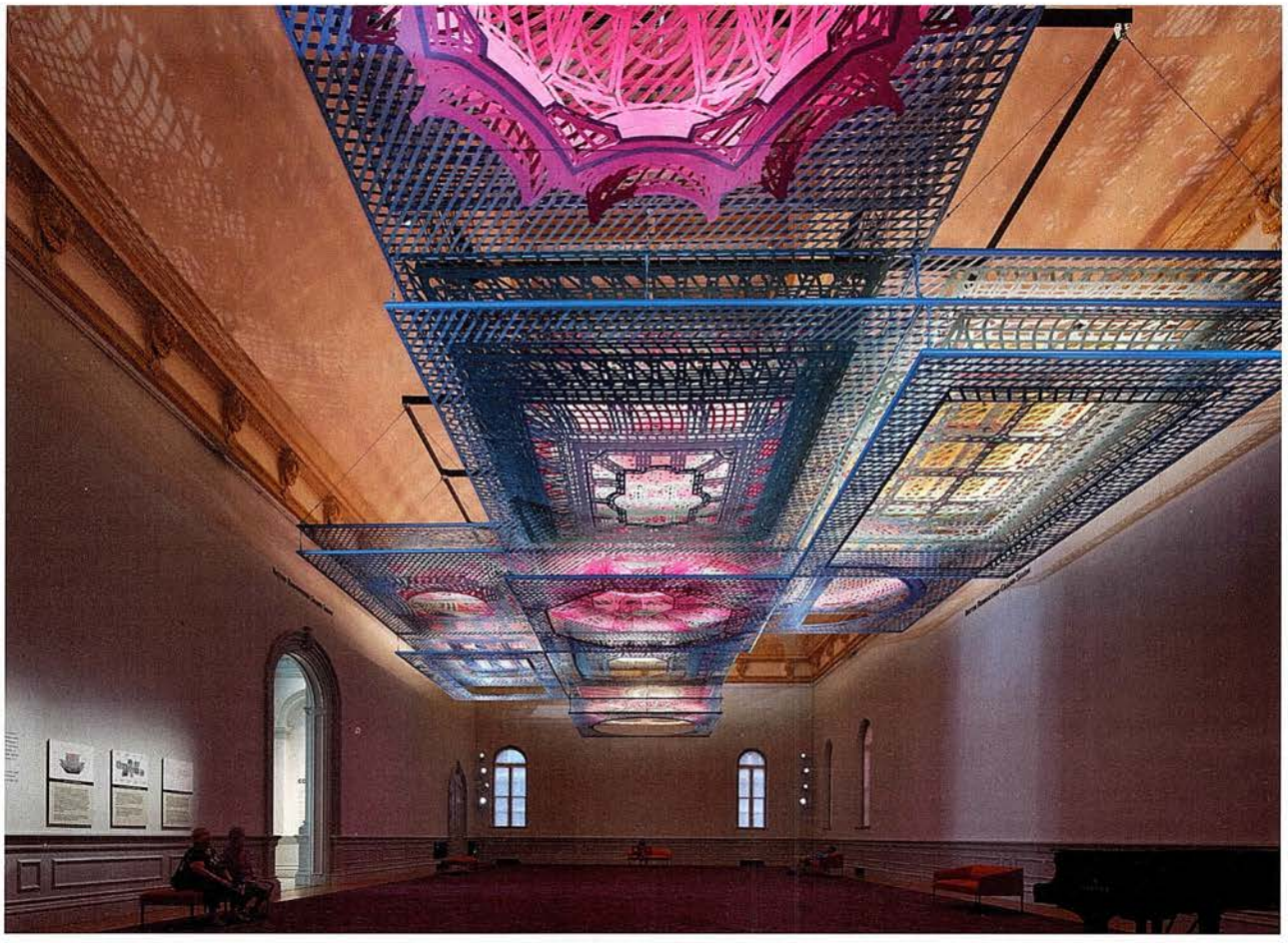


Hungry Man

Matching the lighthearted character of the production company, FreelandBuck created a series of "tumbled" office cubicles that playfully challenge the gridded regularity of the typical office space and take advantage of the generous ceiling height.

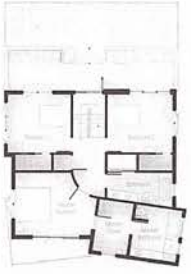
Parallax Gap

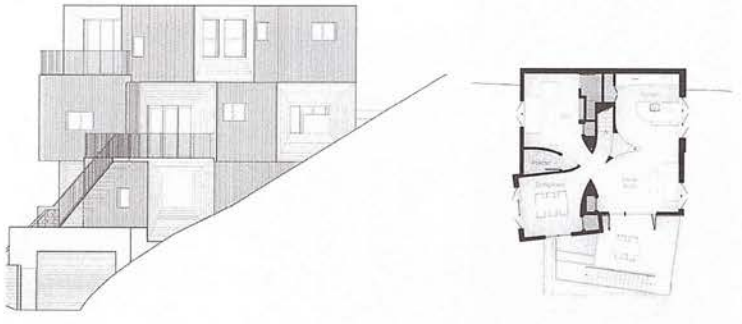
This winning proposal for the Smithsonian's "Above the Renwick" competition is an assemblage in the Renwick Gallery that represents an eclectic selection of 19th-century ceiling designs rendered through 21st-century technology and visual culture.



Stack House

This residential project features a loose pile of rotated boxes on a steeply sloping site in the San Rafael Hills. A corner of each box is removed to knit the rooms together.





B+F Sahara

FreelandBuck's continuing research into lamella structures, explored through a series of projects for Gastronomica Restaurant Group, is deployed in this Kuwait City eatery as a vaguely arboreal canopy over the dining room.

Max Núñez Arquitectos

Santiago, Chile

FOUNDED: 2010

DESIGN STAFF: 3–5

PRINCIPAL: Max Núñez

EDUCATION: Columbia University GSAPP, M.S. Advanced Architectural Design, 2010; La Pontificia Universidad Católica de Chile, M.Arch., 2004, B.Arch., 2002; Politecnico di Milano, exchange program, 1998–99

WORK HISTORY: dRN Arquitectos (in partnership with Nicolás del Rio), 2005–10; Guillermo Acuña Arquitectos, 2003

KEY COMPLETED PROJECTS: MAD Building, Santiago, 2014; Ghat House, Cachagua, 2016; House 400 Columns, Colina, 2014 (all in Chile)

KEY CURRENT PROJECTS: Visitor Center Jeinimeni National Reserve (with Benjamin Murua), Comuna de Chile Chico; Dune House, Ochoquebradas; Catenary House, Puertecillo; Greenhouse, Santiago (all in Chile)

MAXNUNEZ.CL

An architect builds a rich body of work by approaching each commission as a research project.

AS THE DIRECTOR of the master's in architecture program at the Universidad Catolica de Chile, Max Núñez observes: "There is a younger generation that is coming up with new ways of approaching architecture and theory—I think it is going to become very inspirational." Núñez himself could be included in this category.

The Santiago, Chile–born architect, who founded his eponymous firm in 2011 (and has mostly worked for himself or with partners since he finished school in 2004), is in a good position to look forward, as well as back on his country's unique brand of Modernism. After all, he grew up with a father who was, and still is, an architect practicing in Santiago. "Since I was a kid, I knew what architecture was about and what it takes," he says. "I knew the good and not-so-good about the profession—and I knew I had to do my own thing."

And he has. He weathered the financial crisis of 2008–09 by receiving a grant from the Chilean government and coming to Columbia University's Graduate School of Architecture, Planning and Preservation to earn his master's in Advanced Architectural Design. There he began to focus his approach, thinking about each commission as its own research project and gaining a more global perspective. "My interest now is, using each project to test some specific question about architecture. I'm not searching for a formal coherence between different objects, but rather some idea in relationship to architecture that can stand on its own," he says.

For his 400 Columns House in Santiago's northern suburbs, Núñez explored the use of concrete as a lightweight nonstructural element. He enveloped a low, horizontal volume that includes nine interior courtyards with concrete columns that shade and enclose the structure, while enabling cross-ventilation. The architect pushed concrete in another direction for his MAD Building at the Grange School in Santiago, which sits atop five large reinforced-concrete columns of different shapes and angles. With the music, arts, and dance programs consolidated below grade, the ground-floor pavilion becomes a common space protected from the elements while the second level, topped by a faceted roof, is an open flexible space. Núñez's office is also designing a house on Chile's coast—part of a larger development that will include six houses by Chilean architects and six by Japanese architects (Ryue Nishizawa and Alejandro Aravena are each designing one).

With many small- and medium-scale projects completed, Núñez is eager to take on larger ones—a goal he hopes to achieve by entering municipal design competitions in Chile for public work. A few years ago, his office won a competition for the Atacama Regional Museum, which protects the treasures of an area known for its harsh desert climate and indigenous population. Clad in terra-cotta and perforated blocks of clay, the project references the tone and color palette of the Copiapó Valley. For another competition win, Núñez is working on a visitors' center for the Jeinimeni National Reserve, for which he found his inspiration in the large shearing sheds and granaries of Patagonia's sheep farms. By reimagining a structure that defines life in the south of Chile and glorifying its form, meaning, and construction, the project is a good example of Núñez's goal: to "provide new possibilities of habitability." *Laura Raskin*

400 Columns House

Precast concrete columns form a ventilated skin around this house in suburban Santiago. The 400 members were made using agricultural PVC piping that was cut in half lengthwise to form molds. The concrete screen was then manually assembled using a tilt-up system.

MAD Building

Five large reinforced-concrete columns of different shapes and sizes support the MAD Building's upper floor. Built to house the arts, music, and design program at the Grange School in Santiago, Chile, the building's upper level contains three rooms for the visual-arts department and forms a sheltered space below.

Ghat House

This house on the coast in Cachagua, Chile, follows the slope of a beachfront cliff, with the house's roof parallel to its incline. The interiors, which straddle the line between outside and inside, are dramatized by large sculptural concrete columns and stairs.

Atacama Regional Museum

Located in northern Chile's Atacama Desert, this museum was designed to protect the area's historical and cultural treasures. Núñez compares the monolithic structure to a rock with several fissures—one allows access to underground parking, another carves out the public entrance to the museum, and the third opens administration and exhibition spaces on the second and third floors to daylight and views of the street.

Bruther
Paris

FOUNDED: 2007

DESIGN STAFF: 12–15

PRINCIPALS: Stéphanie Bru, Alexandre Theriot

EDUCATION: *Bru*: Paris Belleville School of Architecture, B.Arch., 1999; *Theriot*: Marne-la-Vallée School of Architecture, B.Arch., 1999

WORK HISTORY: *Bru* and *Theriot*: Jacques Ferrier Architecture, 2001–07

KEY COMPLETED PROJECTS: Cité Internationale de Paris, 2017; Plein Ciel housing conversion, Mérigniac, 2017; research and innovation center, Caen, 2015; Cultural and Sport Center Saint-Blaise, Paris, 2014; multiunit housing, Limeil-Brévannes, 2013 (all in France)

KEY CURRENT PROJECTS: Adaptable multiunit housing, Eysines, France; student housing and reversible parking lot, Palaiseau, France; EPFL Building, Lausanne, Switzerland

WWW. BRUTHER.BIZ

A pair of French architects give expressive form to a stripped-down modernism.

"WE DON'T SUBSCRIBE to the religion of minimalism, but we look for a certain nudity," say Stéphanie Bru, 42, and Alexandre Theriot, 43, of Parisian firm Bruther. "Architecture is what remains when you get rid of the superfluous." Since founding their office in 2007, the husband-and-wife team—who cut their teeth working for French architect Jacques Ferrier—has completed a handful of projects that, while seemingly reducing architecture to a sort of degree zero, are rich with idiosyncrasies and highly personal quirks. Take their most recently inaugurated building (the first competition they won, which took eight years to build), an ensemble of 25 social-housing units in Paris's 20th arrondissement. Although it is essentially a stack of very thin concrete floors wrapped entirely in aluminum-framed glazing (could one get less expressive?), it provides a multitude of spatial experiences, thanks to the architects' clever manipulation of the code requirements, on an irregularly shaped hillside site. Subtle detailing of the concrete frame (beams and columns don't quite meet where you would expect) and of the envelope—the all-glass pivoting shutters on the entrance facade, for example—further complexify the "nudity," but without becoming trivial or loquacious.

Bruther first came to attention with the Cultural and Sport Center Saint-Blaise, again in Paris's 20th, which was completed in 2014. Here, in a compact volume that both maximizes precious space and respects its neighbors' sight lines, the architects stacked glazing-wrapped column-free floors, on top of which perches the unglazed sports hall. Once again, subtle touches—the facades' slight curvature or the care with which a cinder block wall was laid—bring richness and nobility to the pared-back response to the brief. For the firm's next completed project, Le Dôme, in Caen—a fab lab and research center—Bruther faced the challenge of building the same floor area as at Saint-Blaise for half the cost. While the basic approach is similar, the materials are much cheaper—ETFE cushions and corrugated polycarbonate on the facade—and finishes left expressively rough. Despite the constraints, the architects still managed to include extra space that was not requested in the brief, in the form of the canvas-covered rooftop dome (hence the building's nickname), which is used for temporary events.

Bruther's work might usefully be classified as "austerity architecture," an approach pioneered in France by Lacaton & Vassal that seeks to rescue the legacy of Modernism from its big-business corporate excesses and restore it to something of its initial social purpose, in the context of the post-2008 economic climate. Among Bruther's other key projects are a characteristically nude residence hall at Paris's Cité Internationale ("We don't really like the domestic touch, little windows and all that") and a forthcoming large lab-and-classroom building for the École polytechnique fédérale de Lausanne in Switzerland, their first built work outside France.

Bruther was founded in the wake of a six-month trip to Japan in 2006, which proved revelatory for both partners. Afterward, they say, it was a case "of unlearning what we'd learned in practice while working for others." It remains to be seen what further refinements they will bring to an approach that they sum up as "a culture of the open plan, with the structure dissociated, and the demonstration that you can be thermally efficient while still maintaining transparency. All of our buildings," they conclude, "are both stripped and expressive."

Andrew Ayers

Cultural and Sport Center Saint-Blaise

Located in a dense neighborhood, the compact building saves ground, a real resource of the area, and is developed vertically. Its transparency welcomes and links populations and uses.

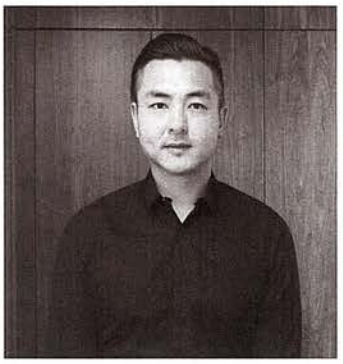
Cité Internationale de Paris

Circulation is concentrated at the center of the H-shaped plan for this building for researchers. Though the north and south ends are opaque, the other facades are completely glazed, offering unobstructed views of a park.

Le Dôme

Bruther won a 2013 competition to design this research center (opposite, bottom, and right), which has come to be known as Le Dôme for the expressive form that tops the building. The project is part of a redevelopment program for Caen's waterfront.

Alan Tse Design
San Francisco



FOUNDED: 2012

DESIGN STAFF: 3

PRINCIPAL: Alan Tse

EDUCATION: University of California, Berkeley, M.Arch., 2009; University of California, Berkeley, B.Arts in Architecture, 2003

WORK HISTORY: Stanley Saitowitz Office | Natoma Architects Inc. 2003–11

KEY COMPLETED PROJECTS: La Maison Condominiums, 2017; International Orange Wellness Center, Larkspur, CA, 2016; 4704 Mission Wine Bar, 2016; Nabe II Restaurant, 2016 (all in San Francisco, except as noted)

KEY CURRENT PROJECTS: Franklin Condominiums; 2240 Market St. Condominiums; 2444 Lombard Condominiums; 1433 Bush Condominiums; 900 Clement Dental Clinic; Nami Japanese Bistro; Offset House, Cupertino, CA; Delucchi Restaurant (all in San Francisco, except as noted)

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Franklin

The design of this eight-story condominium features a curtain wall that lifts up from its corner to reveal a ground-level commercial space.

A resourceful practitioner learns the ins and outs of the city-planning process to execute his contemporary designs.

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That's one thing Alan Tse knows from experience. The 37-year-old once sold a replica Le Corbusier lounge chair on Craigslist, which prompted a "nice lady, in head-to-toe Louis Vuitton" to show up at his door. After she requested a 20-percent discount, Tse went out on a limb, "judging by how put-together she was," says the San Francisco–based head of Alan Tse Design. "I told her I'd apply that 20-percent discount to her next home-remodeling project." The hustle paid off: three months later, the same well-coifed mystery woman took him up on the offer, and he scored his first-ever residential project, the Alta, a 2,400-square-foot remodel with addition. "She told me later, she was purchasing the chair to stage a home she was moving out of, so my 20-percent proposition came at the perfect time."

Tse's story nicely encapsulates his belief that resourcefulness is every bit as important as creative vision, something he says he learned working under Stanley Saitowitz for nine years—that and design rigor, from start to finish. "The success of each design starts with the clarity of the floor plans," says Tse, "but you need to learn the business aspect: how to get work, how to push your ideas forward."

He thinks some basic tenets are overlooked all too often: "Knowledge of the permitting process, constructability, budget allocations; balancing scheduling priorities; understanding exposure to professional liabilities; the know-how to effectively problem-solve design and construction issues."

Sure, it's a lot, but Tse thinks accumulating this body of knowledge is what "eventually grants you better and better opportunities."

Working predominantly in San Francisco comes with its own set of peculiar challenges. His first project, Kare-Ken, was a 400-square-foot restaurant in the heart of the Tenderloin. "I had to deal with graffiti, drug addicts on the streets, a 'massage parlor' as my next-door neighbor, and intense research on urine-repellent paint products."

Over time, he's learned ways to effectively work with the city's planning department, whose design criteria, notoriously, can be Kafkaesque: "My first two building designs were rejected by the city outright," he says. He's since learned how to "parallel workflow with the permitting process to provide a more measurable timeline for clients."

For instance, the initial design for 1433 Bush—a 40-unit condominium building in Nob Hill—was vetoed by all seven planning commissioners on the grounds that it did not fit in with the neighborhood's historic context. Tse had two weeks to redesign the 11-story building. "We strive to understand the concept behind their evaluations, digest the criticism in their vision at a city-planning scale, and never negatively respond to their comments."

He describes himself as a modernist who doesn't need sleep, aspires to design with flexibility, and has a serious appreciation for clean lines and minimalism. Of his current projects—and there are many—he is particularly pleased about La Maison, a series of six market-rate multifamily housing projects, each developed in the same vein and with the same level of commitment to design. "I'm excited for these because they provide a platform for me to broaden my design opportunities and exercise skill sets I've acquired from other projects."

All those endeavors have one important thing in common: "parameters," which he says are essential. "They're the ignitors for design inspiration," says Tse. "Physical limitations allow you to create and generate spaces. Budget constraints encourage thinking outside your comfort zone. And the city is what puts your design capabilities to the test." *Derek De Koff*

La Maison

The articulated form of this 28-unit condominium in San Francisco's SOMA district—the first in a series of six for the same developer—allows for balcony decks and bedrooms to be staggered around lightwells.

Tataki

Inspired by traditional Japanese houses, Tse designed a pitched profile for the interior of a ground-floor vegan sushi restaurant in a new mixed-use building in San Francisco.

Offset House

Setback and buildable-area restrictions drove the form for this single-family house in Cupertino, California, which is defined by the dramatic offset between its two stories.

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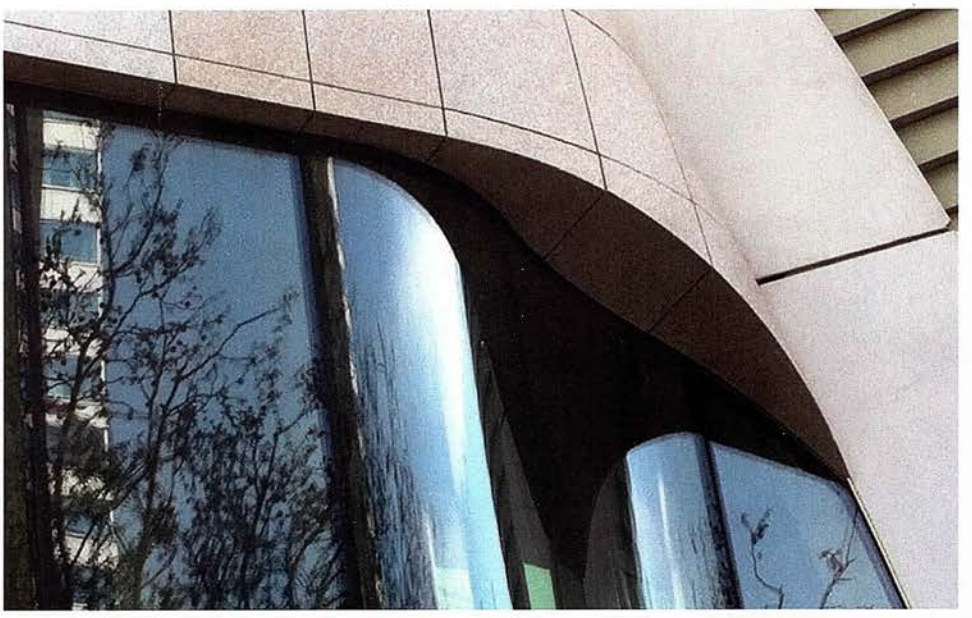
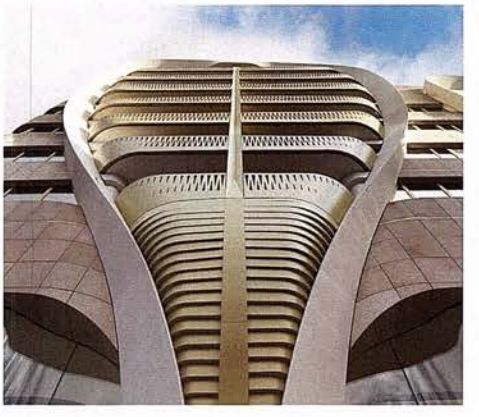
The confluence of natures in the Toison d'Or



The Toison d'Or project, designed by the Amsterdam chapter of the massive UN Studio network and awarded the BSLC Shopping Award in 2016, is not your usual hybrid project. On paper, it's a typical residential block with a retail space podium. But anyone passing through the Toison d'Or avenue in Brussels cannot help but marvel at the execution.



From afar, the standard building block facade is notoriously broken up by the majestic balconies. Framed as though they were standalone pieces, their dramatic curves and jutting forms draw your eye in, almost to the point as to camouflage the core of the building. The interface between these pieces and the classically straight remainder of the building is accomplished with curving that seems to suggest a warping made by the meeting of these two lines of thought. As for the retail podium, spaces like the Apple Store count on a very large window display space, providing the illusion of a structure within a structure.

The building blocks for this building block are made out of an increasingly popular choice: granite. In particular, the mellow tone of Yellow Vila Real granite, acknowledged for its heat conservation.

The portuguese company involved in supplying and assembling this ornamental stone found a unique set of challenges in adapting this raw material to the shapes demanded. The cutting of the stone was conducted on 5-axis CNC machine, and a sandblasted finishing was applied to give the stone a smooth texture. As for assembling the materials themselves, extra care was taken in the support of the huge balcony pieces – as they were almost 5 feet apart from the concrete structure, and additional metallic support was affixed to the stone.

This is one of many projects involving companies associated to ANIET – National Association of the Extractive and Manufacturing Industry – which was founded 42 years ago with the mission to propagate this typically portuguese culture of mixing tradition and innovation in the rock industries, and promoting the demand for materials that already export 70% of its production. Within the extractive and manufacturing sector, the ornamental rock subsector represents half of the total export value.

The main advantages that helped earn this standing refer to the union between innovating technologies and a tradition in stonework mastery. On the other hand, the European manufacturing standards are rigorously achieved, ensuring quality and assurance for every material, all branded with the CE designation. The Toison d'Or itself stands as a spiritual companion to our industry's profile, one more symbol of a joining of two narratives in the very heartland of Europe.

ANIET
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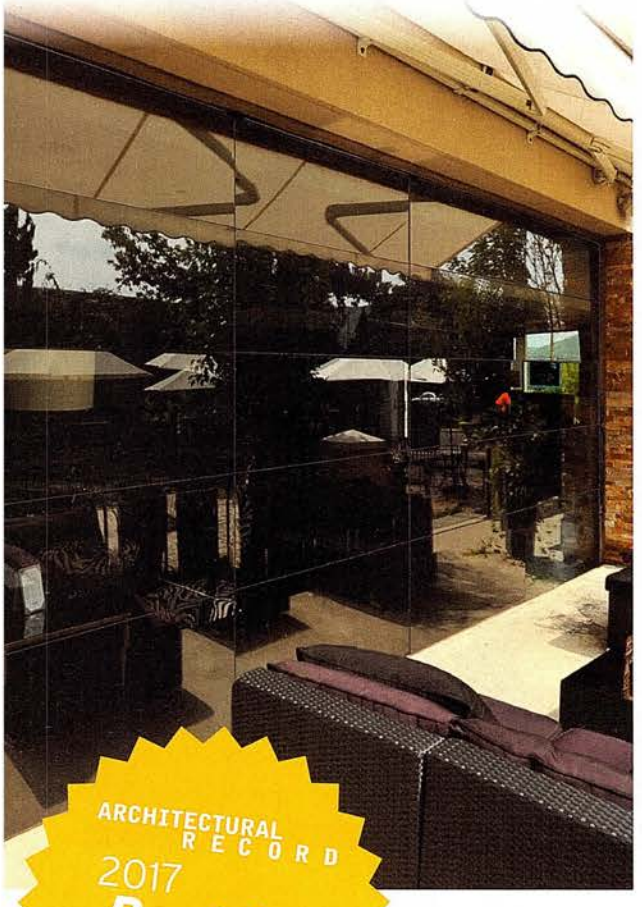

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NEW MUSEUMS

With two museums in distant places, it is interesting to note how distinct they are in their design approach. One, by Thomas Heatherwick, is a tough and brawny behemoth, a former granary that's been carved up and collaged to make a bold statement. The other, by Jean Nouvel, is a new, more ethereal endeavor, where a filigreed dome hovers over an assortment of modest white structures. The first is in Cape Town, a city whose design identity is in formation; the second, in Abu Dhabi, a place whose architectural ambitions are well publicized. RECORD brings the two together to show how the artistic imagination takes advantage of different opportunities to create singular spaces.

LOUVRE ABU DHABI, ATELIERS JEAN NOUVEL

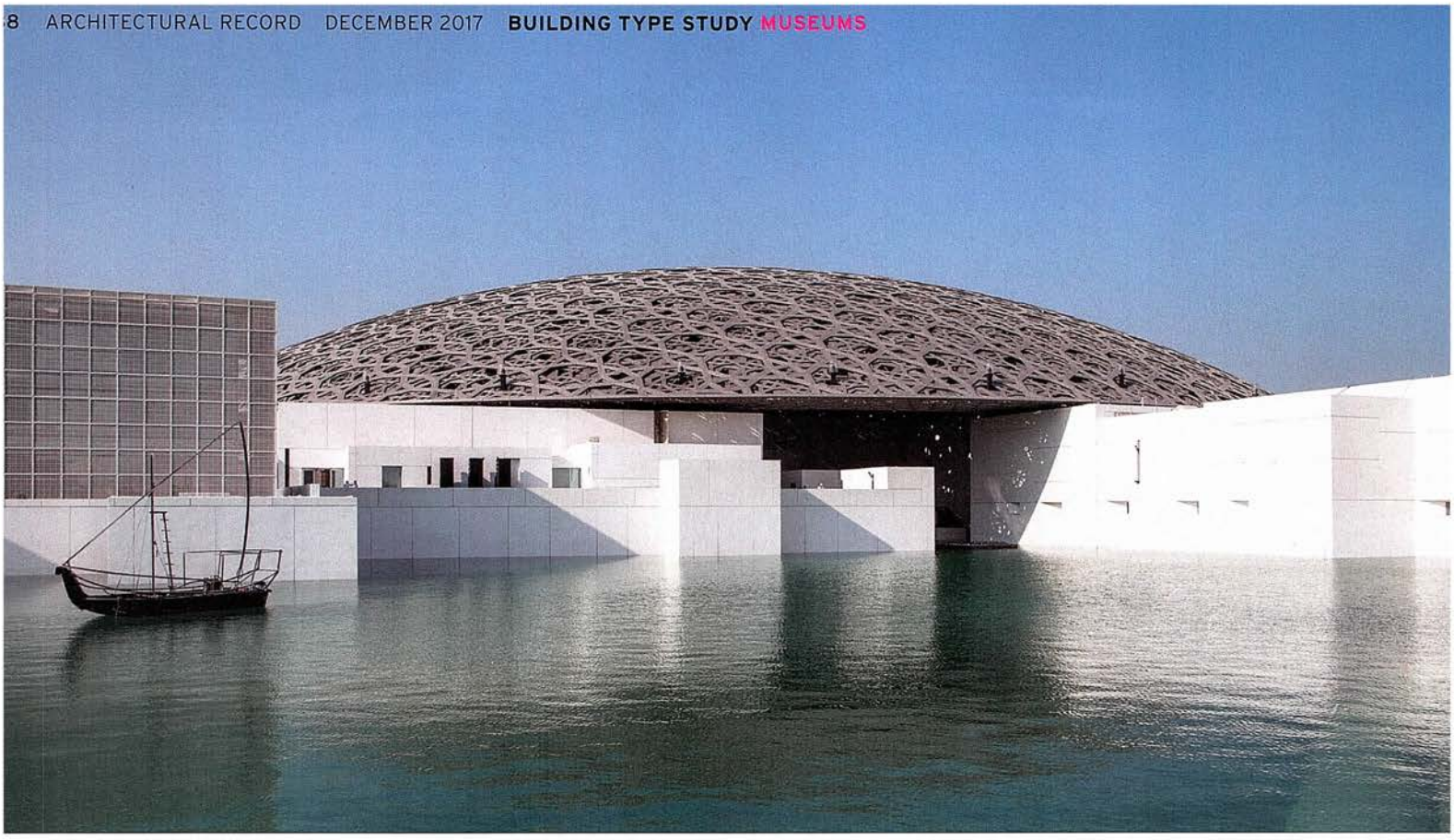
Louvre Abu Dhabi | United Arab Emirates | Ateliers Jean Nouvel

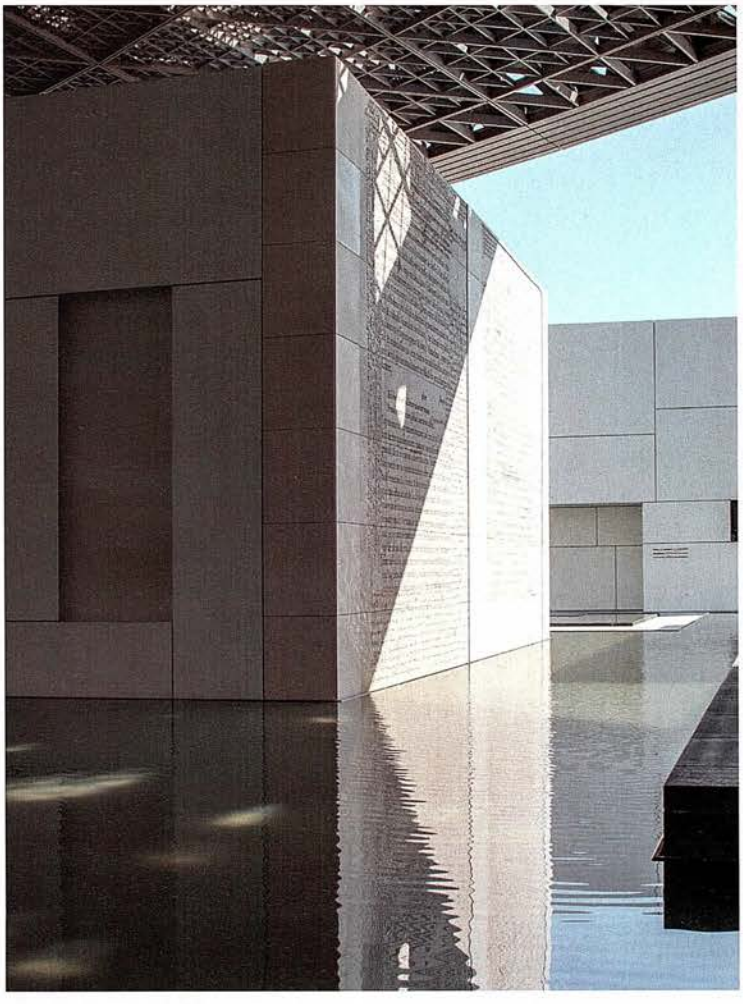
Oasis in the Desert

The much-anticipated museum outpost opens as the anchor for a new island cultural district.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY ROLAND HALBE AND DANICA O. KUS





This may come as a surprise: the Louvre Abu Dhabi is a subtle piece of architecture. In a booming city whose population has tripled in the last 20 years, where surreal landscapes mix with improbable towers, this museum has been over a decade in the making and is reputed to have a total price tag of over $1 billion. Its opening was attended by the Crown Prince Sheikh Mohammed bin Zayed and President Emmanuel Macron of France. So one might expect a bit more of a spectacle. And while there are spectacular moments, this is a work that reveals itself slowly.

There is, of course, the dome; 590 feet in diameter, it is giant. But Nouvel's dome doesn't shout. From a distance, its glimmering metallic finish almost blends with the rippling Persian Gulf waters it hovers above. It is squat. In fact, the entire building is very low and rather unassuming from the outside.

Then, there's that water. "The sea is extraordinary," said Nouvel during a preview of the building just before the museum opened to the public on November 11. "When you have this great asset, it's like having a great card in a hand: you have to use it." Like a built archipelago beside the shores of Saadiyat Island—where a larger cultural district containing museums by Norman Foster and Frank Gehry and a performance center by Zaha Hadid is planned—water winds in canals around the meandering cubic pavilions that make up the museum, which Nouvel modeled after a medina. Like a parasol, the dome covers nearly all of the 55 individual pavilions, almost half of which are galleries.

There is no grand entrance. After walking across the nondescript parking lot, you pass through oversized revolving doors and airport-like security before making your way through several boxy structures —all quite stark—past a large information desk, a ticketing area, and the museum shop. Only a glimpse of the dome's underside is offered up to this point.

But then, as you come upon the plaza—what Nouvel refers to as an Arabian agora—the full splendor of the dome overhead confronts you. At first it looks unreal, like a dizzying mirage above your head, both immaterial and hulking at the same time. It is composed of eight layers

SILVER DOME
The extremely intricate steel dome, while subtle from the outside (opposite, top), inspires awe when viewed from beneath (this page). Artist Jenny Holzer was commissioned to create several pieces for the new museum, including an inscribed wall within the plaza (opposite, bottom).

MAIN-FLOOR PLAN

0 150 FT.
50 M.

1 ENTRANCE
2 INFORMATION
3 TICKETING
4 MUSEUM SHOP
5 GRAND VESTIBULE
6 PLAZA
7 GALLERY
8 RESTROOM
9 TEMPORARY EXHIBITIONS
10 AMPHITHEATER
11 CAFÉ
12 CHILDREN'S MUSEUM
13 RESTAURANT
14 AUDITORIUM

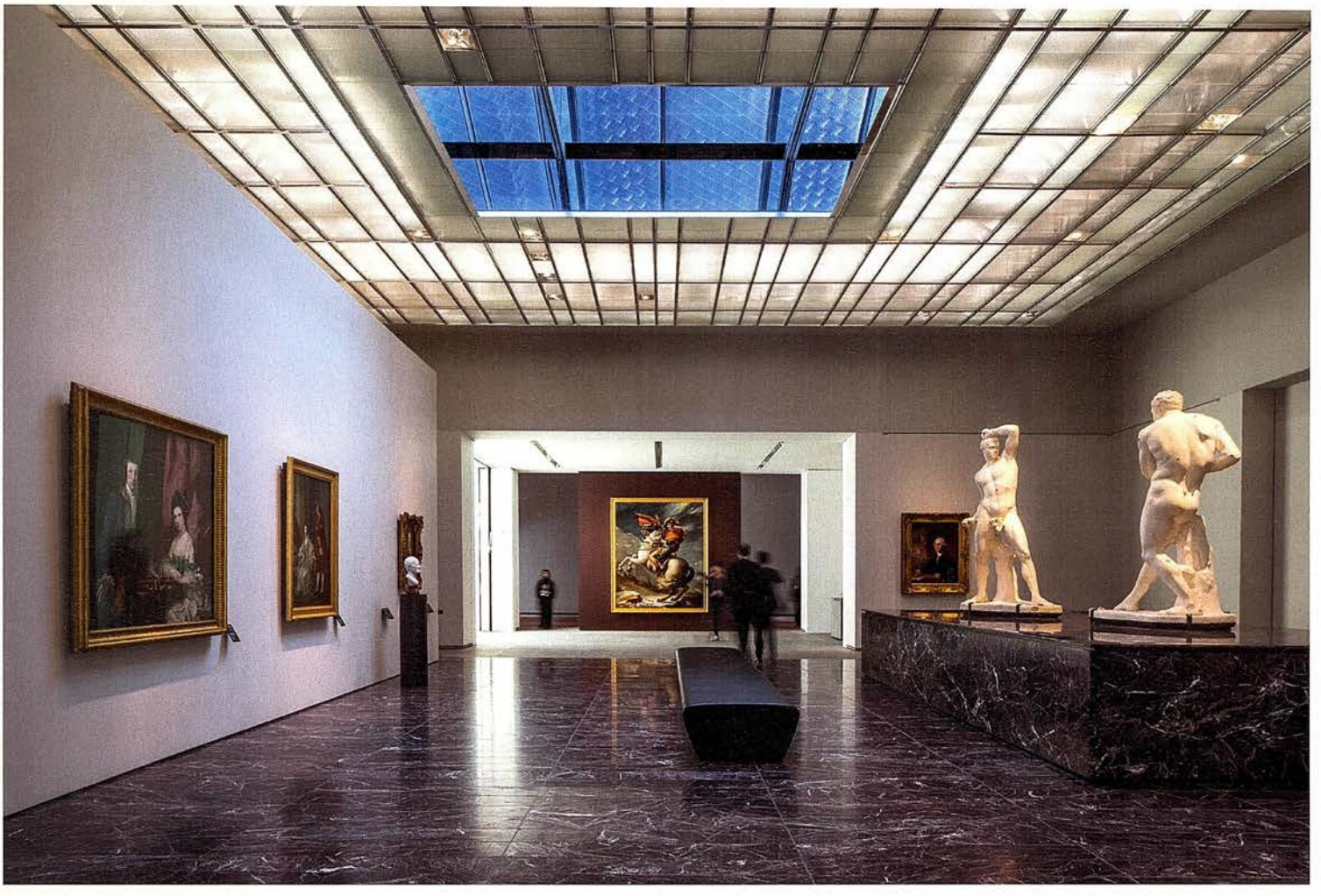
of complex steel assemblies containing 7,850 unique stars—the largest of which are 43 feet wide—in a dense geometric latticework that allows only 1.8 percent perforation. When asked what was the hardest part of building the dome, senior construction manager Shehab Taha replied, "All of it."

Nouvel was inspired by the fronds of the local date palm tree; his dome acts in a similar way to provide shade and dappled sunlight. The area beneath the dome, while completely exposed, is noticeably cooler than the sun-baked parking lot. Though there is virtually no rainfall in Abu Dhabi, should it happen, water would pass through the dome's scant openings. There are no walls either. The dome sits on four piers, 360 feet apart and hidden within the pavilions, giving the impression that it is floating, and offering open, framed views of downtown Abu Dhabi's skyline in the distance. A gentle breeze occasionally wafts through. Birds fly by. Insects flit about. "We didn't want to do a building—we wanted to create a neighborhood," says Hala Wardé, project architect and longtime Nouvel collaborator, who also heads her own firm.

Although the exteriors of the pavilions and their enclosing walls—clad in white, precast, high-performance fiber concrete panels—look like plain urban vernacular forms, the galleries within come as a surprise. They are lavish. Nouvel describes the experience, appropriately enough, as stepping into a palace.

Nouvel's office designed the variously sized bronze-framed glass display cabinets, and pedestals whose bases are wrapped in a grayish-blue Belgian stone, which also comprises much of the flooring between galleries. Within the galleries, a distinct stone "carpet" defines the exhibition area, with a different stone corresponding to the collection on display—Italian marble for the Renaissance galleries, for instance. In some rooms, the 55-inch by 9-inch bronze-framed (and removable) floor tiles are boldly colored; others are deeply veined, and still others more muted. Overhead, an exquisite glass ceiling likewise delineates the display area below. Two superimposed layers of glazed tiles, variously textured with lines, dots, or waves, give the ceiling a subtle moiré effect. Inset between the

DANCING LIGHT Pools of water surround the museum. Between the large temporary exhibitions pavilion (which is not yet completed) and the café is a small outdoor amphitheater. A stage can be set up on the water, as was done for the museum's opening celebration.



WORK OF ART
The rich combination of materials and textures in the various galleries enhances the presentation of art (above and left). While by day the dome offers a rain of light, by night it resembles a starry constellation (opposite).

tiles are custom-designed LED fixtures that Nouvel's office developed with Italian lighting manufacturer Artemide. In some cases, a mirror-walled skylight pierces the glass ceiling.

The art—a CliffsNotes representation of the Louvre's encyclopedic collection, with such famous pieces as Édouard Manet's *The Fife Player* and Jacques-Louis David's *Napoleon Crossing the Alps*, as well as loans from other French institutions—is inventively hung. In one room, a long architectural frieze carved with Koranic verses (ca. 1200) is inset into a wall. A wood statue of Joseph of Arimathea from around the same time stands beside a veiled window, bathed in soft daylight. Exquisite gold jewelry shimmers within a dark-wood room-size case. Select gallery walls are lined with bronze panels. The diversity of materials and textures, masterfully handled here, enriches rather than competes with the art. It is all quite stunning, and a happy antidote to the generic white box of so many museum galleries. These no-expense-spared interiors inspire awe in much the same way that the minimal plaza does with its dancing light and gentle pools of water.

As the first project of the much-hyped but much-delayed arts district to open on Saadiyat Island, the Louvre Abu Dhabi is enjoying the spotlight. But whether or not the other projects are ultimately realized (their fates remain unclear) the museum is, as its architect explains, not a building: it is instead a cultural oasis, very much of its place yet unlike anything else nearby—or, for that matter, anywhere. ■

credits

ARCHITECT: Ateliers Jean Nouvel – Jean Nouvel, principal; Jean-François Bourdet, Anna Ugolini, Sabrina Letourneur, Frédéric Imbert, Damien Faraut, Athina Faraut, project leaders

ASSOCIATE ARCHITECT: HW Architecture – Hala Wardé, principal

ENGINEER: Buro Happold (structural)

CONSULTANTS: Renaud Pierard (museography); Studio DAP (acoustics); Michel Desvigne, Jean-Claude Hardy (landscape)

OWNER: Abu Dhabi Tourism & Culture Authority

CLIENT: Tourism Development and Investment Company; Agence France-Muséums (advisor)

SIZE: 1,044,000 square feet

COST: withheld

COMPLETION DATE: November 2017

SOURCES

DISPLAY CASES: Meyvaert

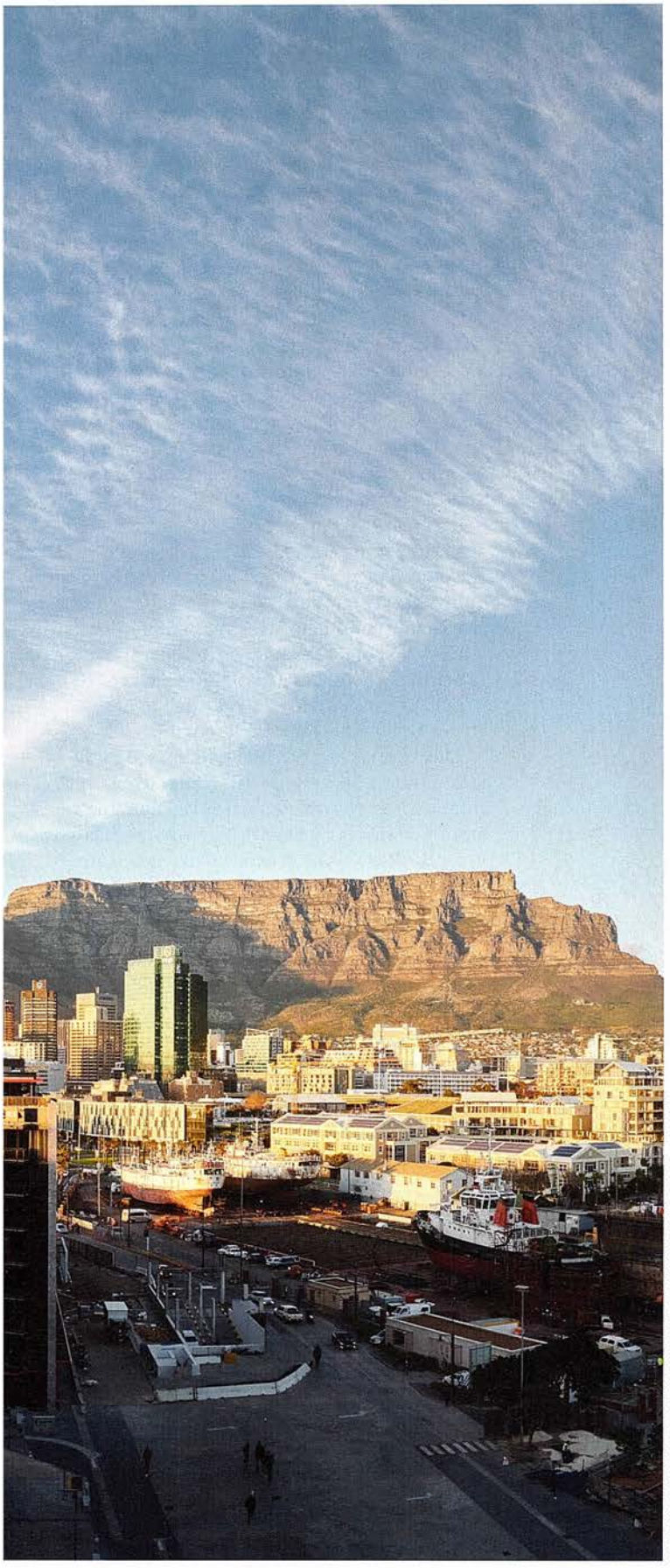
GALLERY SPOTLIGHTS: Artemide

Zeitz MoCAA | Cape Town | Heatherwick Studio

The Silo Effect

A new museum of contemporary African art heightens the sculptural power of the 1920s industrial complex in which it is housed.

BY SARAH WILLIAMS GOLDHAGEN



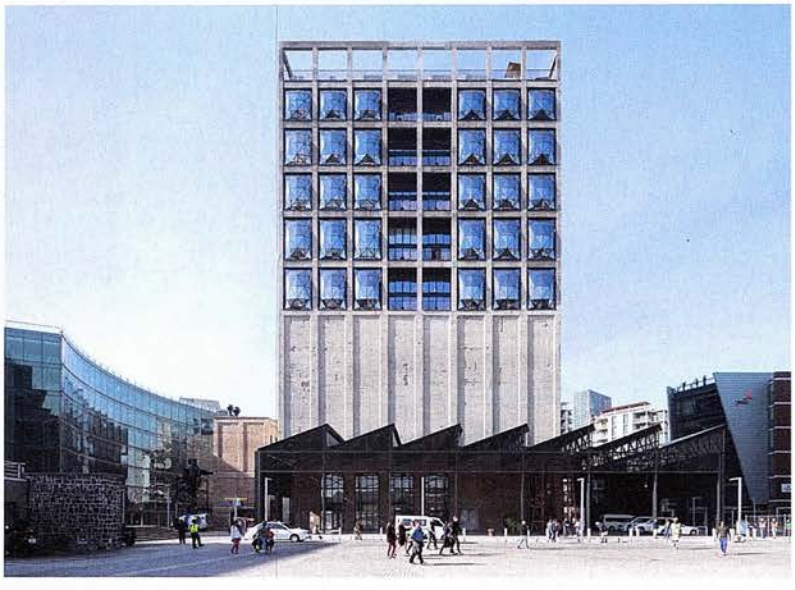
PHOTOGRAPHY: © MARK WILLIAMS (LEFT); IWAN BAAN (RIGHT)

British designer Thomas Heatherwick received no training as an architect—his degrees, from Manchester Polytechnic and the Royal Academy of Art, are in three-dimensional design. What to make, then, of his rapid scaling of the professional barricades and solid landing in the bastion of the global architectural elite? If the recently opened Zeitz Museum of Contemporary Art Africa (MoCAA) in Cape Town is our guide, there are multiple reasons to cheer the incursion. Inside, outside, Zeitz is stunning. Beauty is its own reward, but there's more. This is one of the most important new public buildings anywhere, and surely one of the most significant in Africa.

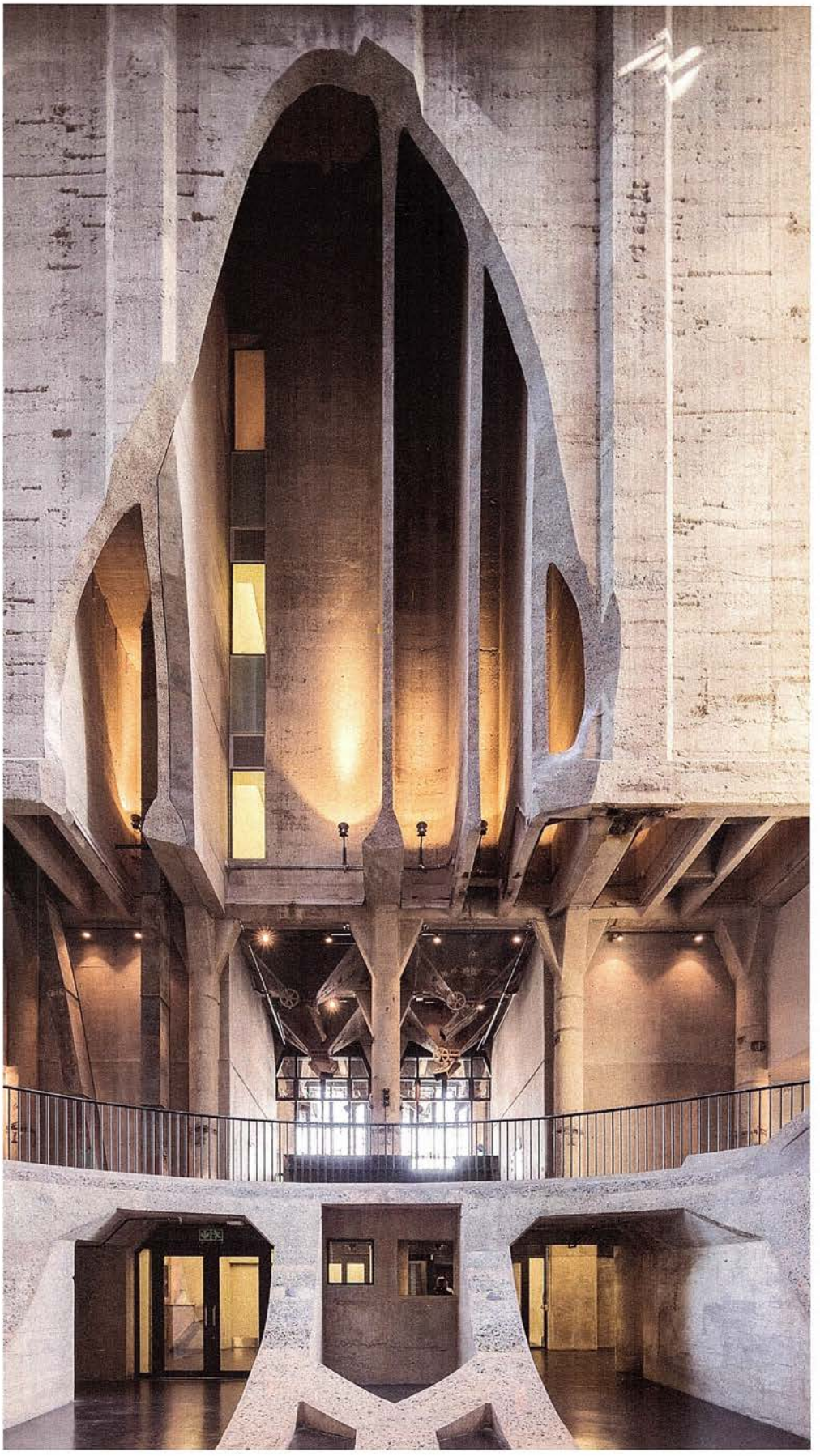
Cape Town, routinely referred to as Africa's most European city, has long drawn international tourists, and its V&A Waterfront, the historic harbor named after Queen Victoria and her son Alfred, is the city's most visited destination. At one edge rises a nearly 200-foot-high grain elevator and silo that, when completed in 1924, stood as the tallest structure in Sub-Saharan Africa. It was decommissioned in the 1990s.

In South Africa, public space is a fraught, and somewhat neglected, terrain. Although apartheid was legally dismantled in 1994, the country continues to suffer the multiple distortions of its legacy. When the African National Congress (ANC) took over, all the country's formal urban spaces, private and public, had been conceived, designed, constructed, and controlled by whites. Since then, the ANC has devoted itself to building housing to ameliorate the appalling slum conditions in the townships. New public space has not been a priority.

The exception is the transformation of Cape Town's harbor. V&A Waterfront Authority officials recognized the grain elevator's potential but struggled with ideas for how to use it, and turned to Heatherwick for help. Concurrently, Jochem Zeitz, a German collector of African art, working with Mark Coetzee, a curator native to Cape Town, sought a venue to house his growing collection of contemporary African art. An unlikely marriage was consummated. Heatherwick's brief was reformulated into the problem of transforming this concatenation of historic, poured-in-place concrete structures–the 190-foot-tall cluster of 44 rectangular and square grain storage bins, the 108-foot-tall cluster of 42 cylindrical silos, and a small dust house—into a world-class museum. Aside from the 10 World Cup stadiums finished in 2010, this



WITH THE GRAIN The museum, as well as the boutique hotel, occupy a collection of grain-storage structures (above and left), including a 190-foot-tall cluster of rectangular and square bins and a shorter cluster of cylindrical silos.



CATHEDRAL OF CULTURE MoCAA's main skylit atrium (left and opposite) was created by reinforcing the existing structure with concrete "sleeves" and then carving out an irregular void whose shape is taken from a kernel of corn.

would be South Africa's first major new public space in decades.

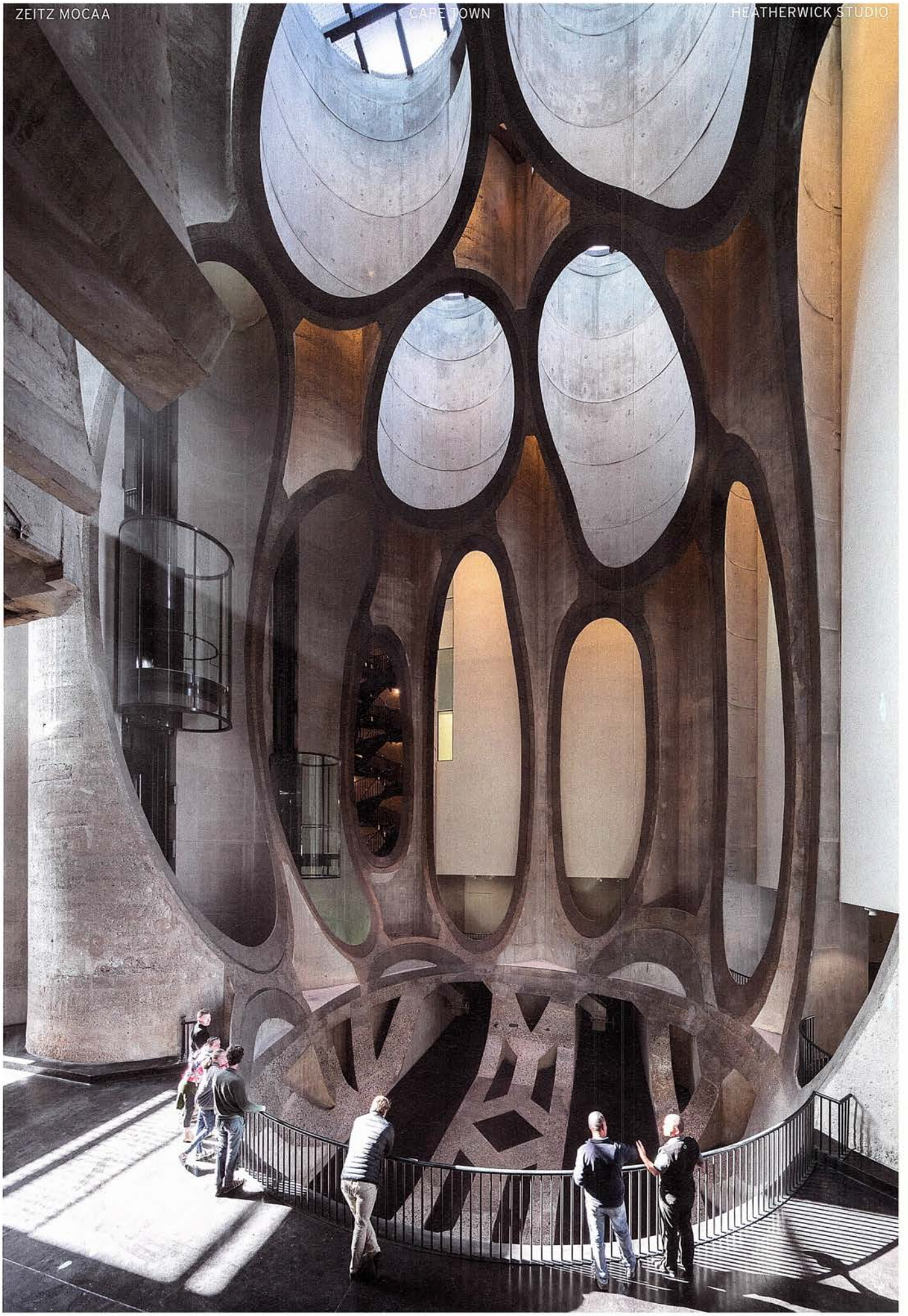
The exterior's immensity and compositional clarity more or less guaranteed the project's iconicity—there's a reason Walter Gropius, Le Corbusier, and Charles Sheeler championed grain silos, with their stark, geometric purity, as towering incarnations of modernity—but Heatherwick refashioned this one into more than just a splendid exemplar of the type. Multiple layers of paint were removed, revealing the silos' continuous surfaces—astonishingly, constructed in a single pour—which greatly amplifies their monumentality. Heatherwick—whose Learning Hub at Nanyang Technological University in Singapore demonstrates his understanding of the phenomenological allure of rich, variegated, textured surfaces—then polished and sealed the silos and elevators' craggy, coarse-aggregate-filled concrete. To signal the structure's programmatic transformation (in addition to an art museum, it contains a boutique hotel), he designed beautifully detailed, pillowlike windows. The faceted structural glazing changes color with the reflected light to make the Zeitz a beacon for miles around.

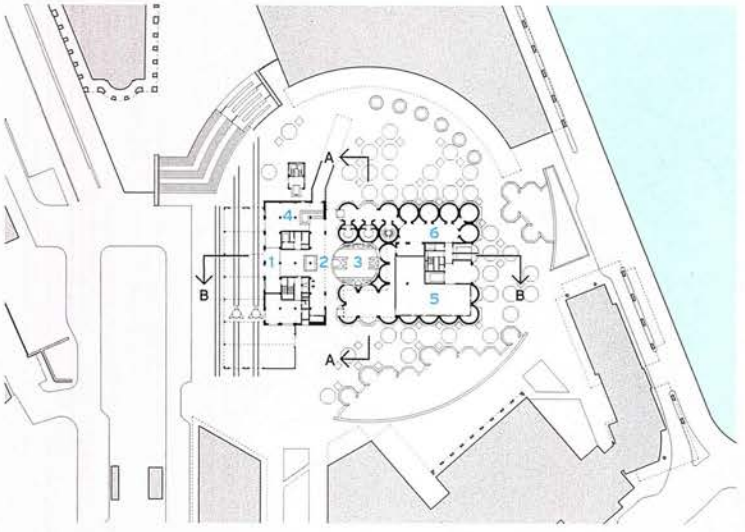
The exterior proved simple compared to the structural and programmatic conundrums of the interiors, which were critical to the museum's sustained success. Just enticing visitors to actually enter the Zeitz was a central challenge, Heatherwick and Coetzee explain, as virtually no culture of museum-going exists in South Africa: people migrate to the redeveloped waterfront to shop, to dine, and to catch the ferry to Robben Island, not to partake of high culture—local or global, black or white.

"Theatricality should be inherent to pieces of public infrastructure" and civic landmarks, Heatherwick maintains, and his design for the main interiors of Zeitz MoCAA embodies theatricality in the best sense of the word: it tugs on your emotions, inspires a sense of delight. To do this, Heatherwick amped up his celebration of the building's history. The narrow, vertical entrance foyer draws your gaze upward, where you discover, inset into the ceiling high above you, the original metal chutes that, when cranked open by hand, would pour the stored grains directly into large, open containers parked on train trestles.

Immediately, an impression: this is an active place.

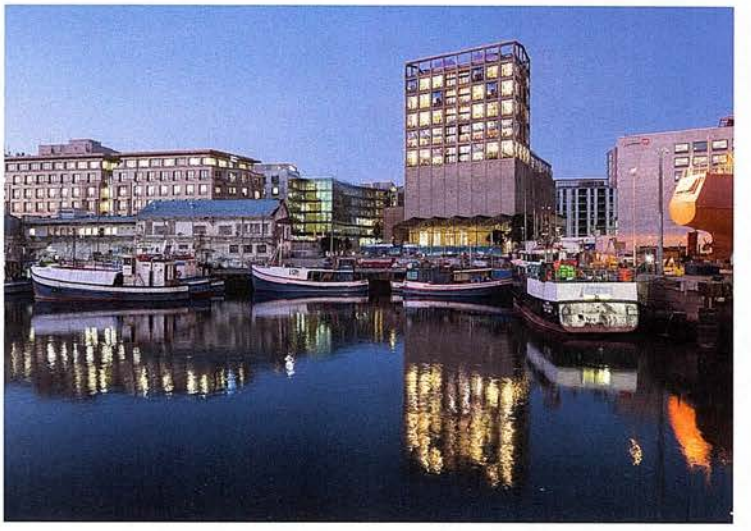
And then! Proceeding into the lobby opens up a jaw-dropping vaulted atrium—before, below, and above you—etched deep with shadows, streaming with sunlight. Reminiscent of Louis Kahn's unbuilt, much smaller Mikveh Israel Synagogue project, this public atrium is as affecting as Frank

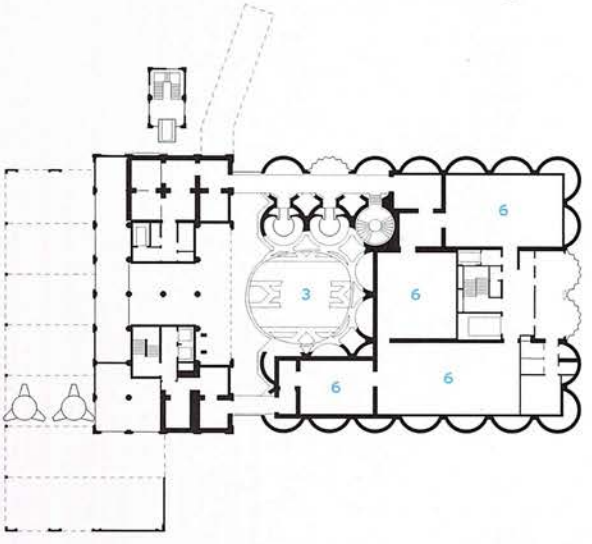




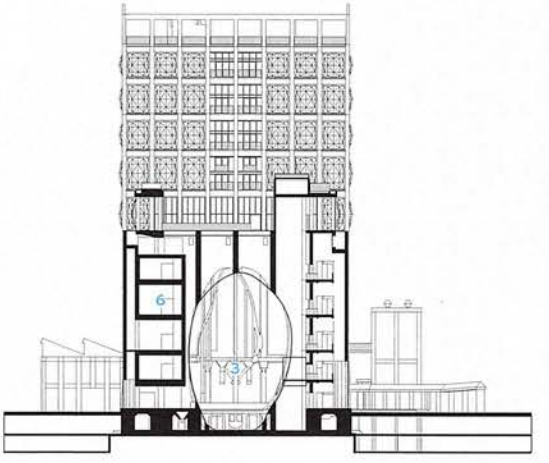
GROUND-FLOOR PLAN

0 100 FT. 30 M.

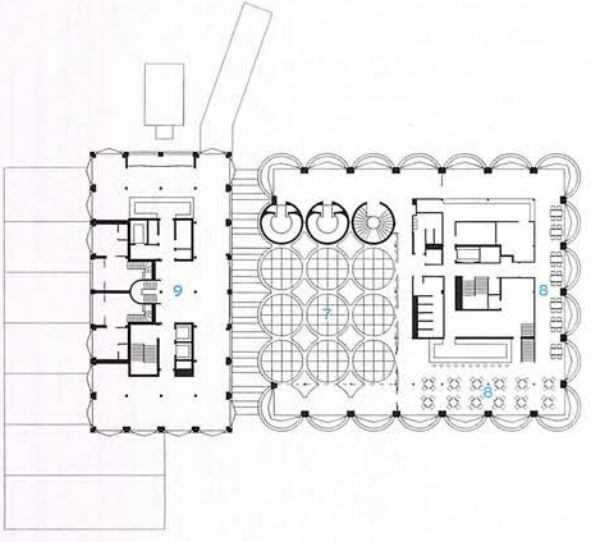




SECOND-FLOOR PLAN

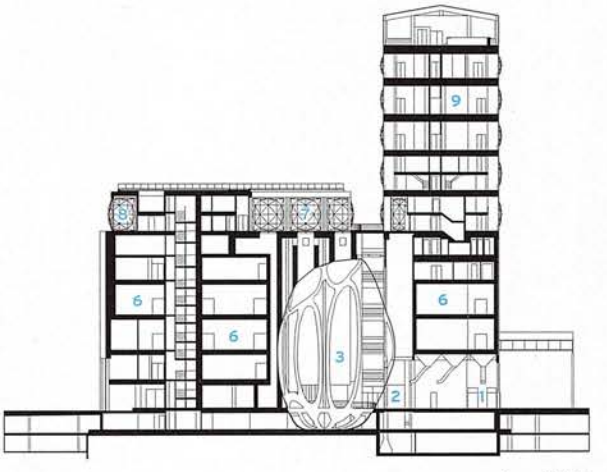


SECTION A - A



SEVENTH-FLOOR PLAN

0 30 FT. 10 M.

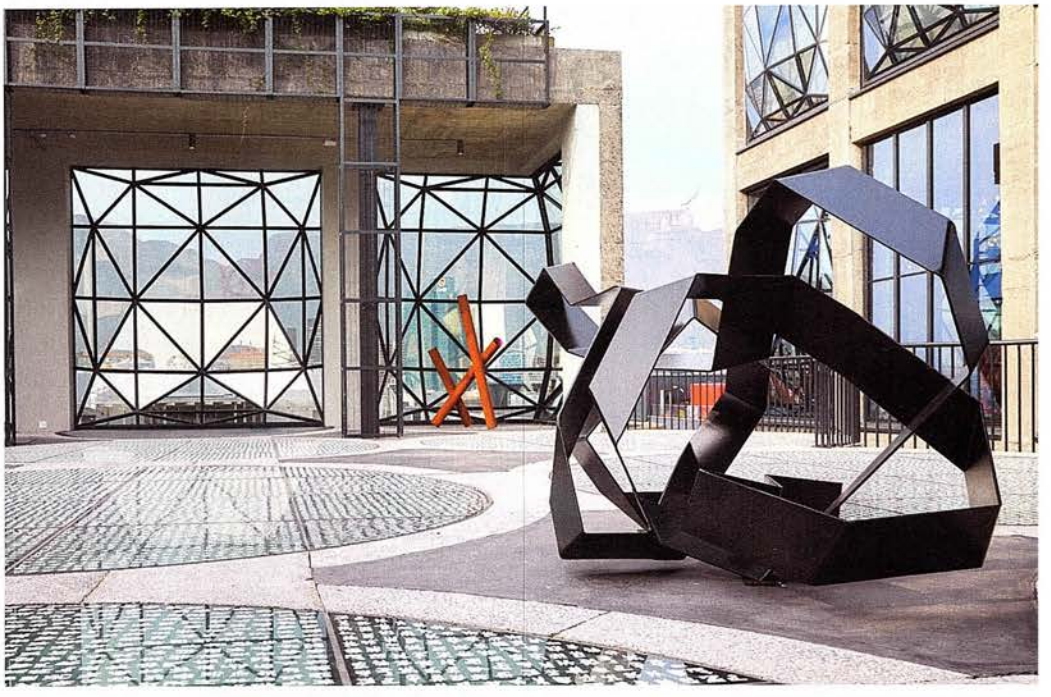


SECTION B - B

0 30 FT. 10 M.

1 MUSEUM ENTRY
2 GRAND HALL
3 ATRIUM
4 MUSEUM SHOP
5 STORAGE
6 GALLERY
7 SCULPTURE GARDEN
8 RESTAURANT
9 HOTEL

WATERFRONT REVIVAL The MoCAA project is part of the ongoing redevelopment of Cape Town's V&A Waterfront (opposite). The museum's exhibition spaces include a rooftop sculpture garden (bottom, right) and 80 box-shaped galleries, such as the one devoted to the work of South African artist Nandipha Mntambo (right).



Gehry's Guggenheim Bilbao, a flat-out wondrous space, at once dynamic and containing, sensuously textural and gravely monumental.

Correctly determining that maintaining the existing building's rigid geometries risked an overly static design, Heatherwick scanned a corn kernel to use as the datum for the shape of the atrium's void, which is carved into the building's clustered cylinders. The contrast between the void's irregular, biomorphic curves and the concrete silos' geometric regularity creates an extremely dynamic composition. (The 80 gallery spaces on nine floors, for a total of 65,000 square feet, are differently sized and proportioned white boxes. They function, they're fine, and they're nothing particularly special, but they are precisely what the curators demanded.)

The execution of this atrium proved more than complex. When the silos were originally constructed, the simple fact of their clustering created the building's lateral stability. How to carve a long-span, multistory atrium out of such a structure? Working with engineers from Arup and local partner firms—Van der Merwe Miszewski Architects, Rick Brown Associates, and Jacobs Parker—Heatherwick's team designed what is essentially a new building to support the original structure. Reinforced concrete "sleeves," 9¾ inches thick, were poured inside each 18-foot-diameter cylinder. Then a land surveyor mapped hundreds of coordinates from the corn-kernel scans onto the silo bins, enabling contractors to identify where to scoop through the resulting two sandwiched layers of concrete.

This design produced opportunities for construction details that significantly enhance the building's emotionally arresting quality. The sanded, velvety-smooth surfaces of the new structure highlight the burnished, jewel-like quality of historic concrete. Heatherwick is unapologetically after what he calls soulfulness, explaining that as a child "the public areas in cities always seemed to be their worst parts." He credits his artistic training with helping get him to his current practice, adding that the curricula in architecture schools in the 1980s, when he was a design student, seemed "so abstracted from the everyday experience of people."

Artist, architect, whatever: Heatherwick's sensibility is a welcome addition to contemporary architectural discourse. Celebrate this accomplishment, watch what comes next, and keep an open mind. ■

credits

ARCHITECT: Heatherwick Studio – Mat Cash, group leader; Stepan Martinovsky, project leader

ASSOCIATE ARCHITECTS: Van der Merwe Miszewski Architects, Rick Brown Associates Architects, Jacobs Parker Architects

CONSULTANTS: Sutherland (civil, structural); Arup (civil, structural, m/p, fire); Solution Station (electrical, fire)

GENERAL CONTRACTOR: WBHO

CLIENT: Victoria and Alfred Waterfront Holdings

SIZE: 102,000 square feet

COST: $35 million

COMPLETION DATE: September 2017

SOURCES

WINDOWS/SKYLIGHTS: Mazor Aluminum

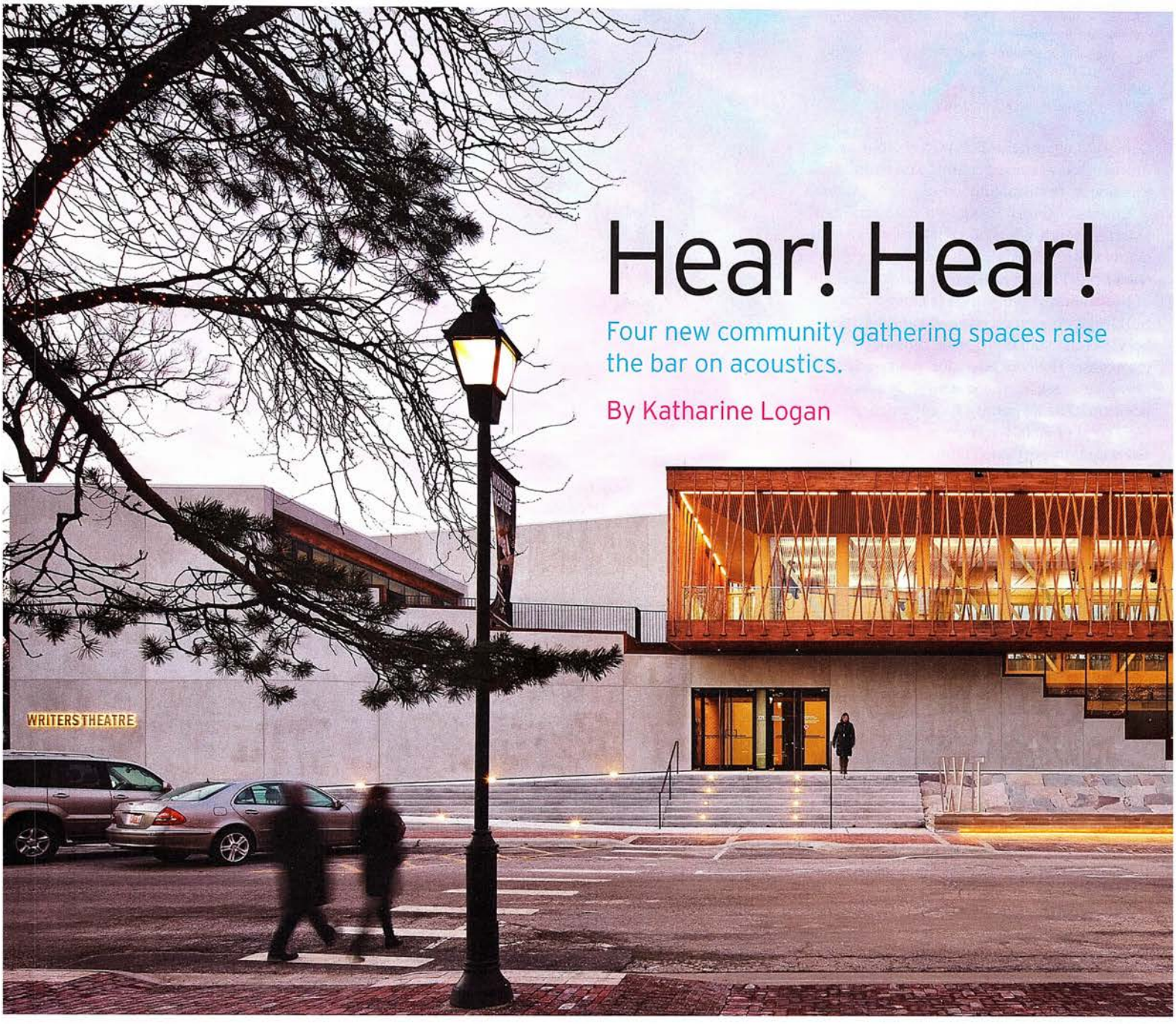
ROOF GARDEN PAVERS: World of Decorative Concrete, Le Roux LJ Industries

GALLERY FLOORS: Sika

HARDWARE: Dorma

SUSPENSION GRID: Saint Gobain

ELEVATORS: Schindler



Hear! Hear!

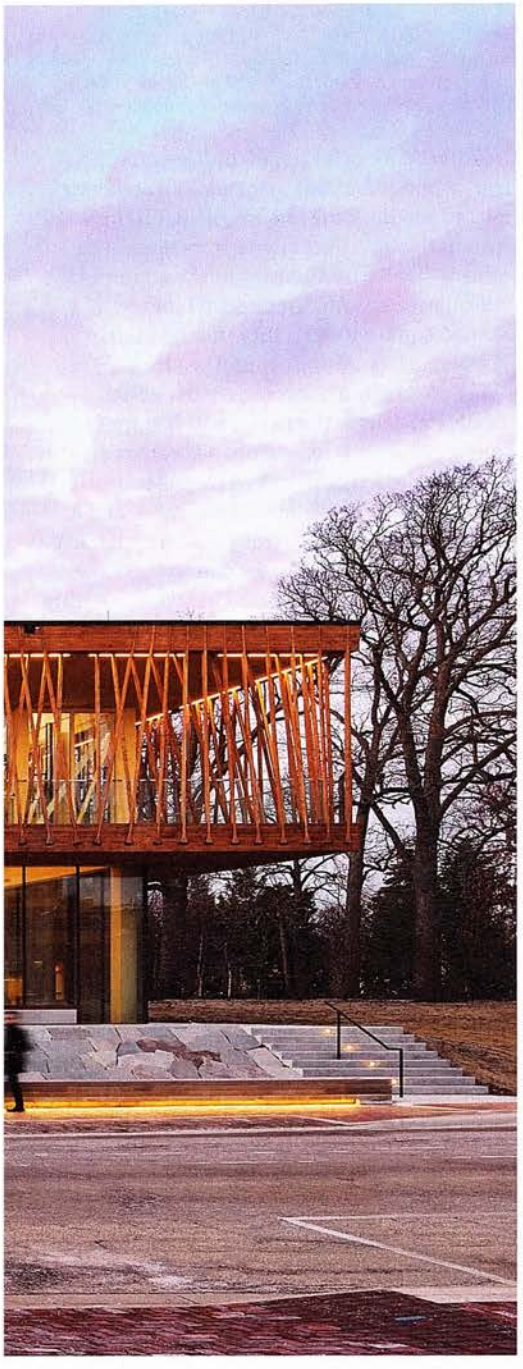
Four new community gathering spaces raise the bar on acoustics.

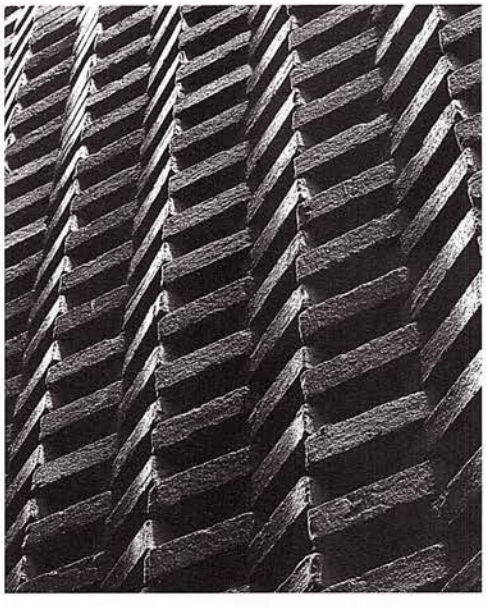
By Katharine Logan

HUMANS ARE visual creatures, and architects are particularly visual humans—first the drawings and then the photographs are often mistaken for a building's whole story. But the experience of architecture is more powerful and subtle than eyes alone perceive. Especially in community gathering places, acoustics play a vital role in shaping a building's character and the quality of experience it facilitates. From theater to library to ashram, designers are working with acoustics to bring their projects into the round.

Few buildings are designed for acoustics more deliberately than performance spaces, as Chicago-based Studio Gang's new Writers Theatre illustrates. The 36,000-square-foot building comprises two performance spaces (a main stage and a smaller black-box venue) opening onto a glass lobby structured by timber trusses. Located in Glencoe, Illinois, and completed in 2016, the new theater replaces a much smaller-capacity venue in which Writers grew up. Theatrical intimacy has characterized the spoken-word company since its start in 1992, and the design team strove to maintain that quality even as Nichols Theatre, Writers' new 250-seat main stage, more than doubled the capacity of the previous venue and quadrupled its acoustic volume.

The spatial design fosters intimacy using a thrust stage around which the audience is seated, with no edge or change of level to separate the front row from the performance. But the acoustics for Writers' typically unamplified performances presented a complex challenge in the larger room. The human auditory system measures the volume of a space by subconsciously comparing the difference between the time direct sound arrives along the line of sight and the time reflected sound arrives from the space's perimeter surfaces. The farther away these surfaces are from





ADAPTIVE REUSE The main performance space at Studio Gang's Writers Theater (opposite) in Glencoe, Illinois, includes an acoustic screen made of bricks (left and above) salvaged from the company's former home.

the listener, the later their reflections arrive; the later the reflections, the more degraded the sense of acoustic intimacy. "In acoustic terms, a fourfold increase is vast," says Carl Giegold, a partner with Threshold Acoustics, Chicago-based consultants to the project.

Threshold uses the metaphor of storytelling around a forest campfire to describe its solution for creating the feeling of being close to or alone with performers, even with more distant surfaces. The actors onstage represent the light, heat, and story around which the audience gathers; unlike the walls of a room, the boundary of a forest clearing—tree trunks and canopy—is diffuse and vague. Translating this experience into built form, the design surrounds the audience with a diffusive screen. Bricks salvaged from the facade of Writers' previous home (a 1938 structure demolished to make way for the new building) are offset 8 inches from the primary theater's perimeter walls. They form a highly articulated surface that changes in shape and amplitude as it rises from floor to catwalk. "The complex patterning of the screen mimics the randomness of the outdoor environment," says Giegold, "and defeats the acoustic boundaries of the room."

Importantly, the brick screen does not absorb the sound; instead, it breaks sound waves into random energy. "We kept that energy in the room," says Giegold. "We diffused it and sent it back to envelop the audience in an ambience rather than in a series of hard reflections." While the sound continues to infuse the theater with energy, it no longer betrays its size.

Having dealt with undesirable reflections from distant surfaces, the designers then set about further enhancing intimacy by introducing a few deliberately distinct reflections from spots near the actors. Small but critically placed and shaped reflectors are located on the underside of the catwalks, and a couple of sail-like reflectors are suspended between them. These take the sound on stage and throw it across the room, so that an actor speaking with his or her back to one side of the audience is nonetheless intelligible. "We end up with a distinctive, intimate character that is the hallmark aesthetic of Writers Theatre," says Juliane Wolf, a design principal at Studio Gang.

While a theater needs as blank an acoustic slate as possible, libraries' acoustic needs are increasingly various. The Old Galt Post Office Idea Exchange in Cambridge, Ontario, by Toronto-based RDHA, and the new Central Library in Austin, Texas, by San Antonio–based Lake|Flato and Boston-based Shepley

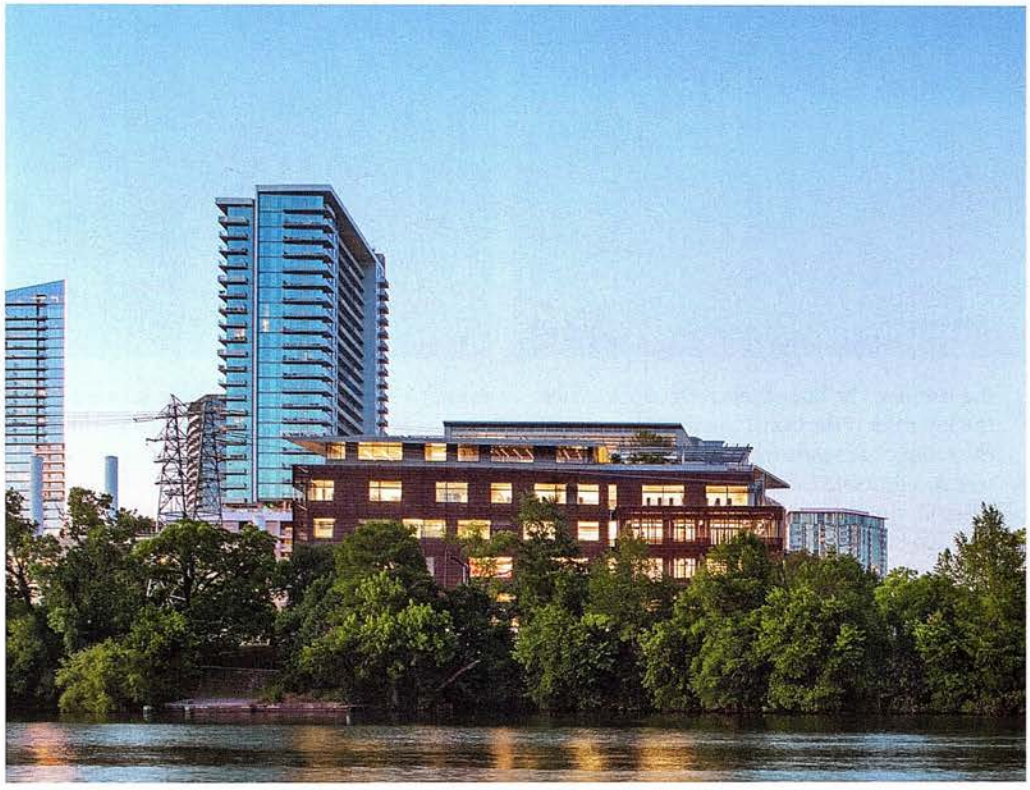
BEYOND THE BOOK RDHA's Idea Exchange (left) in Cambridge, Ontario, and the Central Libarary (below, left and right) in Austin, Texas, by Lake|Flato and Shepley Bulfinch, represent a new generation of library, with spaces that can accommodate a wide range of programming.

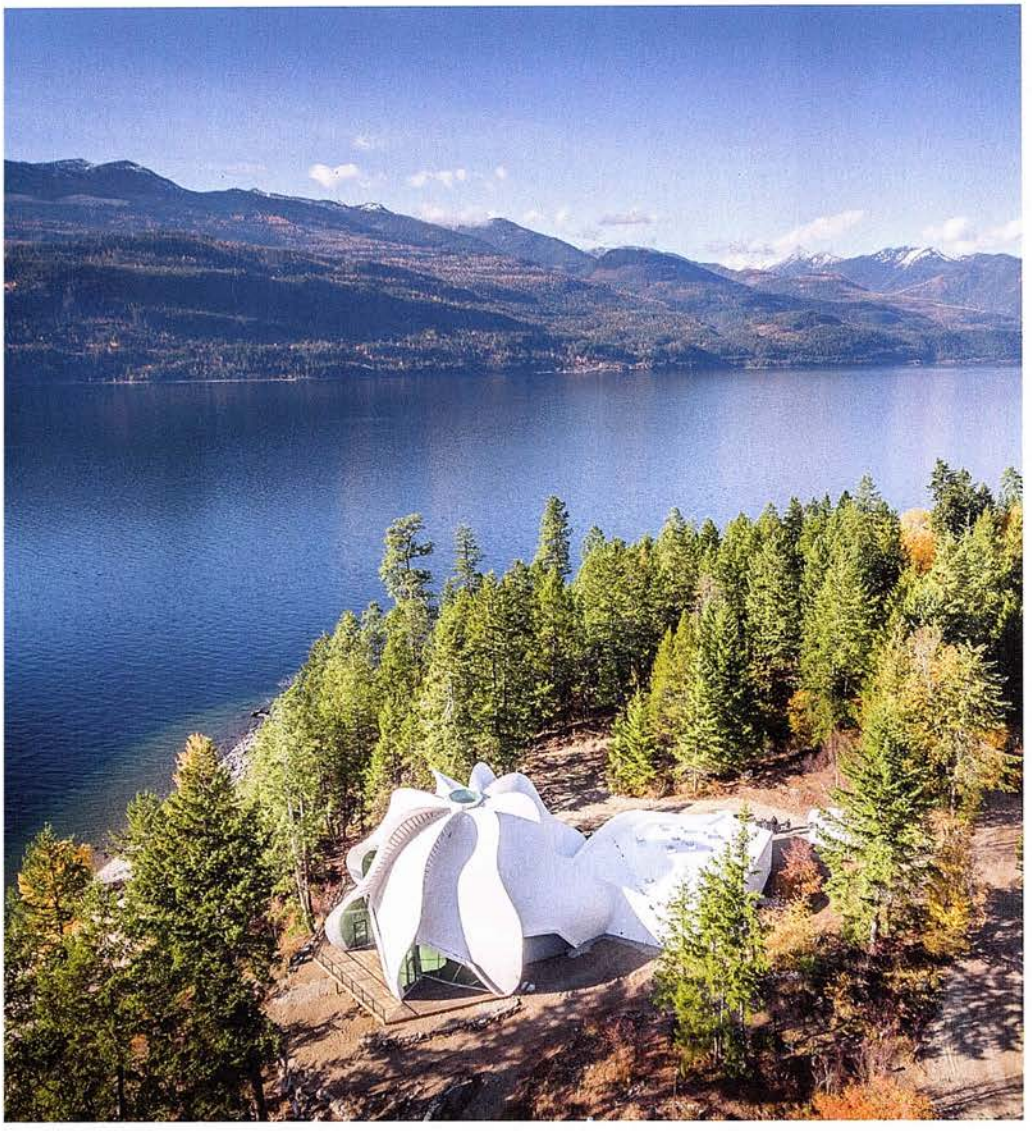
Bulfinch, represent a new breed of library: they are intended as dynamic, polyvalent gathering places. With spaces that can accommodate diverse programming, they address more challenging acoustic issues than libraries have historically faced.

Dubbed Canada's first bookless library, the Galt Idea Exchange, scheduled to open in spring 2018, engages creative people of all ages. The project renovates a 9,000-square-foot heritage post office, adding a new transparent pavilion that doubles the post office's floor area and cantilevers 20 feet over the Grand River. The lower level offers a black-box theater and multipurpose room, audiovisual recording suites, and studios for playing musical instruments on loan. An atrium connects to the main level, which includes a periodicals reading room, café, and restaurant. Upstairs, the Children's Discovery Centre and the adult Creation Space offer opportunities ranging from robotics and 3-D printing to woodworking and sewing. Part of a municipal library system, the Idea Exchange complements an existing book-based library in the community.

Similarly, the Austin Central Library, a 200,000-square-foot facility that opened in October, celebrates books and reading. Jonathan Smith, an associate partner at Lake|Flato, calls it the best daylit library in America, due in large part to a six-story atrium that includes extensive skylights, clerestories optimized for their solar orientations, and a generous east-facing curtain wall. The facility also extends its capacity for community engagement with a 250-seat event space, meeting rooms, art gallery, café, screened porches for reading overlooking Lady Bird Lake, and a rooftop garden, as well as dedicated multiuse areas for children and teens.

"The goal for any community space is to provide a comfortable acoustic environment for multiple applications," says Payam Ashtiani, a principal with Mississauga, Ontario–based Aercoustics Engineering, consultants to the Galt Idea Exchange. To achieve that goal, the acoustic design must address three primary factors: room acoustics (the behavior of sound





RESTFUL RETREAT The form of Patkau Architect's Temple of Light, a sanctuary and meeting place for the Yasodhara Ashram, was inspired by the shape of a previous building destroyed by fire, and its spectacular setting in the mountains of southeastern British Columbia.

in the space), sound isolation (the exclusion of noise from outside the space), and mechanical-noise control (the control of sound from building services). Ken Dickensheets, principal of Austin-based Dickensheets Design Associates, acousticians for the Austin Library, concurs. He adds that acoustic analysis early in the design process maximizes the opportunities for cost-effective solutions.

The distribution of program elements, for example, can simplify acoustics by locating zones that require quiet away from sources of noise, including mechanical equipment. The Austin Library's event space is on the lower level for this reason, as are the Galt Idea Exchange's performance and recording spaces.

Once the opportunities for passive solutions have been fully taken advantage of, floors and walls can be designed to further isolate spaces. An assembly's Sound Transmission Class (STC) rating describes its ability to attenuate the transmission of sound in the audible frequency range. In general, good acoustic separation between adjacent spaces can be provided with demising partitions that have an STC rating of 45 to 50.

At the Idea Exchange, STC-50 is achieved for multipurpose-room walls with two layers of ⅝-inch gypsum board on either side of 3⅛-inch, fiberglass-insulation-filled steel studs. For the recording suite, which requires a higher STC rating, the insulated studs are doubled on either side of a 2-inch air gap. To prevent sound flanking (the transmission of sound around, over, or under the primary partition separating two spaces), the suite's concrete floor slab is isolated from the structure with neoprene gaskets.

Within a room, reverberation time (RT) is defined as the interval in which sound decays by 60 decibels (dB). (Decibels are the logarithmic unit used to measure the intensity of sound.) To prevent collaborative spaces' becoming too noisy, the target RT for the Idea Exchange's Creation Space was less than one second, with a low of 0.6 seconds for the recording studios. For the atrium, an RT of 1.2 to 1.5 seconds maintains the feeling of a large, open space without allowing noise to build to a din.

The Idea Exchange primarily uses perforated acoustic drywall to achieve the desired Noise Reduction Coefficients (NRCs). The material meets a budget that Tyler Sharp, principal at RDHA, describes as difficult, given the ambitions of the project. But it also has desired aesthetic qualities, says Sharp. Its continuous, uniform dot pattern flows evenly across the atrium ceiling's angular geometry, and the dots relate neatly to the pattern of the curtain wall's ceramic frit.

To achieve the NRC required for its atrium, the Austin Library uses acoustical plaster on the ceiling and undersides of projecting floor slabs. A relatively expensive material that shows abuse, acoustical plaster suits these out-of-the-way applications. Two large, south-facing walls designed to reflect daylight into the library are clad with perforated metal panels backed with acoustical batts to prevent them from also reflecting sound. "The fact that this giant volume isn't echoey makes the building feel more approachable," says Smith. "It doesn't show in the photos, but when you're there, you have a great feeling in the space."

If acoustic tranquility is welcome even in the new, more dynamic breed of library, it is a necessity in the Temple of Light, a sanctuary and meeting place for the Yasodhara Ashram, a yoga retreat and study center in the mountains of southeastern British Columbia. The new temple, designed by Vancouver-based Patkau Architects and completed this summer, replaces an earlier one destroyed by fire.

The temple responds to the collective memory of the original space (which comprised eight rotationally symmetric bays, like its replacement). But it also takes cues from the spectacular clifftop site, with its views of Kootenay Lake and the surrounding forest, and from the lotus flower, an important symbol in the yogic tradition, says Luke Stern, manager of design research at Patkau.

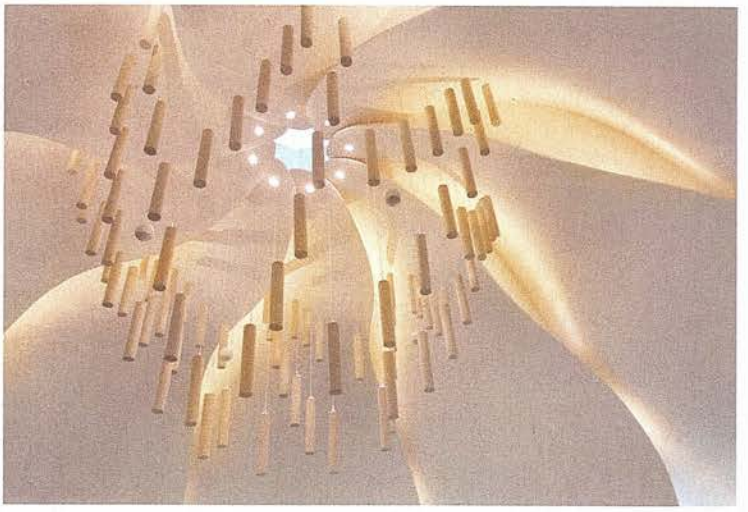
Constructed of prefabricated wood panels' acting in concert with glulam arches and shear wall elements, creating an integral shell, the temple is the focal point of the spiritual life of the ashram. The form of the primary volume, pinwheel in plan, is made up of eight interlocking petals, curvilinear yet built of

straight members, and radiating from a central oculus.

Because of the project's modest budget of $2.75 million, the design team could afford only a simplified approach to acoustic modeling. The acoustic consultants, Vancouver-based RWDI, offered advice based on the sound quality of a simple dome, without the compound curves of the eight petals, in which the RT would reach 3.5 seconds or longer. (An echoey gymnasium has an RT of about 2 seconds.) The architects knew that the design's curves would mitigate the long RT but considered additional measures to be in order.

The temple's unusual geometry was designed in part to mitigate the focusing issues that afflict simple domes. There are no parallel surfaces that would cause significant harmonic resonances or flutters, says Stern, and where concave surfaces occur, they are not centrally focusing, so that acoustic hot spots from each of the eight petals don't overlap. Moreover, those hot spots mainly occur above head height.

At the base of the petals, which are finished in white-painted gypsum board, glazing provides views of the temple's lakeside setting. To prevent sound's ricocheting off the hard surface of the glass and back to the building's occupants, the architects segmented and angled the glass to direct reflections upward, beyond head height. And to absorb excess acoustic energy, a pinwheel array of 96 melamine-foam baffles is suspended from the oculus at the top of the dome. The overall envelope



FLOWER POWER An early scheme for the Temple of Light included wood slats with acoustic backing (left) on the underside of its petals. These interior surfaces were ultimately constructed of painted drywall with compound curves, to help mitigate sound-focusing problems. A chandelier of melamine-foam baffles (above) absorbs excess acoustical energy.

of this acoustic chandelier supports the temple's floral metaphor, as if they were the anthers and filaments of stamens.

Since the building opened, it has hosted musical performances as well as meditation, yoga practice, and instruction. "The acoustics have far exceeded expectations," says Stern.

In common with the designers of Writers Theatre, the Old Galt Post Office, and the Austin Library, Stern describes acoustics as an often-neglected aspect of architectural design. "They really can negatively affect people's experience of a space, no matter how wonderful it is formally," he says. Conversely—as these projects illustrate—when acoustics are taken as a significant design parameter from the start, they enrich the multisensory experience that is architecture. ■

Katharine Logan is a designer and writer focusing on architecture, sustainability, and well-being.

Continuing Education

To earn one AIA learning unit (LU), including one hour of health, safety, and welfare (HSW) credit, read "Hear! Hear!," review the supplemental material found at architecturalrecord.com, and complete the quiz at continuingeducation.bnpmedia.com or by using the Architectural Record CE Center app available in the iTunes Store. 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 Describe acoustical strategies for making a large space feel intimate.

2 Describe strategies for optimizing acoustics in spaces intended for diverse uses.

3 Describe acoustical strategies for mitigating mechanical noise and noise from outside a space.

4 Define such terms as reverberation time, sound-transmission class, and noise-reduction coefficient.

AIA/CES Course #K1712A

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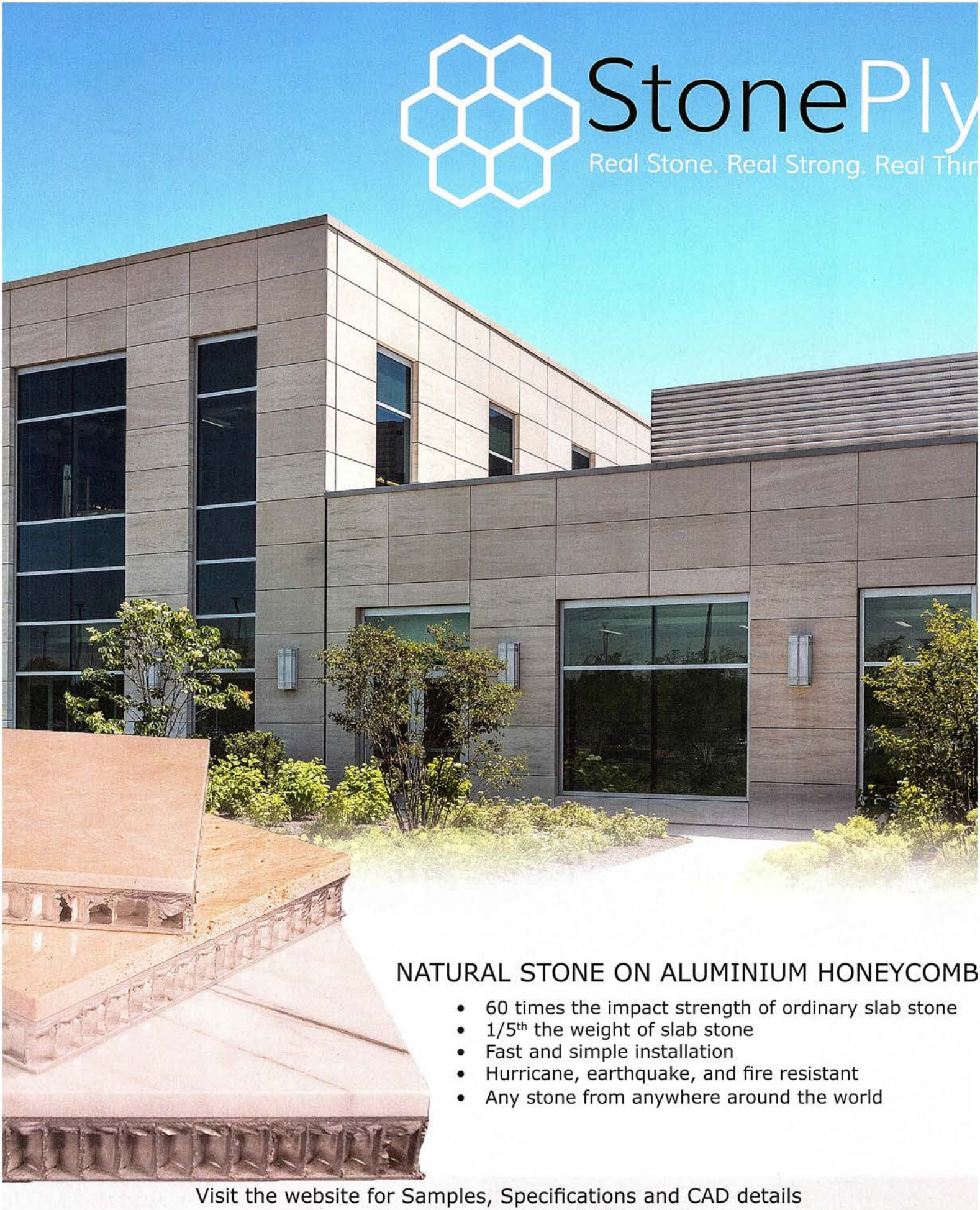

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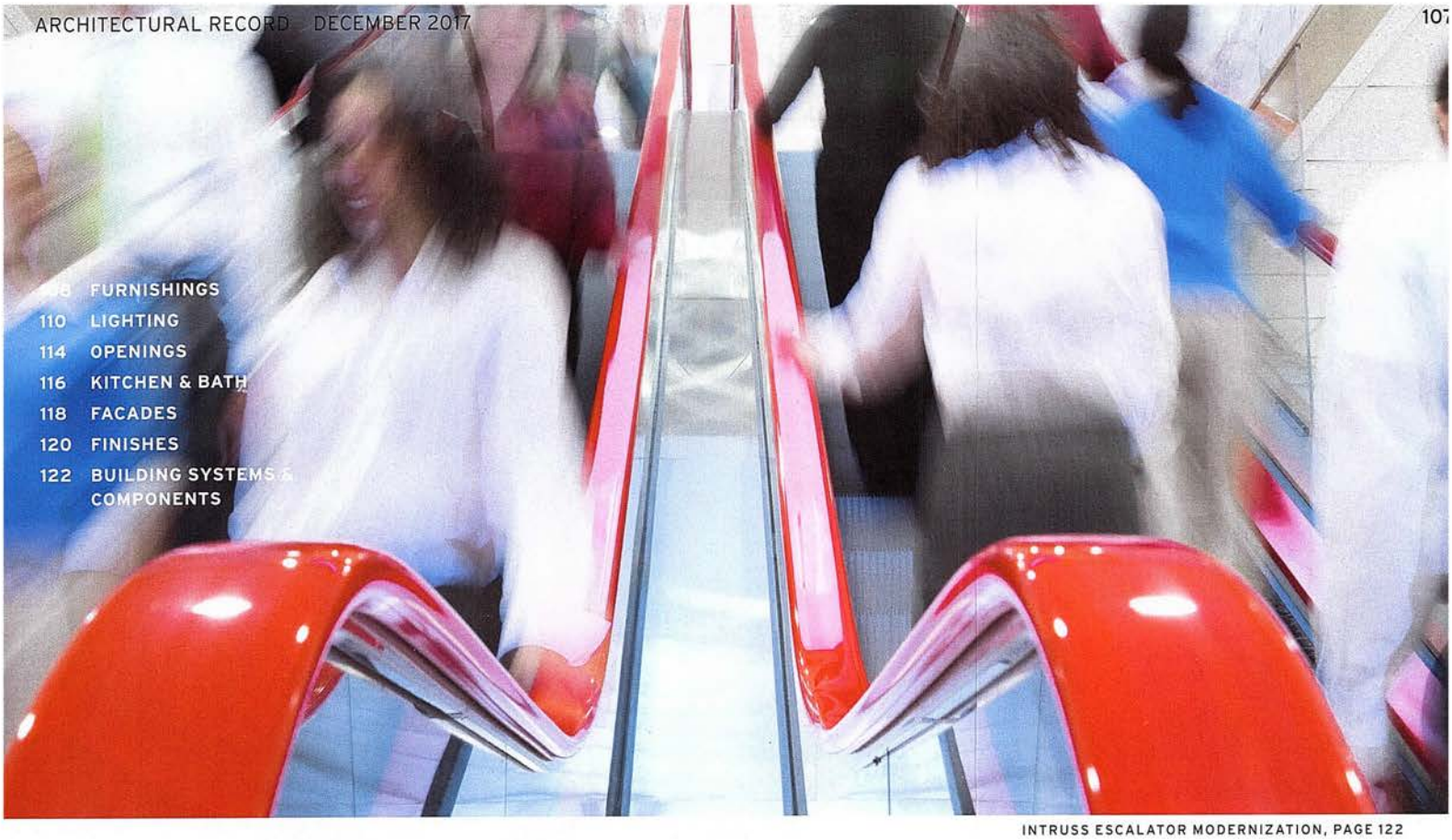


INTRUSS ESCALATOR MODERNIZATION, PAGE 122

Record Products 2017

Architectural Record's annual competition for best new products of the year attracted more than 250 entries. Our independent jury of designers selected 57 innovative winners, of which the Best in Category received the top numerical rankings. In addition, Record editors scrutinized the winners through the lens of their own reporting and highlighted other favorites. Turn the pages ahead to find the latest, and best, building products.

Best in Category *OUR GOLD BADGE denotes winners with the highest total score in a group.*

Editors' Choice *BLUE-RIBBON BEST reflects the Record staff's picks in each category.*

Written by **Leslie Clagett, Sheila Kim, Linda Lentz, and Rita Orrell**
Edited by **Kelly Beamon**

Jurors

Jamison Guest
Since joining Heintges & Associates in 2007, Guest has contributed to the innovative facades of more than 20 global projects. He's a licensed architect with a master's in architecture from Columbia University.

Anne Fletcher, AIA, LEED AP
Managing principal of HOK's L.A. office, Fletcher rose through the firm's ranks, leading high-stakes projects such as the new LaGuardia Airport master plan.

Erin Dreyfous, IALD
As a principal for Tillotson Design Associates, Dreyfous oversees several large-scale projects around the world. She recently received a 2017 IES Illumination Award for the Vagelos Education Center in New York.

D.B. Kim
An architect by training, Kim has developed entire global brands as VP of design for Wanda Group in Beijing and Starwood Hotels & Resorts. He was also a principal for Daroff Design and Pierre-Yves Rochon.

Carrie Moore, AIA
A director for Skidmore, Owings & Merrill, Moore's expertise is in complex institutional projects, including the first net zero energy school in the Northeast (RECORD, January 2016, page 122).

Sheila Bridges
Founder of her eponymous 23-year-old firm, Bridges (a Brown University and Parsons alum) has designed products and interiors, including the Harlem office of former President Bill Clinton.

Standing, left to right: Jamison Guest, D.B. Kim, and Carrie Moore. Seated, from left: Anne Fletcher, Erin Dreyfous, and Sheila Bridges.

Furnishings

Contract | Residential | Indoor | Outdoor

AllSteel Retreat

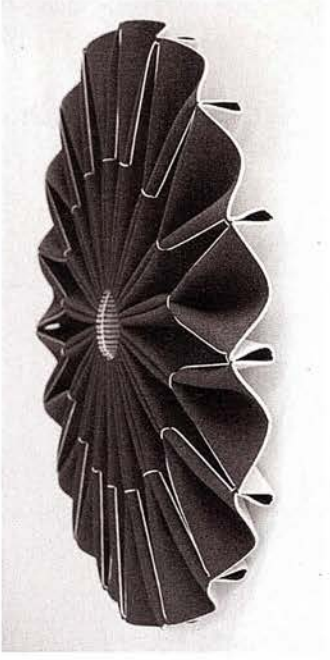
A high back, low armrests, and relatively upright recline differentiate this working wingback from its residential counterparts. The streamlined wings atop the 46" tall back help screen out visual and aural distractions in open workspaces. The tapered base facilitates easy entry and exit. Retreat is available with glides and a swivel rotation that can be 360° or return to the center.
allsteeloffice.com

Seating Stones Lounge Chairs

These triangular chairs (33" high x 63" wide x 33" deep) are one version of the brightly designed Seating Stones collection by Ben van Berkel. Available with Teflon glides for use on stone and carpeting, and felt glides for wood floors, the Lounge Chairs can also be ganged together using floor stoppers for a modern, geometric sectional. Three more chair designs, a pouf, and a table round out the collection.
walter-k.com/products

BuzziPleat

Suspended from the ceiling or mounted on a wall, the two configurations of this acoustic fixture maximize its surface area, which, in turn, increases its sound absorption. BuzziPleat uses folding techniques—hand pleating and smocking—to create a sculptural form. Ripple (shown) comes in two diameters, 39" and 59", in an array of neutral and bright colors. Its sound-absorbing P.E.T. felt is made of 100% upcycled plastic bottles.
buzzi.space



Entrada

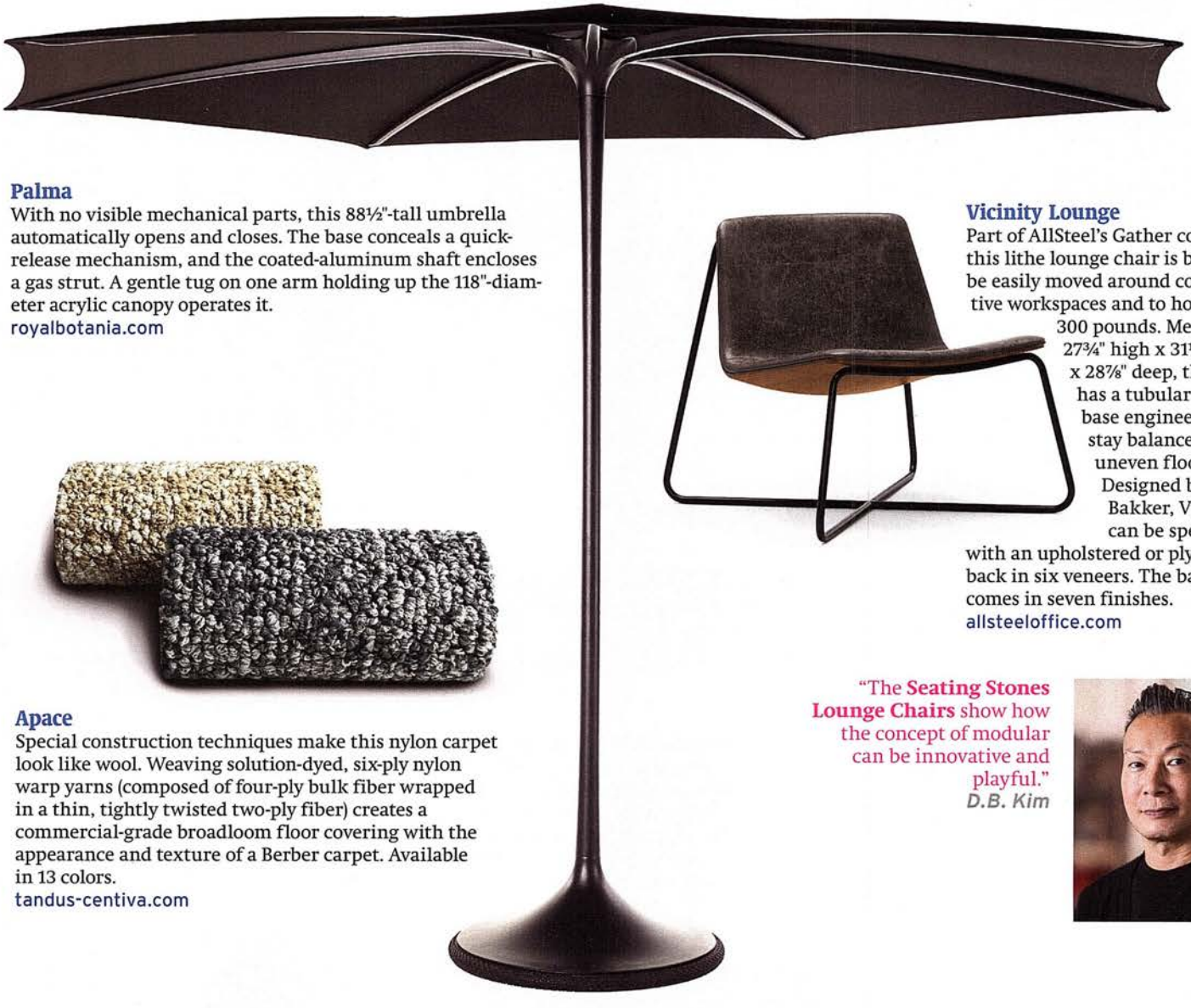
While this hanging panel appears to be wool felt, it is actually made of a polyester fabric that passes stringent fire codes. Installed over windows, Entrada (Carnegie's new acoustic panel) uses its 3-D structure of laser-cut woven fabric to create an interplay of light and shade. As a hanging divider, the 47" x 118" panel has NRC ratings of 0.45 when draped flat and 0.65 if draped at 100% fullness.
carnegiefabrics.com

Halo Credenza

The modular nature and residential details of this credenza can accommodate a range of storage conditions and settings. Part of the Halo system of conference-room solutions, Halo Credenza, designed in partnership with Gensler, comes in three standard depths (18", 21", 24") and is loaded with organizational components including a lift-top compartment, drawers, shelving, and inserts. The casegood, which can be mixed and matched with Halo benches and tables, also ranges in height from 23½" to 40".
halconfurniture.com

Pendleton by Sunbrella Collection

Rendered in sunlight- and chemical-resistant acrylic fabric, this portfolio of Native American–influenced designs merges commercial-grade durability and the Pendleton brand's reputation for craftsmanship. Five patterns form the basis for this collection of 53 outdoor fabrics.
sunbrella.com/pendleton



Palma

With no visible mechanical parts, this 88½"-tall umbrella automatically opens and closes. The base conceals a quick-release mechanism, and the coated-aluminum shaft encloses a gas strut. A gentle tug on one arm holding up the 118"-diameter acrylic canopy operates it.
royalbotania.com

Vicinity Lounge

Part of AllSteel's Gather collection, this lithe lounge chair is built to be easily moved around collaborative workspaces and to hold up to 300 pounds. Measuring 27¾" high x 31¼" wide x 28⅞" deep, the chair has a tubular steel base engineered to stay balanced on uneven floors. Designed by Mitch Bakker, Vicinity can be specified with an upholstered or plywood back in six veneers. The base comes in seven finishes.
allsteeloffice.com

Apace

Special construction techniques make this nylon carpet look like wool. Weaving solution-dyed, six-ply nylon warp yarns (composed of four-ply bulk fiber wrapped in a thin, tightly twisted two-ply fiber) creates a commercial-grade broadloom floor covering with the appearance and texture of a Berber carpet. Available in 13 colors.
tandus-centiva.com

"The **Seating Stones Lounge Chairs** show how the concept of modular can be innovative and playful."
D.B. Kim

Lighting

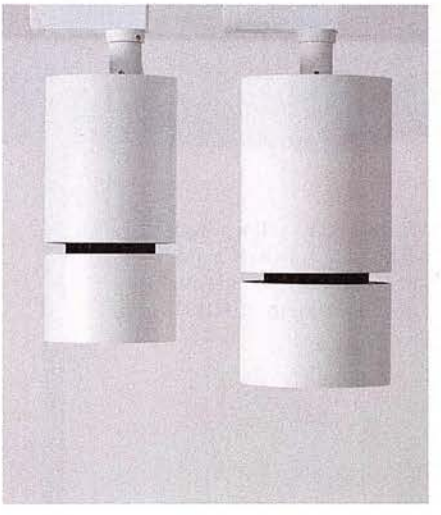
Contract | Hospitality | Residential | Controls

BuzziChandelier

Designed by Antwerp-based Sas Adriaenssens for BuzziSpace, this 30¾" x 29½" LED pendant not only serves as a focal point that casts a gentle play of light and shadow around a space, it has acoustic properties as well. This is due to a sound-absorbing shade made of a dual layer of eco-felt—a product of 100% up-cycled plastic bottles—stretched over a powder-coated steel frame. The BuzziChandelier is available in plain or perforated Emperador (above), Carrara, and Gold versions.
buzzi.space.com

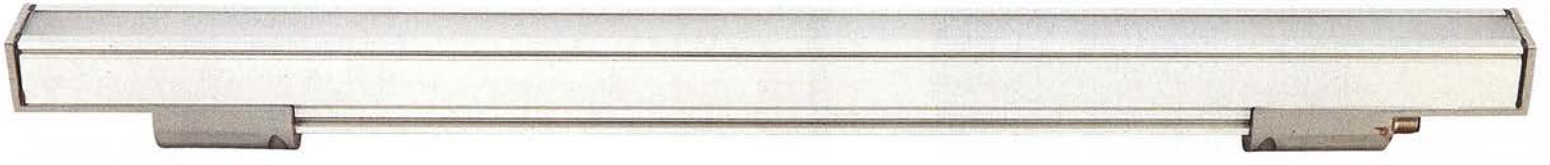
Berlin

This dramatic pendant from Troy Lighting combines a sleek contemporary aesthetic with a touch of industrial heft. Available in three sizes—from 12½" to 19½" in diameter x 11" to 18½" high—Berlin features a frosted globe diffusing a 2700K LED light source that glows from within a handcrafted iron mesh cone. This construction is encased in a bubble of clear blown glass and comes with sectioned stems to allow for ceiling drops ranging from 18" to 67½".
troy-lighting.com



Studio

This collection of LED track projectors by Sistemalux offers flexible lighting solutions for a variety of commercial applications. Designed with a proprietary heat sink for optimum output performance (up to 5000 lumens) and color consistency, the die-cast aluminum Studio series—in medium and large sizes and in matte black or white—features field interchangeable optics, lockable on-axis aiming, and a range of warm to cool color temperatures.
sistemalux.com



LumiLine Low Profile Versatile Performance AC Direct LED Luminaire

The second generation of Electrix Illumination's existing LumiLine L140, this extruded, satin-anodized aluminum fixture ups the ante on its predecessor with greater lumen output and improved efficiency. It also doesn't require a driver, due to its ability to connect directly to AC electrical systems. A good choice for linear applications and architectural accents, the L145 measures 1¼" wide x 2" high and from 22¼" to 44¼" long. Custom options allow for preferences in color temperature, fixture lengths, and hues.
electrixillumination.com

Satellight

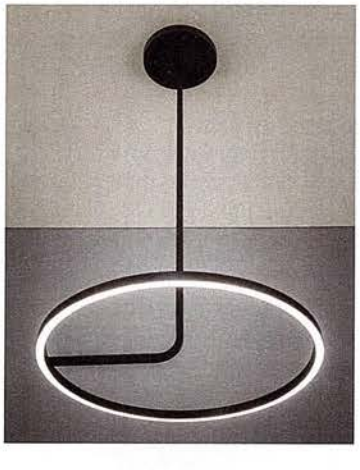
Like a full moon in the night sky, the luminous orb of Foscarini's new collection seems to hover within its bell jar. Milk-white, the spherical diffuser is lodged in the crown of a transparent container; both are hand-blown glass. Available in table, sconce, and suspension (right) versions—the latter measuring about 14" wide x 16" high—Satellight comes with a 3000K dimmable-LED light source.
foscarini.com

Alphabet of Light

Designed by the Bjarke Ingels Group (BIG) for Artemide, Alphabet of Light comprises curved and linear LED tubes that can be connected to create a variety of graphic shapes—including letters and numbers. Suspended or wall-mounted, these fixtures provide shadow-free 3000K illumination, and all connecting joints are concealed. The linear sections come in 47¼", 70⅞", and 94½" lengths and the circular in 35⁷⁄₁₆" and 61" diameters.
artemide.net

Halo

Designed and manufactured by Matthew McCormick, this modular series of pendants was inspired by the golden bubbles floating in a glass of sparkling Prosecco, and can be grouped in myriad configurations. Available with a choice of 8", 12", or 16" dimmable 3000K Circline fluorescent lamps, Halo, finished in brass, copper, nickel, or 24-karat gold, adds a luxurious note.
matthewmccormick.ca



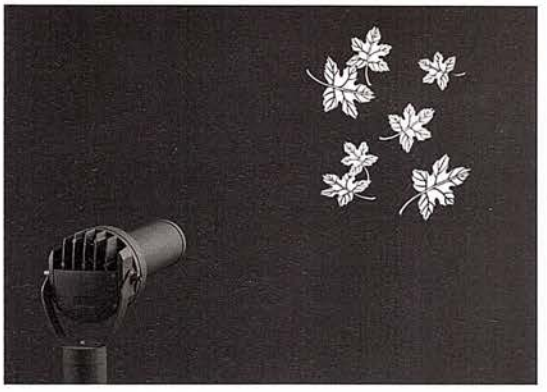
Hoopla Pendant

Designed to make a subdued, elegant statement in spare interior spaces, this lasso-shaped pendant is made of a ⅞" powder-coated aluminum channel that drops 30" to 54" from a ceiling to form either a 16" or 24" halo of 2700K LED light with a CRI of 90 or higher. Standard colors include warm black and soft white, though custom shades are also available.
boydlighting.com

"Seamless light is always something designers are trying to achieve. **Alphabet of Light** offers lots of potential for various applications."
Carrie Moore, AIA

Editors' Choice

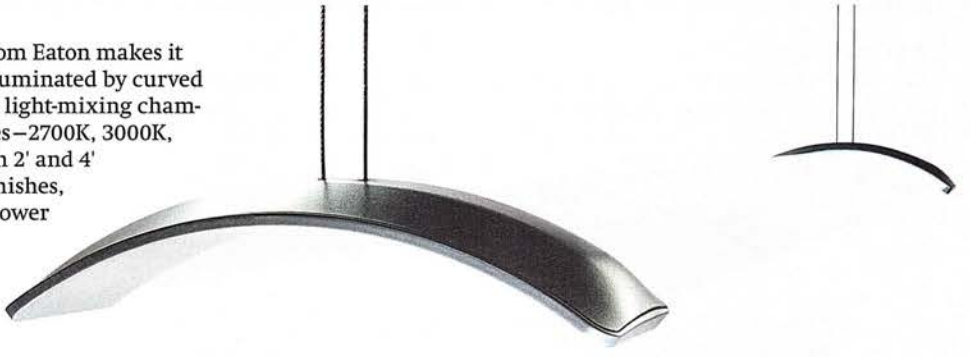
"**FLC200 LED** floodlights provide an impressive offering of optical lenses and internal glare control."
Erin Dreyfous

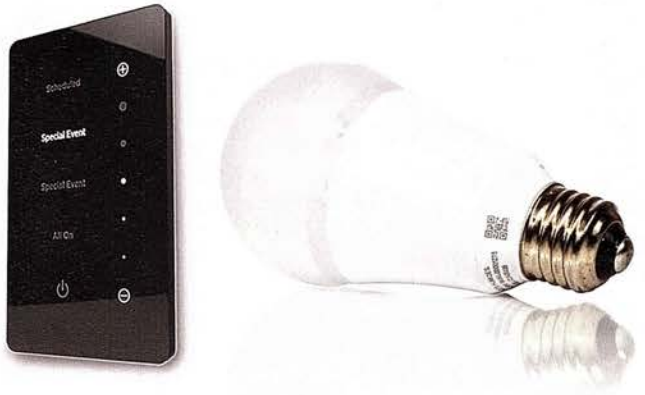


Squilinder
Lucifer Lighting's popular Cylinder line has been revamped with upgraded technology and improved mounting mechanisms. The company also added a new orthogonal form to the line: Squilinder (above). Both offer enhanced LED modules and field-changeable optics with higher output and better beam control, for interior or wet applications. Flexible ceiling-, wall-, and suspended-mount variations are available.
luciferlighting.com

FLC200 LED
Made of marine-grade, die-cast aluminum, this family of high-power LED floodlights by WE-EF Lighting features the FLC230 model (above), with zoom and framing capabilities and the option to create special effects or control the shape of a beam with a gobo (a template or stencil). The line offers a range of power outputs, lumen packages, and beam-spread options, as well as high-performance lenses.
we-ef.com

Neo-Ray Covera LED
The arc of this optical-grade acrylic pendant from Eaton makes it ideal for engaging workplace environments. Illuminated by curved WaveStream LED technology and a proprietary light-mixing chamber, it also provides uniform color temperatures—2700K, 3000K, 3500K, or 4000K—and light intensity. Offered in 2' and 4' lengths, with a variety of mounting options, finishes, and lumen packages, Covera uses low-voltage power delivered to the luminaire via the same cables that suspend it from the ceiling.
eaton.com/covera





Ketra Lighting Control System
This manufacturer has developed a proprietary LED-lighting and control system that can be programmed to shift imperceptibly throughout the day to mimic the color temperature and intensity of natural light—crisp and bright during the morning and noon hours, soft and warm toward evening. Additionally, each lamp in the system is individually addressable, tunable, and dimmable via wireless control. Ketra's portfolio includes a range of lamp types extending to linear products of up to 144".
ketra.com

Academy of Digital Learning

Acoustics

Architectural Record's Academy of Digital Learning is a new, free educational offering that provides some or all of your annual CEU requirements within a specific area of interest.

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PlybooDoor

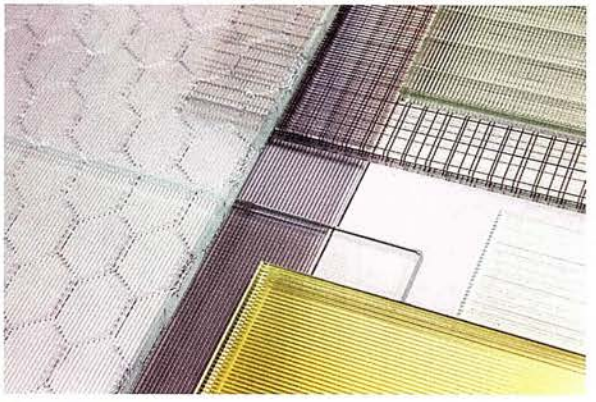
Krownlab and Smith & Fong have collaborated on a complete sliding-door system of decorative bamboo. Available in six premium finishes, PlybooDoor panels feature a linear pattern and are made in the U.S. from either bamboo or 100% FSC-certified bamboo to help toward LEED certification. Krownlab's standard finishes are petroleum-free, contain no heavy metal compounds, and emit no odor once dry.
krownlab.com

ViuLite Fire-Rated

This system of hermetically sealed blinds from Unicel Architectural provides privacy and shading for windows and doors while protecting against dirt, germs, and weather conditions. It is now available in a UL-classified, fire-rated version using Pilkington Pyrostop glass from TGP, which has fire ratings of 45, 60, and 90 minutes. Unicel provides various aluminum framing systems, glass stops, and door-kit options to glaze Viulite into interior partitions, sidelights, doors, windows, or curtain walls.
violite.com

CLR | multi slide Door System

Panels in Slide Clear's new minimal-frame, high-performance multi-slide door can be moved to the left, right, or center, providing flexible opening and storage options. The rail track also offers both four- and six-wheeled roller carriage systems, spreading the load. Integrated handles blend into the stiles to reinforce the clean, contemporary look.
slideclear.com



Houdini Unlocked

Bendheim's Houdini Unlocked Architectural Glass can now be specified in hundreds of colors and styles, including several with an added acoustic privacy benefit of 4 STC (Sound Transmission Class) points. Available in panels up to 23' high, the micro-fluted, daylight-friendly texture of the privacy glass allows light through but prismatically bends it, obscuring objects from view. It's a cost-effective alternative to complex daylight-control devices.
bendheim.com

Hydraulic Patch Fitting

This system features a hydraulic self-closing mechanism that is integrated into a sleek, minimal patch fitting, eliminating the need to cut into the floor to accommodate a floor closer. Instead, it only requires a simple anchoring of the base plate to the substrate, which simplifies and speeds up the door-installation process and reduces the amount of visible hardware, such as cover plates and overhead closers.
crl-arch.com

PanoramicView Lift & Slide

Updated with greater design flexibility, slimmer frames, and improved airtightness, Zola Window's PanoramicView Lift & Slide also offers a completely frameless fixed-glass portion and an operable sliding sash. The sash is only 3.5" wide but can carry an 8'-high x 11'-wide glass panel. A quadruple compression seal along the sides and head of the sliding sash offers Passive House–level air-sealing and gasket design.
zolawindows.com

"I liked **Envy** because it offers a refined system for commercial and residential projects."
Anne Fletcher, AIA, LEED AP

Best in Category

Envy

Overhead Door's first seamless glass garage-door model is made of ¼" tempered glass attached to a hidden aluminum frame. A translucent glass option is ideal for spaces where some visibility from the interior is desired, such as restaurants, auto dealerships, and retail settings, while opaque glass can be used for spaces where privacy is a priority. The door is available in a maximum width of 18'2" and maximum height of 14'1".
overheaddoor.com

INOX Barn Door Lock

The INOX Barn Door Lock provides privacy for barn doors in residential or commercial interiors. Installed inside the door jamb—instead of on the door itself—the bolt slides securely into the barn door's discreet strike. A thumb turn (with an ADA option) allows the door to be locked from inside the room, while a release button installed on the outside enables emergency access.
unisonhardware.com

WhisperShade DC

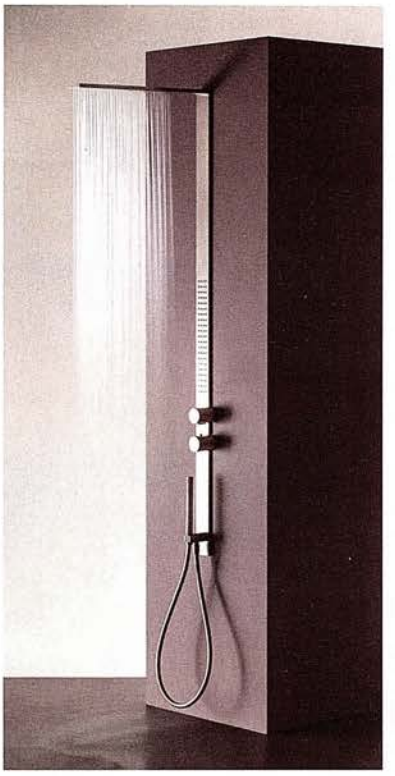
The MechoSystems WhisperShade DC Electronic Drive Unit is a powerful low-voltage motor for shades that are compatible with the MechoNet operating system. The motor offers superior lifting capability (40 pounds, with the shade at a maximum height of 24') while remaining extremely quiet. It also enables shade automation in spaces where the installation of line voltage motors is difficult due to professional labor expenses or construction issues.
mechosystems.com

Kitchen & Bath

Fittings | Fixtures | Hardware | Appliances

Verge with WashBar

This completely touchless all-in-one washing system integrates the Verge natural composite basin with the WashBar, a chrome-plated stainless-steel fixture that houses soap, water, and dryer in a single component. The integrated ADA-compliant design uses LED lights and icons to guide users through handwashing, while the dryer and bowl were designed to work together to eliminate spraying onto users or the floor.
bradleycorp.com



MilanoSlim

Designed by the Milan-based architect Franco Sargiani, the Milano collection now includes MilanoSlim, a multifunctional in-wall shower panel with thermostatic mixer, three-way diverter, rainfall showerhead, hand shower, and the option of either body spray or waterfall. Available in polished or brushed stainless steel.
fantiniusa.com

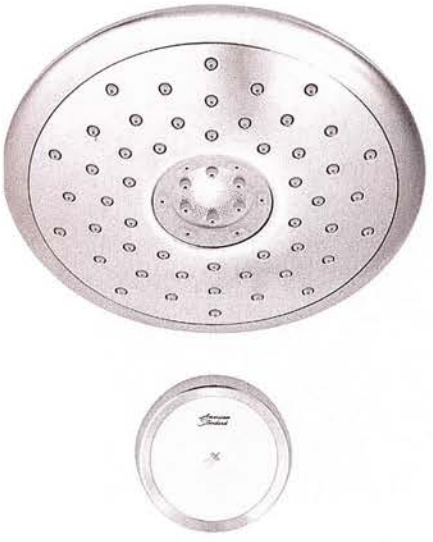
Kingsbridge Series

Inspired by English harbor towns and villages, the Kingsbridge decorative hardware series in Top Knobs' Devon Collection features smooth, flat tops and slightly rounded edges. The base of each solid zinc alloy piece includes an extra layer of detailing with two parallel bands, while the T-shaped knobs mimic the shape of the pulls, with the same wide, flat surface area.
topknobs.com

Zera Food Recycler

Every year, an average family produces over 400 pounds of food waste, most of which ends up in landfills. The Zera Food Recycler by Whirlpool can break down a week's worth of the average family's food waste within 24 hours into ready-to-use fertilizer. The 11"-wide, 22"-high, and 33¾"-deep stainless-steel appliance utilizes oxygen, moisture, heat, a plant-based additive, and an agitator to expedite the decomposition of food scraps.
zera.com

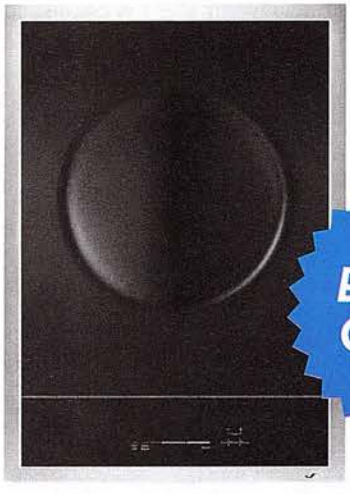
Best in Category



Spectra+ Touch and eTouch Showerheads

These oversized showerheads feature an industry first: capacitive touch technology that allows users to change spray patterns with the touch of a finger on the outside ring of the fixture itself. In addition, the Spectra+ eTouch showerhead comes with a first-of-its-kind remote that can be mounted on nearly any shower wall to offer easy control of the spray patterns for bathers with limitations of height or mobility.
americanstandard-us.com

"I like the fact that the **Zera Food Recycler** enables consumers to reduce food waste. It is innovative and environmentally conscious."
Sheila Bridges



Editors' Choice

Jenn-Air Induction Wok Module

This special induction module features a concave design to cradle the round bottom of a wok. By melding cookware with the heat source, induction technology offers fast, efficient cooking power—a sensor detects cookware before enabling the induction element, and, when the vessel is removed, it switches off after 30 seconds. The 15" module also features glass-touch electronic controls that provide a minimal look and near-flush installation with countertops.
jennair.com

Zaha Stone

With Zaha Stone, Neolith has created the look of Iranian Gray marble in sintered stone. Paying tribute to the late Zaha Hadid, Zaha incorporates a richer industrial-gray tone with white veins etched onto the backdrop in contrasting directions. Available in a silk finish in thicknesses of .24" and .47", the Persian-inspired stone can be used indoors or outdoors for countertops, flooring, walls, and facades in residential or commercial settings.
neolith.com/en

ASA-D2

Cosentino partnered with architect Daniel Germani on this contemporary freestanding outdoor kitchen. ASA-D2 features Dekton by Cosentino countertops, Brown Jordan Outdoor Kitchens stainless-steel cabinetry, and a grill by Caliber Appliances. A modular design allows access to storage on both sides of the unit. Finishes include an aged and oxidized steel, solid-black Calacatta-marble replica, and high-gloss white.
brownjordanoutdoorkitchens.com

Facades

Cladding | Moisture Barriers | Roofing | Glazing

Thermafiber SAFB FF

This new formaldehyde-free mineral wool insulation is the first available in North America and the first in a series of greener Thermafiber solutions being rolled out by Owens Corning. The new products are tailor-made for architects building to green standards. Made of 70% recycled content, the noncombustible batts can be used in wood- and steel-frame structures and are available in 2.5- and 4.0-pcf densities as well as a full range of sizes. Thermafiber SAFB FF is Living Building Challenge–compliant and Greenguard Gold–certified.
thermafiber.com

StonePly Waterjet Finish

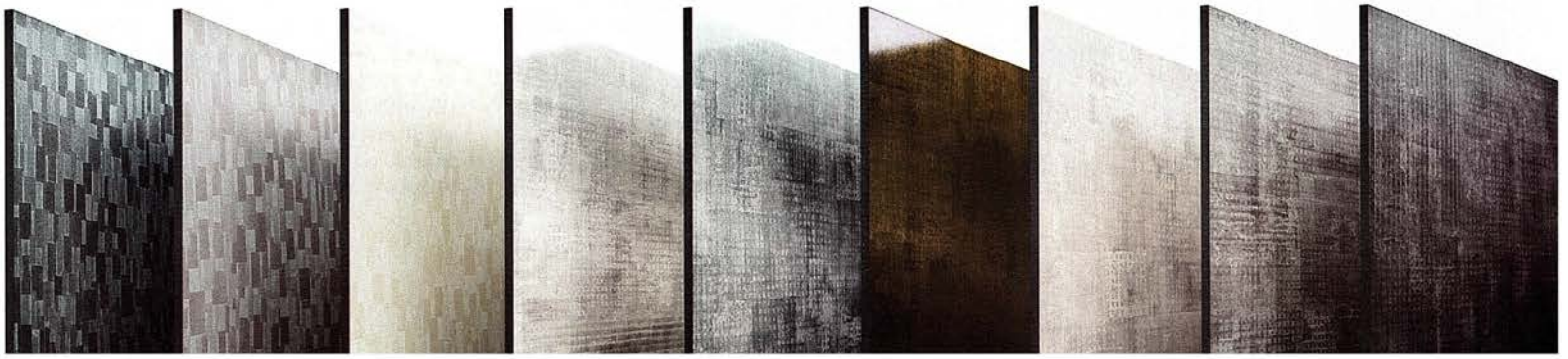
A finish that enhances the stone facing without diminishing its strength is the latest offering from StonePly. The waterjet technology provides a versatile design alternative to flamed and bush-hammer treatments that can degrade the material's appearance and structure. An aluminum-backed panel further preserves the natural substance's strength.
stoneply.com

Precision Series Highline

This update of the original Precision Series HWP wall panels adds heft: new Precision Series Highline panels are 1⅜" thick, which facilitates dramatic shadow lines on a building's facade. The small manufacturing change can offer architects a big visual effect. Available in 45 colors, two widths, and seven rib patterns, the aluminum or steel panels can be attached in a conventional manner or with a clip system.
pac-clad.com

Trespa Meteon Focus

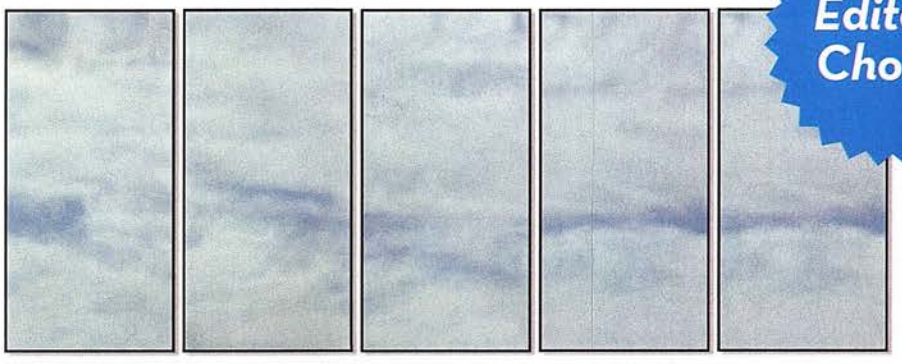
In four sizes and three thicknesses, the new Meteon Focus collection of Trespa panels features wood-based fibers, resins, and surface layers, laminated under high pressure and heat, that are easily cut and machined. Suitable for horizontal and vertical exterior applications, the Focus collection is fire-retardant and impact- and weather-resistant.
trespa.com



Editors' Choice

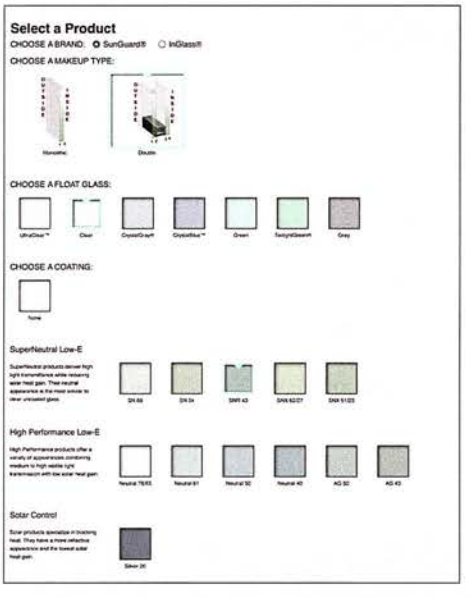
VRE-43

Suitable for use on laminated, insulated, and screen-printed glass, and a variety of tinted substrates, VRE-43 is a colorless solar-control coating that helps achieve lower heat-gain goals while providing ample transmission of daylight. Its low interior and exterior reflectivity preserves design aesthetics, and its VLT and SHG ratings improve occupant comfort and reduce energy costs.
viracon.com



Fusion

Pairing an aluminum structural frame with durable polycarbonate panels creates a turnkey design solution for canopies, transit shelters, and other exterior constructions and assemblies. The translucent polycarbonate panels, produced by 3form, are offered in 92 colors, three finishes, and three thicknesses. The framing can be custom finished.
duo-gard.com



Sustainability Calculator

This manufacturer-specific calculator simplifies the process of evaluating Guardian glazing makeups for sustainability program credit (LEED, WELL Building, Living Building Challenge, etc.). Users enter basic project details, add the products or product combinations desired, select the green program of interest, and click for an eligibility analysis.
sustainabilitycalc.guardian.com

NewBrick

Lightweight, thermally efficient extruded polystyrene forms the basis of this engineered-brick veneer from Dryvit Systems. It's reinforced with a fire-resistant fiberglass embedded in a modified cement coating designed for additional fire resistance, and finished with a textured, colorfast acrylic. Can be installed over a variety of substrates, including concrete, masonry, and Portland cement plaster.
dryvit.com

"For years, we've asked for a formaldehyde-free mineral wool. It's great to see **Thermafiber SAFB FF** on the market."
Jamison Guest

Finishes

Walls | Ceilings | Flooring | Coatings

Rust

Speaking to the current popularity of industrial weathering steel, Rust employs an innovative proprietary process that transfers pattern, texture, and actual rust from metal sheets pressed against resin interlayers that are then encapsulated in glass or 3form's Varia. It comes in two versions: Forge, which spotlights the weathering of metal via dark streaks and marbling, and Oxide, showcasing a mottled reddish-brown pattern with a smoother appearance.
3-form.com

Traceless Laminate

Fingerprints can mar matte surfaces, but Wilsonart has developed a solution by infusing fingerprint-resistant technology into a new super-matte laminate. Silky to the touch, Traceless Laminate comes in five neutral colors and 0.039"-thick sheets of 4' x 8' or 4' x 10'.
wilsonart.com

Archoterra

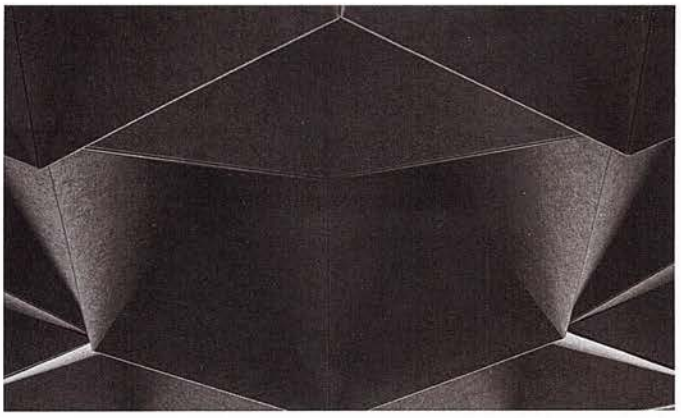
This new material, composed of recycled paper and ecofriendly bonding agents, was developed by Eric Rosen, architect of this issue's House of the Month (page 35). Archoterra is a surface solution that can be applied like veneer or laminate to walls, ceilings, and furniture. This lightweight and affordable product comes in 4' x 8' sheets with a thickness of 1/16" to 1/2". It is available in 38 colors, 12 dimensional patterns, and a smooth or textured surface.
archoterra.com

Glowing Metals

Chemetal has expanded its existing portfolio with new layered textures, colors, and finishes ranging from Brushed Bronze and Rose Gold to tartan-like grids and painterly dots that evoke Seurat paintings. Meanwhile, new embossed patterns have a geometric bent and a reflective surface composed of thin metal foil bonded with high-pressure laminate—with 75% recycled content—making them greener and more affordable than other decorative sheet metals for interior walls and ceilings.
chemetal.com

Ultra Spec Scuff-X

Typically, a high-performance, scuff-resistant coating requires builders to premix two components, but this product requires no second ingredient. The single component is applied as a washable, low-VOC interior latex paint, ideal for high-traffic areas such as corridors, stairwells, and public restrooms where scuff marks are common. Scuff X also boasts antimicrobial properties and comes in more than 3,500 Benjamin Moore colors.
benjaminmoore.com

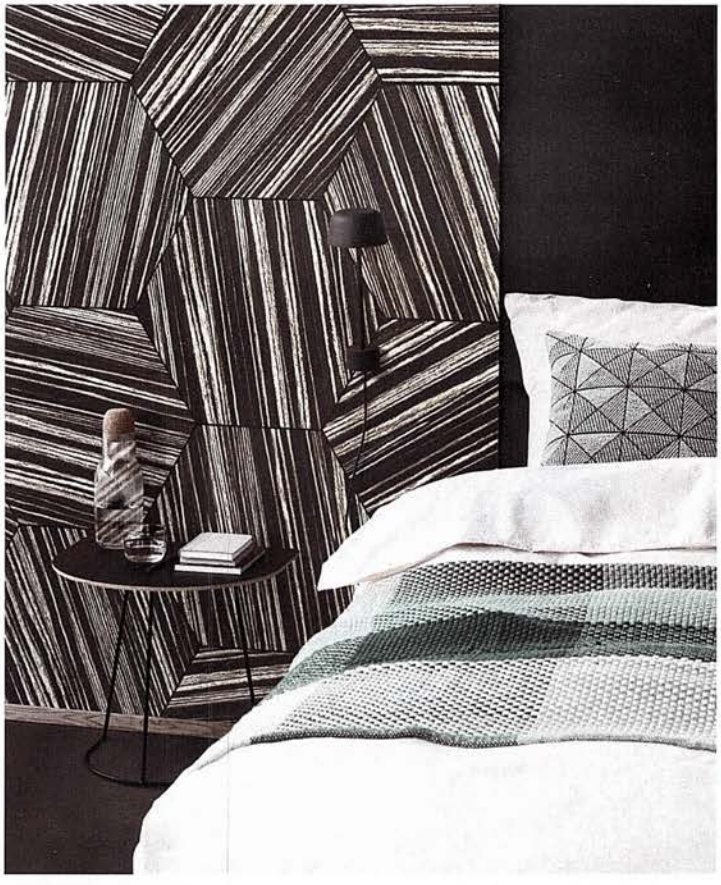


SoundStar

Defined by hexagonal coffers, this ceiling system consists of 12"- or 24"-deep modules made of a proprietary acoustical felt composite (100% PET plastic with up to 60% recycled content). Specifiers can mix and combine more than 30 colors, ranging from neutrals to vibrant hues, to achieve desired performance and aesthetics. SoundStar has an NRC rating of up to 0.90 and Class A or C fire rating.
arktura.com

HeartFelt

Collaborating with architects Schmidt Hammer Lassen, Hunter Douglas has developed a lightweight linear wall and ceiling panel system that helps control noise. The rigid felt bars are thermoformed polyester and attach to brackets for mounting or suspension. Spacing between them provides NRC ratings of 0.50 to 0.70. HeartFelt is Class A fire rated and available in a choice of 12 colors that can be mixed and matched.
hunterdouglasarchitectural.com



Mio

This series of hexagonal porcelain tiles is a new take on traditional parquet. The exotic, safari-inspired asymmetrical striations combine patterns found in nature, earth tones, and ebony wood. The approximately 16"-diameter tiles come in three colorways—Acero, Noce, and Palissandro—and are suitable for wall and floor applications in residential or hospitality settings.
nemotile.com

Fractal

As the latest addition to Smith & Fong's wall-panel range, Fractal plays on geometry and the isosceles triangle, while offering complete customization. Architects can design and preview an entire wall using an online tool: select a carved pattern for each 24" x 24" x 34" triangular panel, a color, and then configure the layout. The panels contribute to LEED and have Class C fire rating, but can also be specified in Class B or A in FSC 100% certified bamboo.
plyboo.com

"**HeartFelt** is a creative application of a common material that successfully achieves the same acoustic performance as the ubiquitous lay-in acoustic ceiling-tile system."
Carrie Moore

Building Systems & Components

HVAC | Special Equipment | Devices| Controls

Best in Category

Climate Control Zoning System II

Building on its original product, Uponor's updated wireless system features new technology that calculates how much energy is required to adequately heat a room with a hydronic radiant-floor system. This results in faster reaction times and greater energy savings compared with similar heated-floor systems. The package includes a base unit, expansion module, and digital or dial thermostat.
uponor-usa.com

Editors' Choice

Schindler InTruss Escalator Modernization

This latest version of Schindler Elevator's 9300AE Escalator Replacement system makes shiny options—including new LED lighting, steps, decking, skirts, newel end caps, handrails, and powder-coated balustrades—possible to install without replacing the existing truss, regardless of its original manufacturer.
schindler.com

"**InTruss** was a favorite because reusing an existing escalator's truss is an efficient and sustainable solution for the client."
Jamison Guest

Ecodrain V1000

The V1000 vertical drain system essentially recaptures heat from outbound water to preheat the incoming cold water, reducing the amount of energy a home uses in the process. Constructed of standard copper tubing, it uses a turbulator that changes the way water flows and increases the heating rate to boost efficiency while maintaining water pressure. It comes in two diameters and several lengths.
ecodrain.com

Flex-Wall Flood Barrier Systems

Extreme weather makes this point-of-use barrier a wise investment for many buildings. The flood-mitigation wall by SmartVent + ILC Dover, of layered Kevlar and other flexible materials, is built to deploy vertically or from the side to protect small areas and entire building perimeters. Other components are ground anchors, trench covers, and attaching posts.
dryfloodproofing.com

CONTINUING EDUCATION

In this section, you'll find 14 compelling courses highlighting creative solutions for tomorrow's buildings brought to you by industry leaders. Read the course, and then visit our online Continuing Education Center at ce.architecturalrecord.com to take the quiz free of charge to earn credits.

Photo courtesy of dormakaba

Innovative Design Trends for Health-Care Environments

Sponsored by AD Systems, AMBICO Limited, dormakaba, Clickeze® Privacy Systems, a division of Inpro®, and SIMONSWERK North America

AC IN PM — CREDIT: 1 AIA LU/HSW

Photo courtesy of Won-Door Corporation

Horizontal Sliding Fire Doors: Architectural Design Freedom

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LS IN PM — CREDIT: 1 AIA LU/HSW

A New Era of Exterior Sealants

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BE PM SU — CREDIT: 1 AIA LU/HSW

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Detailing Continuity in Building Enclosure Systems

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Powder Coating: Plenty of Durable Options

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Translucent Daylighting Facade Systems

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Solutions to Help Control Legionella

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New and Affordable Surface Options for Housing

Sponsored by FORMICA GROUP

IN PM RE — CREDIT: 1 AIA LU/HSW; 0.1 IDCEC CEU

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Digital Fabrication and Natural Stone

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In the Eye of the Storm

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Bathroom Design: The Differentiating Factor

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Improving Concrete Durability with Crystalline Technology

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Spray Polyurethane Foam: The Evolution of Building Insulation

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Beyond Airtightness: Factors to Consider When Selecting an Air Barrier

Sponsored by Dow Performance Silicones

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Courses may qualify for learning hours through most Canadian provincial architectural associations.

CATEGORIES

- **AC** ACOUSTICS
- **BE** BUILDING ENVELOPE DESIGN
- **EM** ELECTRICAL AND MECHANICAL
- **IN** INTERIORS
- **LS** LIFE SAFETY AND CODES
- **PM** PRODUCTS AND MATERIALS
- **RE** RESIDENTIAL
- **RR** RENOVATION AND RESTORATION
- **SI** SITE INFRASTRUCTURE DESIGN
- **ST** STRUCTURAL
- **SU** SUSTAINABILITY

A new wave of innovative building products, such as these manual sliding ICU doors used at the Winslow Medical Center ER, help create modern, patient-friendly, efficient health-care environments.

Photo courtesy of dormakaba

Innovative Design Trends for Health-Care Environments

From doors, hardware, and access control to rolling shades and flexible walls, the latest design advances make a positive impact on patient care and facility ROI

Sponsored by AD Systems, AMBICO Limited, dormakaba, Clickeze® Privacy Systems, a division of Inpro®, and SIMONSWERK North America

With health care dominating the news cycle every day, it's not surprising that for most people, the topic first elicits thoughts of rising costs, insurance quality and affordability, and your provider's credentials. But, increasingly, architects, construction professionals, and owners are considering how the building design aspects of health systems are critical components in order to improve the quality of care and deliver it at a lower cost by operating more efficiently, improving patient outcomes, and increasing patient satisfaction.

According to a recent article in *Building and Environment*, "In recent years, the effects of the physical environment on the healing process and well-being have proved to be increasingly relevant for patients and their families (PF) as well as for health-care staff…Healing environments can be considered as 'smart investments' because they save money, increase staff efficiency, and reduce the hospital stay of the patient by making the stay less stressful."[1]

Building product manufacturers are taking the lead and meeting this growing demand for innovative solutions for health-care facilities. This course will examine a range of products—including doors and framing, hardware, window treatments, and flexible wall protec-

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Define the benefits of sliding door systems for health-care environments, including efficiency of space, acoustics, privacy, and aesthetics.
2. Identify a variety of door and frame products/materials that are especially beneficial in health-care design and construction.
3. Explain the use of accessible floorplans and access control to provide safety and security in health-care environments.
4. Describe advances in door hardware, specifically hinge systems, and how they can aid in medical facility functionality.
5. Discuss how wall protection, curtain tracks, roller shades, and daylighting can provide added value and efficiencies within a health-care setting, specifically behavioral health facilities.

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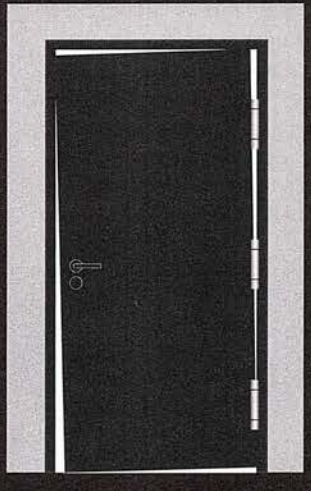
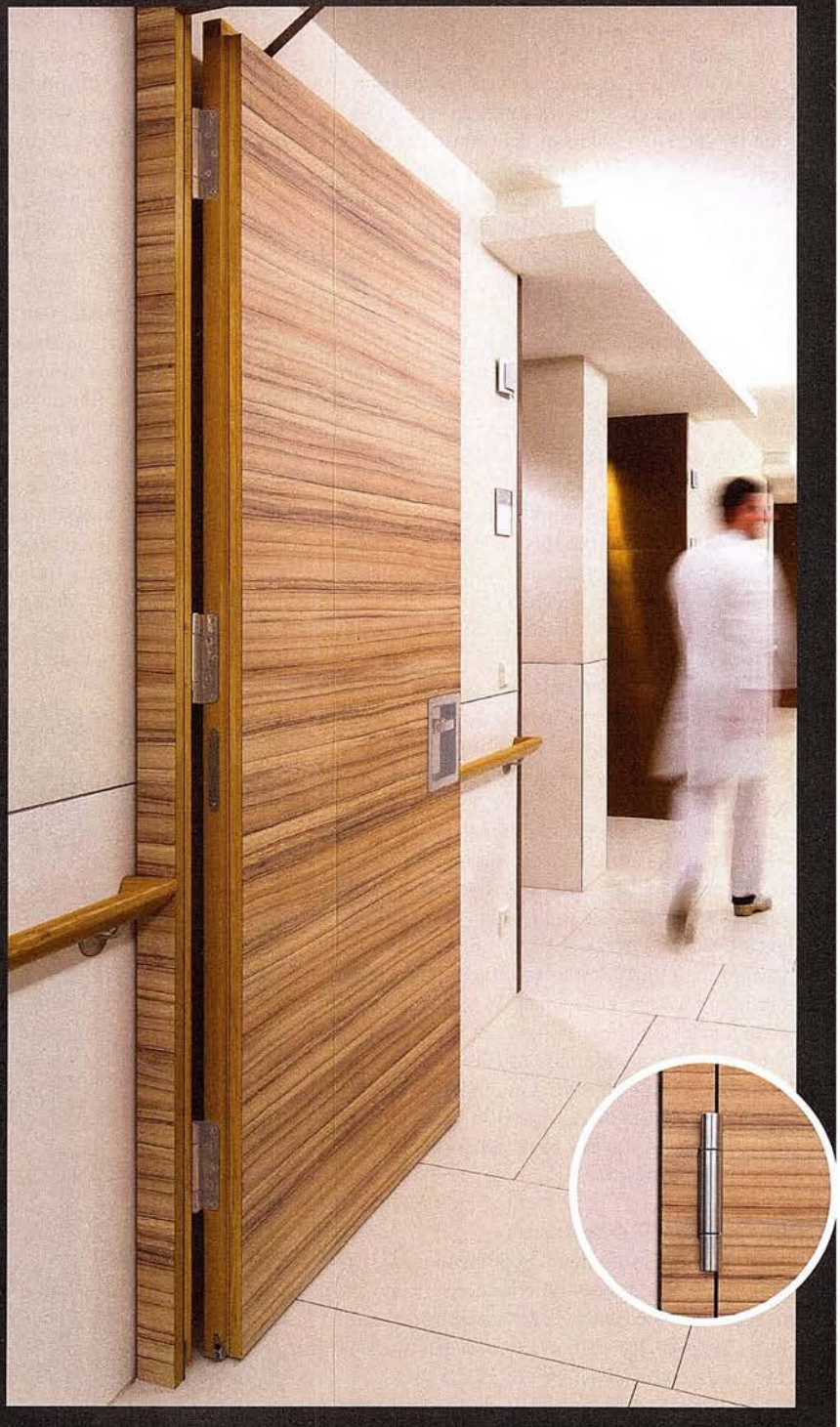


Standard Commercial Hinges

SIMONSWERK 3-Way Adjustable Hinge Systems



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tion—and how they can aid in creating safe, structurally sound, efficient spaces that not only bring about patient satisfaction and optimal healing environments but also impact the owners' bottom line.

DOORS AND FRAMING

Health-care settings—everything from multi-facility hospital systems to medical office buildings and local clinics—all share several common goals and challenges. Increasingly, governing boards, invested shareholders, and owner-partners are keeping a watchful eye on building practices so as to keep operating costs down while increasing patient volumes and their access to quality care. Regardless of the venue, efficiency is at the center of every decision. Designers and facility managers are constantly looking for ways to bring their buildings in line with these ideals, and the right doors and frame products can be an integral part of the solution.

Sliding Doors

Modern door products, especially sliding door systems that include a complete door, frame, and hardware assembly, can make an important contribution to clinic design and ROI through the efficient use of space.

The latest sliding door systems have been designed to cater to the specific demands of health-care environments and address issues of unique concern in medical settings, such as acoustics, cleanability, hardware options, smoke ratings, and reliability.

According to door experts at AD Systems, a manufacturer of specialty door and hardware solutions for commercial and clinic settings, "Contemporary, purpose-built health-care sliding doors for interiors can address health-care facilities' challenging intersection of needs. These facilities are tasked with providing greater accessibility to differently abled people while maintaining efficient and reliable performance for busy staff. This requires products of a high quality with long lifespans that require minimal maintenance and guard against facility down-time for repairs or other issues. It is also essential that these sliding doors in health-care settings offer smart usage of available space and maximum sound abatement to protect patient privacy, all while being pleasing to designers and users' aesthetic sensibilities."

Benefits of Sliding Doors

Architects and professional building managers have many types and styles of interior doors from which to choose for medical facilities. Sliding doors can be a simple, smart solution that provides numerous benefits, some of which are outlined below.

Use of space: Sliding doors allow more exam rooms to fit into the same floor plate and provide a more efficient layout of individual rooms. When doors slide rather than swing out, an average of 14 square feet of valuable square footage is freed up for accommodating medical teams, furniture, and equipment. Health-care sliding doors, by their very nature, are designed to be unobtrusive, hugging the wall when open and gently gliding into place when closed.

Visually appealing: Sliding doors are generally thought of as an aesthetic upgrade that gives clinics a more modern, less institutional feel. Health-care sliding doors are available in a variety of materials and styles (example: flush wood or plastic laminate door leaves; clear, frosted, or decorative glass; or special features such as integral blinds or lead shielding) and will fit most budgets and décor. They may also employ a durable concealed roller system that provides a low-maintenance, smooth glide over their life cycle. Door frames may wrap the wall openings to protect them from wear and tear and give a long-term professional appearance.

Increased performance: Many sliding doors are designed so that performance is not compromised, i.e., architects can specify sliding doors with good acoustic performance (for instance, some newer products feature acoustical seals at all four sides for maximum and acoustical performance and acoustical design that addresses sound leakage at the lead and jambs), smoke ratings, locking and latching hardware, and a full range of decorative finishes.

ADA compliance: Some manufacturers offer sliding door systems that are ADA compliant in terms of operating force and clear opening dimensions. Products may include ADA-approved thumb-turn locks with occupancy indicators or keyways and self-latching doors options with handles that can be operated with only one hand. Another example would be sliding doors with soft-close features that offer protection to younger or slower fingers and that stop nerve-jarring slams.

Door and Frame Products

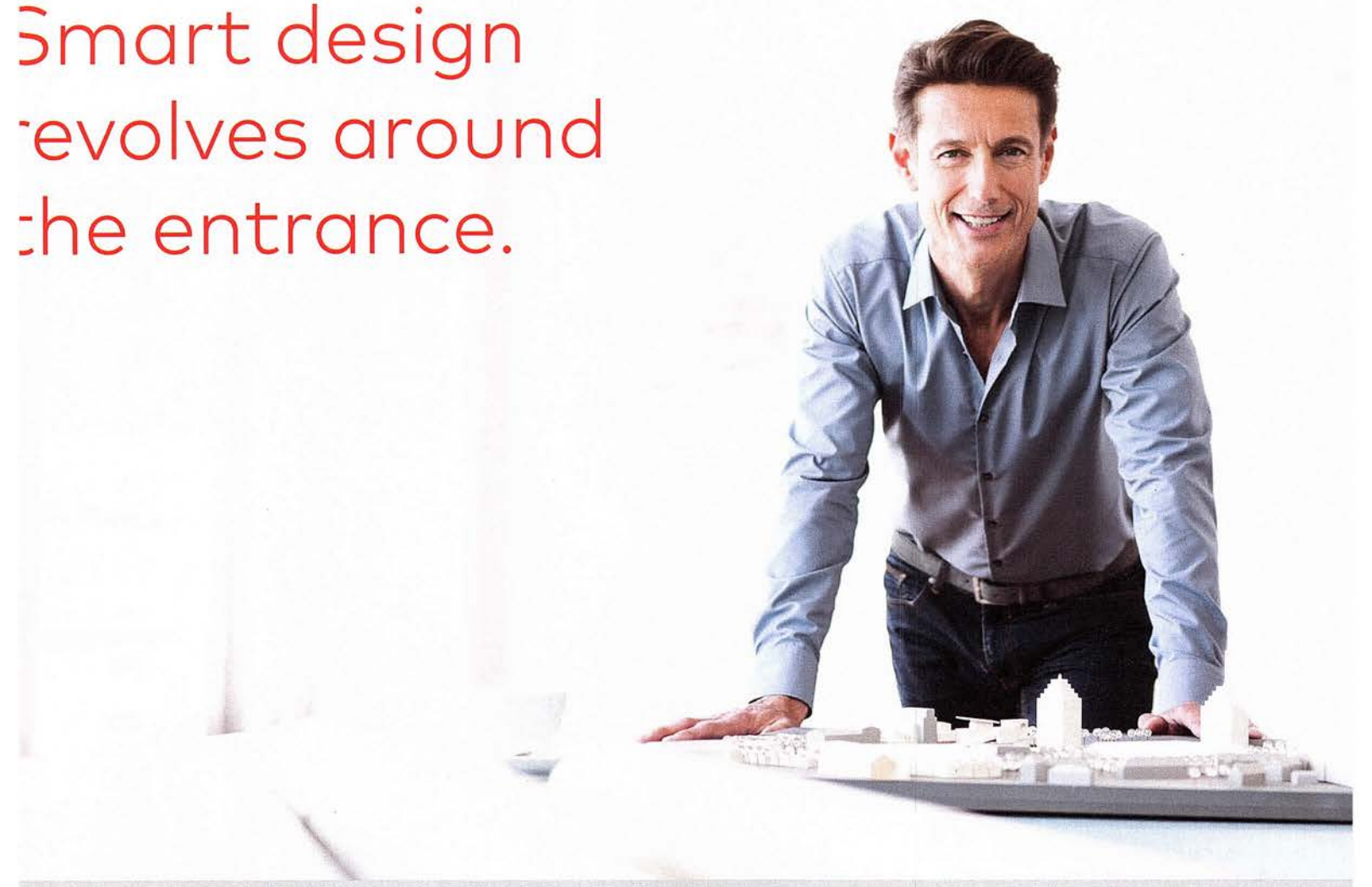
There is always a need for affordable, cutting-edge products for evolving health-care applications, and door and frame products are often part of a complete health-care solution. Manufacturers, more and more, are anticipating the ever-changing challenges of increased security, patient and staff privacy, and microbial contamination. Additionally, the containment of radio wave and radiation interference in hospitals and clinics for X-ray rooms, PET scan theatres, or modern cyberknife clinics is essential. The use of high-security wood doors for patient rooms in behavioral health facilities provides a warm feel while maintaining a safe environment for patients.

The design and manufacturing of performance-leading door and frame products (such as acoustic resistant, bullet resistant, stainless steel, lead lined, radio frequency, and security wood doors) can add tremendous value. Stainless steel frames specifically are often used on patient rooms, and frames and doors are commonly found in operating and labs areas. According to Steve Peterman, director of sales and marketing, AMBICO Limited, "Today's

Photo courtesy of ZGF Architects © 2016 Doug Scott

Today's sliding door systems are designed to serve the demands of health-care environments, such as acoustics, cleanability and reliability—among others.

Smart design revolves around the entrance.



terior Lobby

Main Entrance

One World Trade Center
285 Fulton St, New York, NY

Architect: David Childs
Skidmore, Owings & Merrill

Crane Series 4000
All Glass Revolving Doors

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manufacturers must support architects by offering superior products and service to meet the often-demanding performance requirements associated with the built health-care environment."

Some of the door and frame types that are popular for use in health-care facilities include:

Acoustic doors: Acoustic steel doors and frames are available that combine outstanding sound transmission loss with the appearance of standard hollow metal products. Such doors can be provided complete with acoustic steel frames, perimeter, and bottom seals. Acoustic wood doors and steel frames set the global standard for sound transmission loss. It is recommended that doors and frames be tested as a unit and supplied with acoustic perimeter and bottom seals. Wood doors are available in virtually any veneer species and cut to match other standard wood doors on a project. Custom stain or clear coat finishes are also available to match the appearance of commodity wood doors.

Radio frequency steel doors and frames: These door and frame assemblies should meet combined radio frequency standards. Assemblies shall be provided complete with perimeter gasketing, which is essential to product performance in the field. Materials can include mild steel or stainless steel formats to meet a wide variety of applications.

Bullet-resistant doors: Some manufacturers offer bullet-resistant steel doors and frames that are secure from ballistic attack yet have the appearance of standard hollow metal products. Many bullet-resistant products on the market can be furnished with factory-installed bullet-resistant glazing. Another option is bullet-resistant wood doors and steel frames, which can combine ballistic security with the appearance of standard wood door and steel frame products. Wood doors are available in virtually any veneer species and cut to match other standard wood doors on a project. Custom stain or clear coat finishes are also available to match the appearance of commodity wood doors. These products also can be furnished with factory-installed bullet-resistant glazing.

Lead-lined steel doors and frames: These are useful when there is a need to combine protection against radiation with the appearance of standard hollow metal products. Manufacturers offer fire-rated and non-fire-rated products. Materials here also can include mild steel or stainless steel, depending on the application.

Stainless steel doors and frames: These are used in health-care facilities where there is a demand for an extremely high level of cleanliness. Frames are readily available for use in ICU and operating room environments. Frames and doors can be custom designed and produced in alloys 304 and 316 with a wide range of finishes available.

Security wood doors and steel frames: These openings offer state-of-the-art security where patient or personnel security is a key concern. Offering a warm feel and a secure and safe environment for patient rooms in behavioral health facilities, these security openings include anti-ligature and anti-barricade hardware, providing safety and emergency access to patients at all times.

ARCHITECTURAL OPENINGS AND ACCESS CONTROLS

Access control for architectural openings is another important management tool providing safety and security in health-care environments. In fact, electronic access control

Photos courtesy of AMBICO Limited

Wood bullet-resistant doors in steel were used in the emergency areas of the 72-bed Major Hospital, a general medical and surgical hospital located in Shelbyville, Indiana.

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Photo courtesy of dormakaba

Access control strategies are vital to providing safety and security for health-care facilities.

hardware and software can be an important touchpoint in the design of health-care facilities, in conjunction with openings with automatic sliding doors (including all-glass sliding doors and operators). Some product types that are being used currently include exit devices, door closers, cylindrical locksets, and electromagnets for hold-open systems.

As health-care facilities are complex and evolving environments, a well-considered access control strategy can be an enhancement, not an obstacle, to effective building performance in terms of ADA, fire codes, and occupant security. Furthermore, product and system specifications are integral to the definition of spatial boundaries and controlled movement through the entirety of a building. Effective application can correct issues in the present and provide adaptability in the future.

The bottom line is that for health-care facilities, the complex concepts of health, safety, and welfare are inextricably intertwined. Every health-care-related facility has a responsibility to provide a sterile, physically safe, and secure yet accessible managed environment in order to effectively conduct its daily operations.

For a successful project, it is imperative that the architect or designer become familiar with the latest products, standards, guidelines (including ADA), codes, and technologies specifically impacting the design and management of health-care facilities. Managing access and security and maintaining a sterile patient environment should always be top of mind in any health-care project.

According to Rick Ruppert, manager of architectural services at dormakaba Access Solutions Americas, "The inter-connectivity of access control, security, and even environmental systems now occurs at every scale. Something as complex as touch-free credentials activating automated doors that prompt a temporary HVAC override while the medical team makes its way to an emergency operating theater can be realistically accomplished. Once there, discrete recognition by the pharmacy cabinet security controls can create a virtual dispensary with highly exclusive access. Fundamentally, it all communicates through the same shared system."

Door Openings and Functionality

Beyond access control, architects must also recognize the importance of maintaining the functionality of a door or opening and how to design a health-care building with that functionality in mind. Oftentimes, this means finding the right hardware.

One new product type to help meet this goal is a three-way adjustable hinge system, which has been used successfully in Europe for many years in high-frequency institutional, commercial, and industrial applications, such as office buildings, schools, hospitals, and airports. Typically, continuous hinges are used in applications requiring robust hinges in North America. However, now there is a hinge system of a similar durability with an additional three-way adjustability feature.

Rudy Kessler, CEO of SIMONSWERK North America, explains, "Nearly every hinge in any European health-care facility is adjustable. When I moved to the United States, I saw the difficulty in maintaining a common commercial door. I wondered why they were going through such trouble and saw the opportunity for adjustable hinges. With recent advancements, there is now the ability to bring this type of system to a North American market and educate the architectural community on how adjustable, heavy-duty hinges can simplify the overall maintenance of an opening."

WALLS AND CURTAINS

Flexible Wall Protection

Beyond doors and door hardware, walls and wall protection is another area of importance in designing successful health-care facilities.

Photo courtesy of SIMONSWERK North America

The correct door hardware, including hinge systems, can be a key factor in maintaining functionality within a health-care facility.

SPECIALIZED DOORS & FRAMES FOR HEALTH CARE ENVIRONMENTS

AMBICO manufactures performance leading door and frame products designed specifically for the built, health care environment. In business for over 60 years, AMBICO anticipates the ever-changing challenges of increased security, patient privacy, microbial contamination as well as containment of radio wave and radiation interference in hospitals and clinics.

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Photos courtesy of Inpro

Antimicrobial cubicle curtains were installed at the new Parkland Hospital in Dallas.

Roller shades can offer numerous benefits—from allowing in natural light to providing patients with a greater sense of control of their environment.

As an example, there is a trend toward flexible wall protection with products that offer the ultra-durable performance of rigid sheet wall protection but in a flexible product, and are also available in an assortment of patterns and colors to match any décor.

A new generation of products is now available that combine the flexibility to become the showpiece of any interior, yet are durable enough to handle the harshest environments. Thomas Larwa, senior product manager at Inpro, explains the trend, noting, "Until now, designers have had to either compromise the look of their design with a traditional product or sacrifice preserving interiors for aesthetics. There are products in the market today, such as specialized flexible wall protection, that offer the aesthetic of wall covering but are very resilient."

Antimicrobial Protection

Further, these products are not only able to resist the wear and tear that walls in health-care facilities receive, but they also fend off stains (and even graffiti), which can be removed completely from the surface, without damage, using the strongest of standard liquid cleaners. Silane-based antimicrobial fabrics are used for privacy and shower curtains, helping to fight odor-causing bacteria, mold, and mildew, along with the superior stain resistance mentioned above and being liquid repellent—making them ideal for cubicle curtains, shower curtains, window treatments, and bedspreads.

Another option being employed is the use of snap-panel curtains, which allow for easy change-outs of soiled panels. Both antimicrobial fabric and snap-panel curtains reduce the need for major laundering of curtains. When combined with standard track, these curtains are the better choice over certain proprietary curtain systems that end up locking the end user into higher-cost products, which can be very expensive over time. The idea is to help keep a facility cleaner and avoid higher expenses to do so.

Curtain Tracks and Privacy

Bendable privacy curtain tracks are another option, allowing curtains to be placed in any configuration. An additional benefit is the track and carriers are quieter, which can be an added benefit to a hospital's overall noise-reduction program to help speed healing.

FENESTRATION, DAYLIGHTING, AND CONTROLLING HEAT GAIN IN BEHAVIORAL FACILITIES

The final topic we'll discuss here are products that aid in maximizing the benefits of daylighting and also control heat gain. As our main example, we'll take a look at roller shades and the benefits they bring to health-care settings, with a specific focus on mental health/behavioral facilities.

Roller Shades

The benefits of roller shades lie in the ability to take advantage of daylighting and control heat gain, while still allowing for an outdoor view depending on the fabric's openness pattern. In addition, allowing patients to adjust the level of light or brightness increases their sense of control.

Experts note that it is important to select shades specifically manufactured for use in behavioral facilities. They should feature:

- enclosed security roller boxes,
- cordless operation,
- durable fabrics that are easy to clean but difficult to damage, and
- locking devices that resist tampering by patients. On this last point, cordless roller shades can be much more cost effective and offer lower maintenance than encased blinds.

Printed roller shades: Printed roller shades provide all the same benefits but go a step further. Again, the introduction of nature scenes has a benefit of reducing patient stress. An additional benefit of healing window treatments is that they reduce destruction where framed artwork is not allowed. There is anecdotal evidence from administrators at several behavioral health facilities that patients tend to not vandalize window shades in spaces where printed shades were installed. Patients appreciated the printed images and were less likely to damage or destroy them, due in part to decreased anxiety.

Continues at ce.architecturalrecord.com

flexible

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Baylor McKinney Medical Center - McKinney, TX

Baylor McKinney, a $195 million, 469,000 square foot medical center, was in search of a flexible solution to protect their design and patient privacy; and Clickeze® Privacy Systems had the answer. Formatrac® Bendable Cubicle Track accommodates almost any design, enabling easy installation and maximizing privacy protection.

At Clickeze®, we cover your facility's most essential privacy needs by making and installing innovative solutions to ensure people feel comfortable. With professional installation and contemporary designs, our cutting-edge products are designed to protect health, safety, comfort and privacy, so you and your guests can feel at ease.

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PRODUCT REVIEW

Innovative Design Trends for Health-Care Environments

AD Systems

© Aaron Leitz/ZGF Architects

AD Systems ExamSlide™

ExamSlide™ is a sliding door system designed specifically for the unique needs of health-care projects. ExamSlide™ can be customized with wood or aluminum and glass doors, a range of sizes, smoke-rated and acoustic performance options, and ADA-compliant locking and latching hardware.

www.specadsystems.com

dormakaba

Photo courtesy of dormakaba

ED100 Automatic Swing Door Operator

The versatile ED100 from dormakaba can function as either a low-energy operator or a power-operated pedestrian unit. This complete factory-engineered door system is ideal for ADA-compliant entrance applications. With a multitude of adjustable features, you have the flexibility to fine tune the operator to meet opening requirements.

www.dormakaba.us

AMBICO Limited

Photo courtesy of AMBICO Limited

Bullet-Resistant Wood Doors and Steel Frames

The Major Hospital in Indianapolis required bullet-resistant doors for personnel and patient safety in the emergency room and surrounding areas. All assemblies had to comply with UL 752 ballistic standards. AMBICO's ability to provide standard and custom side lites and borrowed lites proved critical to providing complete and effective solutions on the project.

www.ambico.com

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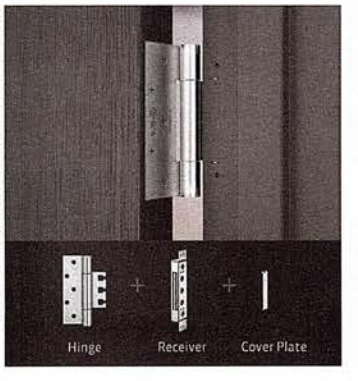
Formatrac® Bendable Cubicle Track

Easily eliminate the hassle associated with traditional track installation and design with Formatrac® Bendable Track. It can be bent by hand on the job-site so installation is simple. Additionally, because of its flexible nature, Formatrac can accommodate virtually any design. Quiet, too, thanks to our patented track and carrier design.

inprocorp.com/clickeze-privacy-systems

SIMONSWERK North America

Image courtesy of SIMONSWERK North America



VARIANT: The Adjustable Hinge System for Commercial Doors

The VARIANT series offers three-way adjustable hinge systems for wide, heavy-duty doors that require a robust and stable hinge. After being used successfully in Europe for many years in high-frequency commercial applications, this proven concept has been tailored to fit the needs of the North American marketplace.

www.simonswerk-usa.com

Photo courtesy of Won-Door Corporation

The ability to curve horizontal sliding fire doors provides the architect with endless design possibilities.

Horizontal Sliding Fire Doors: Architectural Design Freedom

Special-purpose horizontal sliding accordion or folding door assemblies allow freedom of design while meeting egress requirements found in IBC and NFPA

Sponsored by Won-Door Corporation | *By Karin Tetlow*

Since successfully passing Underwriters Laboratories (UL) fire-rating tests in 1977, self-closing horizontal sliding accordion-type doors have long been sought as a solution to meeting fire requirements in certain applications. But 20th century codes did not accept them as a complete solution for meeting fire and building code egress regulations. Design professionals were often required to specify standard wood- or steel-framed hinged swinging doors to serve as emergency exits and to separate internal spaces. Since 2000, however, significant code changes have greatly expanded the use of horizontal sliding door systems. Today, these systems are universally accepted as meeting both fire and building code regulations in virtually any application.

Continues at ce.architecturalrecord.com

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Describe the functioning components of horizontal sliding fire door assemblies and explain the practical safety benefits as compared to traditional vertical rolling door systems.
2. Assess the design implications of specifying sliding fire doors in commercial buildings.
3. Identify the building and fire codes that regulate sliding fire doors, particularly egress requirements found in IBC and NFPA.
4. Discuss the typical features of a horizontal sliding fire door system that contribute to both design flexibility and practical means of egress.

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A New Era of Exterior Sealants

New technologies allow sealants to provide better adhesion to the wide range of building materials used in modern construction, and they are longer lasting for improved durability

Sponsored by OSI | *By Andrew A. Hunt*

The building envelope is the vertical, horizontal, and sloped plane where the interior and the exterior of a building meet. This includes floors, crawl spaces, ceilings, windows, doors, the wall and roof assemblies (consisting of framing and insulation), and areas around plumbing pipes and electrical wiring. The building envelope is a comprehensive system that, when properly designed and installed, protects the building from unwanted water intrusion, controls air movement between conditioned and unconditioned spaces, and greatly improves the energy efficiency of the building.

To properly seal a building envelope, the key is to treat the entire structure and building envelope as if it is one system. If any part of the system is compromised, the seal of the entire structure can deteriorate and cause serious and costly damage.

Continues at ce.architecturalrecord.com

Andrew A. Hunt *is vice president of Confluence Communications and has been a writer and consultant in the green building and building science industry for over a decade. He has authored more than 100 continuing education and technical publications as part of a nationwide practice.* ***www.confluencecommunications.com***

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Explain the building envelope and the role it plays in improving energy efficiency, indoor air quality, and durability.
2. Discuss how modern sealants play an important role in creating a successful building envelope.
3. List the different attributes, characteristics, and classifications associated with high-quality sealants.
4. Compare the advantages of modern sealants over traditional sealants relative to shrinkage, UV resistance, and protection against dirt and dust collection.

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AIA COURSE #K1712T

Photo courtesy of Huber Engineered Woods, LLC © 2017

In order to assure the continuity of the water, air, thermal, and moisture barriers in building enclosures, detailed attention is required at changes in wall and roof surfaces, transitions, and openings.

Detailing Continuity in Building Enclosure Systems

Integrated products and proper detailing help maintain air, water, and thermal barrier integrity

Sponsored by Huber Engineered Woods, LLC | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

The role of the building enclosure is to provide proper separation between the building interior and the exterior. Beyond the structural enclosure, separation is accomplished through the use of four primary types of barriers: water-resistant barriers (WRBs), air barriers, thermal barriers, and vapor retarders. All of them are intended to restrict or control the passage of a targeted item (water, air, heat, or moisture) through a roof, wall, or foundation system. While this can seem fairly straightforward along flat, continuous surfaces, it is the noncontinuous conditions that present design and construction issues. These can include transitions from one material to another, penetrations, or interruptions caused by planned openings such as windows and doors, or changes in surfaces such as roof/wall junctions or parapets. Proper design and specification details of all of these areas is critical, particularly in wood-framed exterior wall assemblies to reduce the risk of compromising any of the four primary barriers. Understanding the choices and developing complete details as part of construction drawings is the best way to achieve integrity and continuity of the building enclosure barriers to create air-tight, weather-resistant enclosures that promote energy efficiency and long-term durability. This course will look at the continuity issues of the four primary barriers and present a series of drawings and details that can help accomplish these goals.

THE PRIMARY ISSUE: CONTINUITY OF BARRIERS

It's easy to write the word "continuous" on a construction drawing to describe any barrier in a building envelope, but that is hardly enough to

CONTINUING EDUCATION

1 AIA LU/HSW

1 GBCI CE HOUR

Learning Objectives

After reading this article, you should be able to:

1. Explain the four primary, code-based barriers that make up a building enclosure system for traditional and high-performance green and sustainable buildings.
2. Define the primary issues related to continuity of building enclosure barriers, particularly in wood-framed wall and roof assemblies.
3. Review the common choices for products and materials for building enclosure barriers, including critical transitional areas when using integrated sheathing to maintain barrier continuity.
4. Compare different drawing details and solutions for their use in wood-framed wall and roof assemblies for conventional and green/sustainable buildings.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

AIA COURSE #K1712D
GBCI COURSE #0920014917

assure that it will be achieved. The reality is that the building envelope and all of its details need to be designed and constructed to assure that all of the barriers are in fact continuous.

A common technique used in the process of commissioning building envelopes (yes, just like commissioning HVAC and other systems) is to look at a building cross section. Then, starting at the foundation level on one side, draw a line upward. At the first change in construction (i.e., an opening, a different construction assembly or material, etc.), draw a circle around it. Then continue on up the wall until the next change and do the same, and so on. When you reach the point where the wall meets the roof, draw a circle around that point too. Then continue along the line of the barriers at the roof level, at whatever pitch, and circle any changes in conditions there too. At the next roof/wall junction, draw a circle there and proceed down the wall in like manner as the other side until you reach the base of the foundation again. Every circle now represents an architectural detail that is needed to show how all of the barriers in the building envelope need to be treated to be fully continuous across each of the conditions encountered. If the building section is not representative of all possible cross sections of the building, (i.e., different sections are different heights, different massing, etc.), then building sections need to be looked at in the same way for those other areas, and the process of circling the details is needed there as well. Cases where there are offsets in walls or roofs or a change in materials used between sections will need attention. It is also important to address all typical and nontypical openings around windows and doors or penetrations for electrical and mechanical systems.

This process of identifying all of these areas for detailing is important to assure that air, water, heat, and moisture don't end up in places where they aren't intended. The integrity of each of the barriers is the only way to assure that doesn't happen. If any one of them become compromised, then the performance of the building enclosure is lessened below what was intended or predicted. In some cases, that may be a minor inconvenience to occupants who experience a slightly uncomfortable draft or cool surface. In other cases, it can lead to a slow deterioration that may go unnoticed from the outside but cause damage within the construction assemblies that shortens the overall service life of the enclosure. Such damage can also compromise the ability of the envelope to remain energy efficient (i.e., wet insulation with reduced R-values or unintended gaps that increase air infiltration), causing an increase in the need for energy to heat or cool the building. In the worst case, it can lead to functional failure of the barrier and/or the construction assembly. That can subsequently domino to damage other areas of the building, including deterioration of the structural system. If water and moisture get trapped around organic material, it can lead to mold and mildew that can have health impacts on the occupants. These outcomes are undesirable on multiple levels: they aren't good for the building, they aren't good for the occupants, and they aren't good for the professional liability of architects.

Hence, with all of the above in mind, let's first take a closer look at defining each of these barriers and then look at some details to address their continuity.

THE FOUR BARRIERS OF A BUILDING ENCLOSURE

The barriers of a building enclosure are based on good building science and the collective body of knowledge regarding current common construction techniques. This is particularly true in wood-framed construction, which continues to dominate most residential construction and a lot of commercial construction as well. In either case, the requirements for all of them are codified in the family of International Construction Codes adopted in most of the jurisdictions throughout the United States. The science behind the barriers are also each sophisticated enough to warrant specialty organizations that address them in multiple ways. We will look at each one briefly below, but keep in mind that there are many different products and solutions to achieve the performance and requirements cited. Further, as we will discuss, it is entirely possible to select a single product that provides more than one of the barriers, thus streamlining the specification and construction process with the possibility of achieving higher performance overall.

Photo courtesy of Huber Engineered Woods LLC ©2017

The IBC and IRC codes require a water-resistive barrier behind the exterior cladding plus a means for draining water along that barrier back out to the exterior.

Water-Resistant Barriers (WRBs)

The 2015 International Building Code (IBC) is very clear about the need for a WRB to protect the integrity of construction from bulk water (i.e., rain or other precipitation). Chapter 14: Exterior Walls, Section 1403.2 reads: "Weather Protection: Exterior walls shall provide the building with a weather-resistant exterior wall envelope." Further, it goes on to state here and in Section 1405.4, "The exterior wall envelope shall include flashing…[which] shall be installed in such a manner so as to prevent moisture from entering the wall or to redirect that moisture to the exterior. Flashing shall be installed at the perimeters of exterior door and window assemblies, penetrations and terminations of exterior wall assemblies, exterior wall intersections with roofs, chimneys, porches, decks, balconies, and similar projections, and at built-in gutters and similar locations where moisture could enter the wall." Clearly, the codes look at all of the same places that envelope commissioning agents do and that architects need to address.

The code doesn't dictate how the required weather resistance and flashing is designed (that is the role of the architect), but it does require the weather-resistant performance of that wall, specifically with the ability to be water resistant. Given that there are a multitude of choices on the market, it behooves an architect to have a source of information on the performance of the products and the relevant data on how to use them. One such source is the Sealant, Waterproofing and Restoration Institute (SWRI) which is a nonprofit corporation that defines it membership as "the leading commercial contractors, manufacturers, and design professionals of our industry. [The] Institute provides a forum for those engaged in the application, design, and manufacture of sealant, waterproofing, and restoration products that is beneficial to the membership and the industry," (www.swrionline.org).

One of the programs of SWRI is a product validation program that is designed to give an independent review and validation of the published test results of the various sealant, repellant, and coating products on the market. The stated intent of the program is "to provide specifiers and end users of [these] products an unbiased method to judge whether [these] products will perform at the levels of the manufacturer's published data sheet for that particular product." This can be very useful information when choosing a WRB and seeking to know if a particular product will perform as intended when applied to particular substrate surfaces as part of a specific construction condition.

Recognizing that there is more to continuity than just products (i.e., how they are used counts too), there are specialty consultants who focus on building enclosures. A nonprofit association

Photo courtesy of Huber Engineered Woods LLC ©2017

One way to add R-value to wall assemblies is to use single-panel sheathing systems with a built-in layer of continuous foam insulation integral to the back of the panel.

known as RCI describe themselves as "an international association of building envelope consultants. Members specialize in design, investigation, repair, and management of roofing, exterior wall, and waterproofing systems." These are the professionals who would likely be looking at the building sections and doing envelope commissioning in many cases. Their focus is on the best means to provide WRBs, roofing, and other protective surfaces for the building enclosure.

Working collaboratively to understand products and the way they are used by engaging organizations like those described above will help architects achieve the best set of WRB options for a particular building design. The goal should be to assure that the water resistance of a construction assembly performs as intended (i.e., shedding water or being fully water proof depending on the situation) without compromising or inhibiting the performance of other barriers in the assembly.

Air Barriers

An air infiltration barrier is required, not as part of the International Building or Residential Codes (IBC or IRC), but as part of the International Energy Conservation Code (IECC). It is typically placed along the plane of the exterior sheathing; however, it is worth noting that in a wood-framed wall with a multitude of individual materials and components, air infiltration can be difficult to control. The key to success lies first in the ability of a particular material to be considered a true air barrier. The codes rely on ASTM E2178: Standard Test Method for Air Permeance of Building Materials as the basis for determination. Hence, any individual material (or combination of materials) that can demonstrate compliance with this test showing a very limited air permeance can qualify as an air barrier material (maximum air penetration through a material at four-thousandths of a cubic foot per minute). The second key to the effectiveness of an air barrier is to look beyond the specific material and to its ability to be truly continuous as an entire system. That means any joints, seams, penetrations, or other breaches of the barrier need to be addressed in some manner as part of a total system. The codes then look to other specific tests; in this case, namely ASTM E2357: Standard Test Method for Determining Air Leakage of Air Barrier Assemblies and ASTM E1677: Standard Specification for Air Barrier (AB) Material or System for Low-Rise Framed Building Walls. Compliance is based on testing the entire assembled system, not just the individual materials in this case (maximum air penetration through an assembly at four-hundredths of a cubic foot per minute).

One of the leading sources for researching and testing materials and assemblies for air permeance is the Air Barrier Association of America (ABAA). It is a "national, not-for-profit trade association that consists of a wide cross section of stakeholders in the building enclosure industry. Its membership includes manufacturers, architects, engineers, trade contractors, researchers, testing and audit agencies, consultants, and building owners," (www.airbarrier.org). Using data and information from this organization can help identify both individual materials and assembled systems that will qualify to properly restrict air flow through a roof or wall. It can also provide information on critical areas to address in those assemblies through its education and certification programs for professionals.

Thermal Barriers

Code compliance for thermal performance is predictably based on the IECC and begins with identifying the climate zone for a particular building project. The building type (commercial or residential) then comes into play, and the IECC uses charts and tables to identify the minimum performance requirements for the entire building thermal envelope. Following this process, the prescriptive requirements of the IECC point out that, in many climate zones, it is no longer enough to simply provide insulation materials between wood-framing members. This is because the wood framing itself is known to compromise the effectiveness of the insulation. Rather, the code requires many wall and roof assemblies to use continuous insulation (ci) to reduce the effects of "thermal bridges" and help mitigate heat conduction through the wood framing (IECC C402 and R402).

Traditionally, the continuous insulation has been applied to the exterior side of the wall on one side or the other of the sheathing. The intent is to cover all wall framing, floor framing, etc. with a layer of insulation that is continuous around the entire building envelope. In most climate zones where this applies, 1 or 2 inches of rigid insulation (R-5 or R-10) is typically used. It is important to note that making ci truly continuous around the full envelope requires some attention to detail such that the interface of the continuous insulation on the wall meets and seals with the continuous insulation in the roof, floor, or basement.

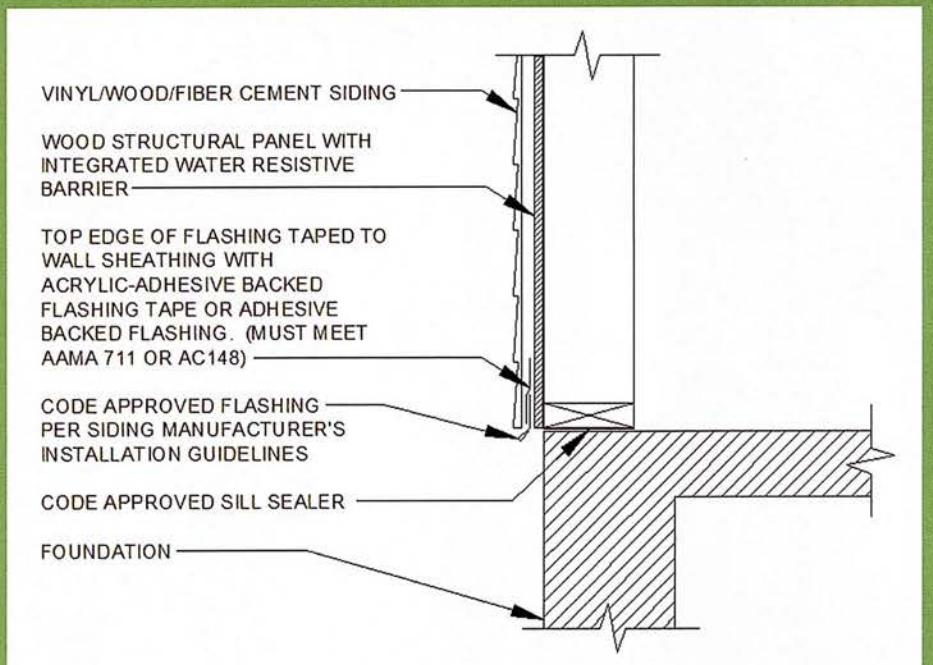
The amount of ci to use will be based on meeting overall building energy performance targets, either to meet code minimum levels or higher levels called for in voluntary standards, such as LEED or Passive House. Hence, computer-based energy models or similar methods will come into play to determine the predicted performance values needed (R-values or U-factors). How to achieve those levels is based on the type of insulation used and the way it is detailed into a construction assembly. Most commonly, rigid foam insulation of different types is used and needs to be adhered or attached to the sheathing. Combination products that include engineered wood sheathing and rigid sheathing in one product are also available, again simplifying the design, specification, and installation.

Vapor Retarder

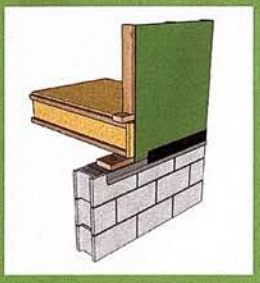
The IBC and IRC recognize that water vapor or air-borne moisture is different from bulk water. They also recognize the potential for damage to a wood structure from vapor condensing in an exterior wall and deteriorating construction materials through rot, rust, or mold. Therefore, the IBC and IRC require protection against condensation in the exterior wall assembly and go on to clearly require specific solutions to provide that protection. Although the determination for applicability and type (identified as Class I, II, or III) of the vapor retarder is determined by the IECC climate zones, the requirement for its inclusion remains in the IBC/IRC. In the climate zones where the vapor retarder is required, it is called for on the "interior side of frame walls," typically meaning on or behind the finished interior surface of the wall.

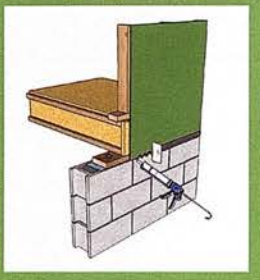
There is one caveat regarding vapor retarders in that a significant code exception exists in regard to the use of lower permeance Class I and II vapor retarders in the colder climate zones 5, 6, 7, 8, and Marine 4. Specifically, the exception applies if plastic foam continuous insulation is used outside of the studs in these zones since the ci will warm the stud cavity above the typical dew point. That means there is less chance of condensation in the wall cavity so less interior vapor control is required. The amount of ci used that triggers this exception varies based on the climate zone and whether 2-by-4 or 2-by-6 insulated framing is used. If the wall design meets the stated criteria, then a Class III or more permeable vapor retarder is all that is called for.

Images courtesy of Huber Engineered Woods, LLC © 2017



DETAIL 1: FOUNDATION TO FRAMED WALL





Foundation walls and wood framing are typically aligned with each other in the same plane. The seam between the wood and foundation construction is a weak point in air and water barrier continuity that needs to be addressed. While sill sealers are common, their effectiveness can vary. Further, flashing is often needed at this joint to assure that water, which finds its way down the face of the sheathing, has a place to safely exit out and away from the wall assembly. A typical detail showing a flashed wood-framed wall on a concrete slab foundation is shown in the above diagram. The middle image shows a wood-framed floor resting on a CMU foundation wall with the wall sheathing extending past the floor structure down to the top of the CMU in typical fashion. At the wall/foundation joint, metal flashing is installed to direct water away. Using integrated sheathing in this case means that the sheathing surface provides a continuous air and water barrier to the end of the sheathing. By also providing self-adhering tape over the metal flashing (effectively acting as counter flashing), the joint is sealed along the top of the flashing, assuring that water and air do not penetrate along this top flashing edge. Placing sealant under the flashing will further strengthen the seal along this joint. The foundation should then be treated with separate coatings to assure that it meets the criteria for water and air resistance. In this way, all water and air barriers are run up to each other and are indeed continuous.

An alternative is shown in the bottom image using liquid flashing. In this case, the framing is adjusted so that the outer face of the sheathing is aligned with the outer face of the foundation wall. This would allow for continuous insulation to run up from the foundation, continue past the floor framing, and up along the wall, thus creating a truly continuous insulation condition. However, the joint where the wood framing meets the foundation wall still needs attention to be sure that any wayward air or water does not penetrate. In this case, liquid flashing can be applied as a coating across the joint and assure the continuity.

CHOICES IN BARRIER SYSTEMS

As with most design and construction systems, there are choices available in how to achieve each of the four building enclosure barriers and assure their continuity on and around a structural framing system. The conventional approach is to use a multi-product, multilayer solution where each of the four barriers is specified and installed as a separate layer in an assembly. This requires specifying multiple products that need to be compatible and performing multiple labor tasks, perhaps by different trades, during construction, all of which need to be coordinated. Further, to be assured that their installed performance will be met, the particular combination of products needs to have been tested to assure they meet all of the water, air, and thermal thresholds required for the assembly. There also needs to be proper detailing between the materials to assure the total system will work as intended.

As an alternative, there are integrated product solutions that have become available, most notably in the form of integrated sheathing. These products typically come in the form of engineered structural wood sheathing that can also provide at least two of the needed barriers with preapplied coatings that qualify as both a WRB and an air barrier. This means that a single, high-performing wood sheathing product can be specified, used as the basis of design, and installed by a single trade in the building. Such integrated sheathing systems rely on factory-created surfaces on the sheathing that can meet both air and water barrier requirements with a higher assurance of performance since they are installed under controlled conditions. In some cases, they can also include a thermal barrier of continuous insulation of differing thickness preapplied to the sheathing and ready to install. Overall, the installation can be simpler and quicker, reducing the amount of labor and skill needed to create an effective end result.

Of course, such integrated sheathing products need to address the joints, penetrations, and openings, just like any other system, to assure continuity and effectiveness. In this case, that is achieved with compatible self-adhering tape, sealants, and even liquid flashing where appropriate.

Continues at ce.architecturalrecord.com

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Powder Coating: Plenty of Durable Options

Sponsored by SIERRA PACIFIC WINDOWS – A Division of Sierra Pacific Industries

Powder coating is a paint finish that is industrially manufactured in a powder form. Polymer granules are mixed with other ingredients and then broken down and milled into a fine powder. It is factory applied and cured, and applied to metal components or other materials such as medium-density fiberboard. Powder coating works well for a range of applications, and unlike liquid paint, powder coating does not require a solvent. It creates a thicker, more durable coating than conventional paint.

First developed in the late 1940s and early 1950s in Europe, the process of powder coating was in response to health and environmental concerns. At that time, liquid paints that contained solvents dominated the market, and the solvents polluted the environment and had harmful health effects on people. As stricter limits on industrial emissions came into play in the 1970s, powder manufacturing began to spread globally. A rapid growth phase in powder production began in North America and Japan in the early 1980s, and innovations in the application process led to increased transfer efficiency, reduced waste, and lower overall costs. The automotive, appliance, and industrial markets drove the developments as the sophistication of materials, manufacturing, and applications improved.

The general application of a single coat of a powder finish is economical and efficient. Application of powder coating takes one shot; single-coat applications are the most common method of powder coating and reduce time and energy. There are exceptions, however, when a two-coat system of powder coating helps create a special effect, such as a texture or pattern on the surface.

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Understand powder coating and its history.
2. Describe powder-coating application processes and their development.
3. Explain how powder coatings differ from liquid, and understand the environmental and health benefits.
4. Discuss architectural applications and testing.

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AIA COURSE #K1712K

Powder coating can be applied manually to the object, or the object can be run through an automated paint booth. The powder is applied electrostatically. The object can be coated in a powder-coating booth, which is computer operated with banks of nozzles. Stationary or reciprocating guns are used in automated application systems. The computer generates data about the length of the substrate and whether it needs to be sprayed on both sides.

The substrate is hung from a rack or conveyor that transmits a negative static charge to the material. At the tip of the applicator, a probe gives the powder a positive static charge as it is sprayed through the gun. This allows the powder to be attracted to the substrate and minimizes overspray. Once the substrate has been coated, the powder is then cured. The coated object is baked in an oven at temperatures ranging from 250 degrees Fahrenheit to 400 degrees Fahrenheit. This thermal cure forces the cross-linking of molecules in the resin to make the resulting thermoset coating system. The finished product is an object coated with a hard and durable powder-coated finish. Adding to the economic benefits, the base product for powder coating costs less than wet paint. While the cost to buy and run an oven to bake and cure powder coating can be high, the substrates tend to cool and be ready for use very quickly, in as little as 20 minutes. On the other hand, liquid paints can take days to dry and be ready.

Durability is another benefit of powder coating. Powder-coated products can be highly resistant to extreme weather conditions, impact, moisture, chemicals, and light. As an example of the relative durability, let's take the high-performance American Architectural Manufacturers Association (AAMA) 2605 exterior powder-coating specification. AAMA 2605 is the high-performance exterior specification for qualifying paints and finishes. These finishes are resistant to moisture, weathering, ozone, and UV radiation. An application for this finish would include architectural projects like bridges and structural load-bearing members that require long-term cosmetic and functional protection.

It's important to note that when the solvents from liquid paint evaporate, they can leave a porous surface that is less resistant to chemicals and industrial cleaners. Solvents that evaporate from liquid coatings also leave porosity in the dry film, which makes the surface less resistant to acid rain and industrial cleaners. Powder coatings are denser and provide better corrosion resistance than liquid coatings. Powder coatings typically have a higher buildup of film that offers improved chemical resistance. They resist scratching as shown by their performance under a pencil hardness test. Unlike liquid PVDF coatings, a thermoset fluoropolymer powder forms a hard, durable film to provide excellent scratch and mar resistance.

Another major advantage of powder coatings is the vast range of colors, glosses, and textures that goes beyond what liquid coatings offer. There is a wider aesthetic choice of finishes in an array of color schemes. Powder coating selection also includes a broad range of gloss

Environmental Issues	Liquid	Powder
Reclaim, reuse/recycle	No	Yes
EPA recommended	No	Yes
EPDs	No	Yes
Chrome pretreat	Yes	No
Chrome primer	Yes	No
Solvents	Yes	No
Toxic compounds	Yes	No
Toxic waste	Yes	No
Carbon footprint	Yes	No

Image courtesy of Sierra Pacific Windows

coatings—more than liquid PVDF coatings provide. Another interesting feature is that there is a good selection of contemporary textures and patterns for powder coatings. Finally, unlike liquid coatings, powder coatings leave vertical and horizontal surfaces more evenly covered.

Some examples of architectural powder-coating applications in residential areas include windows, doors, verandas, fencing for homes, and light posts in the neighborhood. The finishing of residential property can include such decorative considerations as trellises, umbrellas, and patio furniture. Other useful things from around the home that take powder coating are kitchen racks, lighting fixtures, handles, drawer pulls, and metal table and chair frames that can be streamlined or modernized with powder coating. Special ordering new colors and textures can help homeowners avoid throwing away old items to buy new ones. Instead, powder-coating businesses do custom work to update furniture in a home. Any electrically conductive metal or object that can withstand 400 degrees Fahrenheit can be powder coated. Powder coating offers a decorative, cost-effective, and environmentally friendly alternative to buying new items, simply by refinishing and giving new life to older products.

A final benefit is that powder coating finish is environmentally safe with green finishing technology. As a result, it can contribute toward LEED credits in a building project.

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Project: Element LA
Location: Los Angeles
Architect: Gensler
High-performance daylighting facades are possible using advanced systems that combine glare-controlled translucent light with customizable, thermally efficient, two-panel polycarbonate systems and nighttime facade illumination, as shown here.

Translucent Daylighting Facade Systems

When implementing a high-performance daylighting strategy, choose a total system that works best for each project

Sponsored by CPI Daylighting – A Kingspan Light + Air Company

By Peter J. Arsenault, FAIA, NCARB, LEED AP

One of the hallmarks of a green building is the use of natural daylight to create a positive quality of lighting for indoor environments. This feature, when coupled with appropriate electric light switches or controls, also has the added benefit of being able to reduce energy costs for artificial lighting. When electric lights are turned off, they don't generate heat, so less cooling is needed in a building. Hence, daylighting provides multiple benefits for people and buildings, but how is it best accomplished? New advances in building product technology now make it possible for architects to consider not only window openings for daylighting but the creation of entire daylit building facades. Further, understanding that clear-view glazing is not necessarily the first choice for good quality daylighting, investigation into other options using translucent glazing is warranted. Such translucent systems offer better glare control, higher thermal performance, and easier maintenance compared to clear glass systems. This course will explore some of these systems and the ways that they can contribute to innovatively designed, high-performing buildings that are fully code compliant, green, and sustainable.

DAYLIGHTING EVOLUTION

Incorporating natural light into buildings has been part of design and construction since primitive times and has continued throughout all historical time eras in all parts of the world. So why is it seen as something new or different today? Because our building envelopes are different than in historical times.

Continues at ce.architecturalrecord.com

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CONTINUING EDUCATION

1.25 AIA LU/HSW

1 GBCI CE HOUR

1 AIC CPD CREDIT

Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the green building characteristics of translucent building envelope systems using high-performance, multi-pane insulated panels.
2. Investigate the design potential and innovative opportunities to create buildings that use translucent facades for natural daylighting and energy-use optimization.
3. Assess the multiple ways that translucent building envelopes and glazing systems contribute to green and sustainable design.
4. Specify insulated translucent wall panels in a variety of green and conventional buildings, and formulate appropriate selections related to specific applications.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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GBCI COURSE #0920014920

All images courtesy of Watts Water Technologies

Solutions to Help Control Legionella

Different water treatment systems are effective at reducing the risk of Legionnaires' disease outbreaks

Sponsored by Watts | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Legionella bacteria is a harmful pathogen which, if inhaled, can lead to a very severe form of pneumonia known as Legionnaire's Disease (LD). The legionella bacteria grows in water with moderate temperatures, which means any building with water systems is a potential breeding ground for the bacteria and an outbreak of LD. After years of research and development, the Centers for Disease Control (CDC) and the American Society of Heating, Refrigeration, and Air-Conditioning Engineers (ASHRAE) have developed protocols and standards to help avoid outbreaks using proper water management. That management requires that design professionals work with facility owners and create a specific water management plan for the facility. The successful implementation of that plan requires some specific water treatment solutions for reducing or eliminating the risk of an outbreak. There are a number of choices that can be made in this regard, and this course will review some of the main solutions available along with some of the pros and cons of each.

LEGIONELLA OVERVIEW

Outbreaks of legionella bacteria can cause LD in any setting but is a particular concern in health-care facilities (hospitals, nursing homes, long-term care) and hospitality buildings (hotels, motels, resorts). The presence of the bacteria can be widespread since it can grow in any part of a water system in a building that is continually wet, such as tanks, piping, fixtures, or water features. In order to infect a person, the legionella bacteria needs to be part of water droplets that become airborne in a manner of aerosol generation. If that infected moisture reaches a person's nose or mouth where it is inhaled and settles in the lungs, then it can sicken the person with LD. Since transmission of the bacteria in the water systems to humans requires it to become airborne, it can occur from things like showerheads, cooling towers, bubbling hot tubs, HVAC units, and decorative fountains. However, the legionella bacteria can form and grow before it ever gets to those places, which is why LD outbreaks are generally linked to water in large or complex water systems, including those found in health-care facilities and hospitality settings.

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the conditions that contribute to the development and growth of legionella in buildings.
2. Investigate the importance and makeup of a water management program as identified in ASHRAE 188.
3. Assess the solutions available to address legionella in water systems, including those that rely on heat, chemicals, or other means.
4. Describe the pros and cons of different water quality solutions that can be effective at reducing legionella outbreaks.

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Legionella bacteria is transferred to people through air-borne moisture from plumbing fixtures or air-handling systems.

When considering the impact of legionella, the CDC has been determined that LD is primarily a health risk for persons who are at least 50 years old, smokers, and those with underlying medical conditions, such as chronic lung disease or immunosuppression. Nonetheless, the disease can, in reality, affect anyone. According to the Mayo clinic and some other sources, many people exposed to legionella bacteria don't develop symptoms, but those who do may experience cough, fever, chills, shortness of breath, muscle aches, headaches, and diarrhea. In severe cases, it has also caused death. Treatment typically requires antibiotics, hospitalization, or other care. The CDC has been tracking the number of people who have been diagnosed with LD and have recorded anywhere between 8,000–18,000 cases annually since the year 2000. While the number of cases is disconcerting, even more so is the trend of growth in the number of outbreaks and infections. The CDC reports that in the United States from 2000–2009, the number of infections increased by a dramatic 217 percent. However, over the time span measured from 2000–2014, the increase has been an even more staggering 400 percent. Clearly this is a serious health concern, and one that comes with a significant price tag. The CDC tells us that the number of direct health-care dollars it costs in the United States to treat a single case of Legionnaire's disease is $34,000.

LEGIONELLA CONTROL

Due to the seriousness of the disease and the linkage to water systems in buildings, ASHRAE has been at the forefront of investigating an effective means of controlling the conditions that will reduce LD outbreaks. Following some initial work in the early 2000s, it published in 2015 an updated ANSI/ASHRAE Standard 188: Legionellosis: Risk Management for Building Water Systems. This document has become the accepted standard for a comprehensive water management plan for buildings where legionella control is sought. Specifically, it has been recognized by the CDC and The Department of Health & Human Services (DHHS) Centers for Medicare and Medicaid Services (CMS) as the basis for programs that they administer. In fact, federal funding for many health-care facilities, particularly those that receive Medicare or Medicaid for payment, must show compliance with an ASHRAE 188 Water Management Program (WMP) or risk losing payments.

A full WMP under ASHRAE 188 is based on a seven-step process that includes defining a full program team, survey/documentation of water systems, analysis of water systems, determination of control measures, monitoring, confirmation, and documentation. In order to be effective, the WMP needs to be ongoing and continuous, not just a one-time exercise. As such, it can be integrated into other building operations policies and procedures, but it must be able to stand on its own as a complete plan. The whole process requires confirmation and appropriate documentation that the water management program is being carried out and all activity is recorded and documented.

The key to a successful water management program under ASHRAE 188 is the formation of a dedicated team of the right people to be involved in carrying it out.

The ASHRAE 188 standard is proving to be an effective resource for building operations teams that need real guidance on reducing the risk of LD outbreaks. As a standard, however, it is focused on the process of creating, implementing, and carrying out a full water management program. It does not provide specific solutions for addressing water systems or offer any design components. Rather, design professionals (engineers, architects, etc.) are required to provide expertise on identifying and analyzing all aspects of the water systems. Then they need to recommend specific control measure solutions appropriate to the particular building and water system at hand. For full effectiveness, those same design professionals should be involved with ongoing aspects of the WMP.

Part of the plan requires ongoing monitoring and water testing for legionella bacteria and the means to address how it may or may not be transported within a water system. If monitoring reveals a concern, then corrective action must be taken promptly to eliminate it from the system. That means a series of corrective measures must be in place ahead of time to solve the problem immediately. It also means that the normal day-to-day operation needs to allow for ongoing preventative treatments to occur as part of standard operating procedures. That is where attention to all of the plumbing components and choices about their application comes into play, often requiring specialized knowledge of things like expansion/storage water tanks, water treatment systems, mixing valves, drains, backflow valves, etc.

In light of everything discussed above, the means to treat water on an ongoing basis as well as in the case of a corrective measure for a discovered presence of legionella deserves some special attention.

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When it comes to specifying products for interior surfaces in housing, architects and interior designers have a wide range of choices. Paper-based high-pressure laminate surfaces have recently made a comeback in the market for several reasons, including improvements in quality and style.

All photos courtesy of FORMICA Group

New and Affordable Surface Options for Housing

Paper-based high-pressure laminate surfaces make a comeback with improved quality and a flair for style

Sponsored by FORMICA GROUP | *By Rebecca A. Pinkus*

Warm. Modern. Professional. Whimsical. Whatever the design goal, interior surfaces establish a sense of place within the larger space, and surface materials play a huge role. A butcher-block countertop in a kitchen can present an upscale style, and colorful cabinetry mixed with custom ceramic backsplash tiles can offset a monochromatic countertop. Wood features may evoke the warmth of a traditional home. Newer, writable surfaces can turn a door into a chalkboard for children (or adults). The options and combinations are unlimited, especially with modern manufacturing techniques that can create engineered stone, thin ceramic, acrylic, and high-pressure laminate.

With so many surface options available, choosing the right material for a project can sometimes be challenging. This decision can be even more difficult when designing for larger multifamily residential properties, where both affordability and aesthetics are often a priority for investors, owners, and tenants alike. Fortunately, there are some great high-quality products on the market that are easy to install and care for, last a long time, and won't break the bank. These products let designers bring their creative visions to life. In this course, we're

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1 AIA LU/HSW

0.1 IDCEC CEU

Learning Objectives

After reading this article, you should be able to:

1. Understand the different surface options available when specifying for single-family and multifamily residential projects.
2. List the spaces and areas in residential buildings that are well suited for new and unique surfaces.
3. Describe the key characteristics and attributes associated with popular surfacing materials.
4. Explain why high-pressure laminate surfacing products are durable, on-trend, healthy, and affordable.

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IDCEC COURSE #CC-106881-1000

New or improved materials mean designers have a wide variety of options for almost every room in the dwelling, including countertops, cabinetry, permanent shelving units and bookcases, backsplashes, and doors.

Multifamily residential projects can pose a challenge for property owners as they try to balance economics with the needs of the occupants. Writable surfaces made of high-pressure laminate are durable and allow renters to add a personal touch to their apartments.

going to walk through a few of the more commonly used surface materials and highlight the newer and more affordable options available to architects and designers for residential design.

RESIDENTIAL PROJECTS

Specifying surfaces for residential projects can feel like an overwhelming task. Every material has its pros and cons, but once the client's needs and design goals are clear, architects and designers can have fun with the process. Not surprisingly, many clients may have a certain aesthetic goal in mind, but they also have questions about the cost, installation, durability, and even health features of common surface materials. These questions come into play for both single-family residential projects and multifamily residential properties, the latter of which incorporate multiple residential units as well as the public spaces within the property. After all, in multifamily residences, common areas such as entranceways and front lobbies are the first things prospective buyers or tenants see, and surface material choices can influence that first impression.

There's a strong case to be made for specifying durable, attractively priced surfacing products over more costly options in both single-family and multifamily residences. Surface choices are one area where costs can be reduced while keeping quality high. Where surface materials traditionally focused on more utilitarian purposes such as countertops and flooring, new materials mean designers have a wide variety of options for almost every room in the dwelling, including cabinetry, permanent shelving units and bookcases, backsplashes, and doors. Architects and interior designers now have access to a wide range of high-quality materials that are eco-friendly, aesthetically pleasing, durable, and affordable. Natural materials such as stone and wood are rooted in more traditional looks, but they can be prohibitively expensive. Man-made materials such as ceramics, acrylics, and high-pressure laminates provide more options, as some can be designed to resemble stone or wood at a fraction of the cost.

Single-Family Housing Needs and Expectations

Single-family housing needs vary tremendously in regards to what people expect based on what they can afford and how they plan to use the space. It's safe to say most people value materials that offer a combination of style and durability whether they are investing in the hottest new trend in interiors or simply looking for an affordable way to meet their interior design goals. Products that easily lend themselves to the do-it-yourself (DIY) crowd can be very popular, even if contractors do the installation work. And with the advances in both materials and design options, single-family homeowners now have almost limitless options for their interior designs—many of which are very affordable. Moreover, a lot of the more affordable options such as acrylic and high-pressure laminate surfaces have such a wide variety of colors, patterns, and designs that they may rival more traditional materials. And, newer trends in high-pressure laminates offer patterns that are almost indistinguishable from natural products (e.g., wood or stone), all while being highly durable and often much easier to maintain.

These characteristics of durability, longevity, affordability, and easy maintenance are often at the top of the list for single-family homeowners. Regardless of the surface material they choose, they want it to look good for a long time, require very little maintenance, and be part of a clean and healthy home. Products that meet those characteristics—all while being affordable—open the design options in ways that were previously more limited.

From the standpoint of architects and designers, stylish and affordable surface materials mean they can help their clients have the interiors they want, whether with bright, modern color choices or with faux stone or wood. And if it's a natural wood or stone look, they can provide the look without the challenges of ordering and installing expensive, heavy surfaces that require specially trained installers. Meanwhile, homeowners get the interior style they want, along with the knowledge that the surface materials will last for years.

Multifamily Housing Needs and Expectations

Multifamily housing, whether condos, townhouses, apartments, or senior care facilities, has recently been in high demand. These projects are filling urban areas across the United States. According to the National Association of Home Builders, the number of multifamily projects jumped 15 percent from 2014 to 2015, and around 383,000 multifamily units were started nationwide in 2016. While the growth rate dropped a bit between 2015 and 2016, the number of for-sale multifamily completions grew 225 percent, from 4,000 units to 13,000.[1]

Continues at ce.architecturalrecord.com

Rebecca A. Pinkus** is an independent communication consultant, writer, and editor focusing on the intersection of technology, environment, and human health. She has contributed to more than 35 continuing education courses and publications through Confluence Communications. **www.confluencecommunications.com

New digital fabrication techniques allow the eruption of fire and water from this natural stone fountain at City Creek Center in Salt Lake City. The stone manufacturer meticulously fabricated a total of 176 perfectly positioned holes for water jets and light fixtures and 49 holes for gas-fueled fire nozzles, providing the exacting precision required for this dramatic public space.

Photo courtesy of Martin van Hemert

Digital Fabrication and Natural Stone

Transformative digital technology now provides enhanced opportunities to choose natural stone for contemporary and traditional projects

Sponsored by Coldspring | *By Celeste Allen Novak, FAIA, LEED AP BD+C*

For more than 30 years, Sidney Hornstein, a geologist and environmental educator emeritus at the American Museum of Natural History, has provided tours for architects to walk through time by visiting some of Manhattan's iconic stone buildings and parks.[1] This tour of building stones in lobbies, on facades, sidewalks, and curbs provides a trip through time and across the globe. He identifies rock varieties from North America, Europe, Asia, South America, and Africa ranging in age from 1 to 3 billion years. From Rockefeller Center to the Empire State Building, these permanent icons of the city were also expressions of geological history. Natural stone used in buildings provides a record of prehistoric events and connects humans to the natural world.

Today, the curious can also take a guided walk through London, using an interactive map of natural stone in the urban setting. The walk directs observant geologists and curious design professionals to places where they can see crushed shells, bones, fossils of prehistoric reptiles, a variety of limestone seams, and granite crystals created by a meteor hit.[2]

The authenticity of a material has been a hot topic of aesthetic research and discussions from the beginning of the Industrial Age through the Modern era. In the "Seven Lamps of Architecture," John Ruskin argues for material structural and functional

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1 AIA LU/HSW

1 PDH, LA CES/HSW

1 LFA CEU

Learning Objectives

After reading this article, you should be able to:

1. Discuss the benefits in the design and specification for natural stone fabricated and installed through the adoption of precision digital technology.
2. Define new standards developed to measure, document, and verify efficient, sustainable practices throughout the life cycle of natural stone.
3. Identify key considerations in the selection, design, and specification of natural dimension stone to maximize performance, durability, and sustainability.
4. Explore innovative examples of natural stone used for its functional and artistic potential in buildings and landscapes around the country.

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LA CES COURSE #K1712C

purity. This document and others were the basis of continued design initiatives by Modernists and others to choose materials that were not imitations of the original material. When used as a contemporary cladding and not a structural system, natural stone retains its original unique characteristics. No two stones are alike, and the variations provide a wealth of creative opportunities.

In order to provide a change of light reflectance on buildings, walkways, and other exteriors, a monolithic surface needs to be manipulated. The surface of natural stone can be varied to change its characteristics. For example, granite may both sparkle in the sunshine or provide a mirror reflection of its surroundings.

Whether specified for a building facade or for exterior stairs, ramps, walls, fountains, and walkways, the performance, permanence, durability, versatility, resiliency, and beauty make stone a primary construction material for buildings and landscape applications that are meant to last for centuries when specified correctly.

Natural stone provides a connection to the environment and a history of human construction. This material is timeless and chosen by architects for buildings meant to last for centuries. Granite, limestone, marble, onyx, quartzite, sandstone, serpentine, slate, soapstone, and travertine are just some of the natural stones used in buildings.

Granite (from the Latin granum, or grain, signifying its characteristic structure), an igneous rock, was formed billions of years ago when magma cooled deep beneath the earth's crust. Nearly as durable as diamond, granite owes its density and hardness to its origins, solidified deep within the earth under extreme pressure. Marble (and its wildly varying relatives: travertine, limestone, and onyx) is a metamorphic form of limestone.

Granite is a hard rock suitable for use on exteriors for paving, walls, and building exteriors. Marble was formed when sediment and other materials forged together beneath the weight of heavy bodies of water. After millions of years, these crystallized minerals resulted in a natural stone that is typically white with streaks of color, capable of taking a hard polish. Different types of stone can be used for different applications depending on the technical properties and the applied use on a building interior, exterior, or landscape areas. All natural stone is classified as a nonflammable, Class A building material, and design professionals examine technical properties such as the natural stone's water absorption, compressive strength, and frost resistance before selecting a type of stone for their project.

There are many misconceptions about the use of natural stone. Architects may avoid this material if they feel that their creativity will be limited when using natural stone in contemporary design. This happens if they don't realize that this product can be used when designing complex geometric shapes. The following examples are proof that today's architects are applying natural stone in creative and inventive designs because of new digital advances in the stone industry as well as the timeless beauty inherent in this natural material. These architects, landscape architects and artists, are exploring the value of using various finishes and new fabrication technologies to achieve their aesthetic objectives. The following case studies demonstrate the many benefits of using natural stone as well as the new and creative ways that technology continues to enhance the way stone can be used.

Photo: © Amesse Photography

When constructing the new barrack at West Point, the design team chose to match the existing feel and color of the 200-year-old campus's gothic revival architecture. It chose two types of black granite in order to provide the Army with new campus structures that will last another 200 years.

IDENTICAL GRANITE + MULTIPLE FINISHES = UNIFIED DESIGN

Diocese of Wheeling-Charleston Campus Plan, Wheeling, West Virginia

Finishes bring variety and versatility to a project and can unify the design palette. Some fabricators have developed a wide variety of finishes that increase a designer's choices for applications throughout a project, both inside and outside.

Different finishes accent different surfaces, and they can be used as clues for wayfinding. For example, a different finish can indicate the approach to a bench, stairs, or object. A different finish can be used to help create a slip-resistant surface applied as a universal design principle or create a highly reflective, smooth surface that magnifies the stone's appearance.

The new Diocese of Wheeling Campus Plan in Wheeling, West Virginia, provides the first example of how a design team used the change of finish for both practical and dramatic effect.

Continues at ce.architecturalrecord.com

Celeste Allen Novak, *FAIA, LEED AP BD+C, is an architect, writer and planning consultant in Michigan.* ***www.celesteallennovakarchitect.com***

Built in part with FEMA funding, this tornado shelter at Ewalt Elementary School in Augusta, Kansas, can hold up to 600 occupants and doubles as a normal-looking classroom.

Photo courtesy of Schultz Squared Architects LLC

In the Eye of the Storm

Tested for code-required wind pressures and the latest impact resistance, highly engineered doors, shutters, and hardware assemblies are turning tornado shelters into aesthetic, functional spaces

Sponsored by ASSA ABLOY

In the wake of a series of tornado catastrophes in the past decade, industry associations, code-making bodies, and authorities having jurisdiction have rallied together to provide key guidelines and code requirements for storm shelters in school buildings and critical facilities.

In turn, the building products industry has responded with an assortment of impact-resistant doors, shutters, and hardware to protect occupants from the great dangers posed by winds of up to 250 mph, wind-borne debris, and other dangers created by the awesome and terrifying effects of Mother Nature.

TORNADOES LEAVING THEIR MARK

While tornadoes have wreaked havoc on vulnerable cities and towns in the United States for many years, a spate of particularly devastating tornado outbreaks in the past decade have served as a wake-up call to vulnerable tornado-prone areas.

Case in point, a series of 56 confirmed tornadoes drove through the South in the winter of 2007, beginning in Kansas and making its greatest impact on Enterprise, Alabama, where more than $307 million in property damages and significant loss of life occurred.

The single-most deadly tornado to date occurred in Joplin, Missouri, when an EF-5

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1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Understand FEMA P-361 recommendations and NSSA/International Code Council 500 requirements for tornado storm shelters for certain occupancies in tornado-prone areas.
2. Identify the various testing requirements for tornado-resistant products.
3. Discuss key information regarding the optimal location of tornado shelters.
4. Explain the evolution of bunker-like caverns into aesthetic, architectural spaces thanks to certified tornado-resistant door-opening assemblies.
5. Specify tornado-resistant doors, shutters, and hardware.

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tornado—the highest category—with more than 200-mph wind speeds killed 162 people, caused close to 1,000 injuries, and damaged or destroyed approximately 8,000 structures, affecting approximately 30 percent of the town of less than 50,000 people.

Then in Moore, Oklahoma, in 2013, 210-mph estimated peak winds took the lives of 24, injured 377, destroyed 1,150 homes, and left $2 billion worth of damage in its wake.

Unlike hurricanes—which are large weather systems that can last up to three weeks and give advance warnings of several days, giving time for residents to evacuate the area—tornadoes are short, intense storms, giving towns little warning of the impending attack. In fact, the National Oceanic and Atmosphere Administration reports that the average tornado warning is just 13 minutes.

"Compared with hurricanes and earthquakes, single tornado events typically affect smaller geographical areas but occur more often and cause more deaths," explains Ken Kilzer, SE, structural engineer, Olsson Associates, Omaha, Nebraska. According to the National Weather Service, "From 1950 through 2011, tornadoes caused about 5,600 fatalities in the United States, more than hurricanes and earthquakes combined over the same time period."

Photo courtesy of ASSA ABLOY

Estimated 210 mph peak tornado winds killed 24, injured 377, and destroyed 1,150 homes in Moore, Oklahoma, in 2013.

In comparison to hurricanes, tornadoes are much smaller, usually no more than a ½ mile wide, lasting from a few minutes up to an hour.

Putting things into perspective, James E. Waller, PE, director of engineering, Remagen Corporation, Monteagle, Tennessee, explains that the wind pressures and forces of a tornado on a structure are approximately four times as great as what engineers design for in coastal areas subject to Category 4 hurricanes, and nearly eight times as great for design of buildings in noncoastal areas.

Photo courtesy of Schultz Squared Architects LLC

This classroom at Garfield Elementary School in Augusta, Kansas, meets stringent FEMA P-361 tornado shelter standards and offers an attractive architectural design with a window thanks to a code-compliant shutter attached to the opening.

In addition to the structural damage incurred by extreme winds and flying debris, internal and external pressures induced by the winds can cause damage to buildings as well.

ENTER THE BUILDING CODES

In order to direct building teams to design and build spaces to protect occupants from tornadoes, the Federal Emergency Management Agency (FEMA) began conducting post-disaster investigations and found that many smaller, interior rooms were surviving, while the rest of structures were destroyed.

"The study of past storms and their affects have allowed engineers, meteorologists, and scientists to determine the wind speeds and debris impact requirements that are appropriate to use for the design of storm shelter structures," explains Jason Pirtle, PE, M.ASCE, president, Remagen Corporation, Jackson, Tennessee. "Since these load demands are greatly elevated from those used in typical buildings, the development of a Standard to specifically address shelters was needed."

Emerging from this FEMA research, the agency developed FEMA 320: Taking Shelter from the Storm: Building a Safe Room For Your Home or Small Business, first published in 1998, and FEMA 361: Design and Construction Guidance for Community Safe Rooms, first published in 2000, offering guidance for storm shelter construction. Incidentally, both FEMA P-320 and FEMA P-361compliance are required for building owners seeking construction grants from FEMA.

In May of 2002, the International Code Council (ICC) and the National Storm Shelter Association (NSSA) initiated a joint project to write a standard for the design and construction of storm shelters. A standard development committee was created, and the first meeting was held in May of 2003. The scope of the standard was established to provide minimum design and construction requirements for storm shelters that provide a safe refuge from storms that produce high winds, such as hurricanes and tornadoes. First published in 2008, ICC 500 became a referenced standard in the 2009 International Building Code (IBC). In the 2009 and 2012 IBC, shelter construction was voluntary, but in cases when a shelter was built, it was regulated by the standard.

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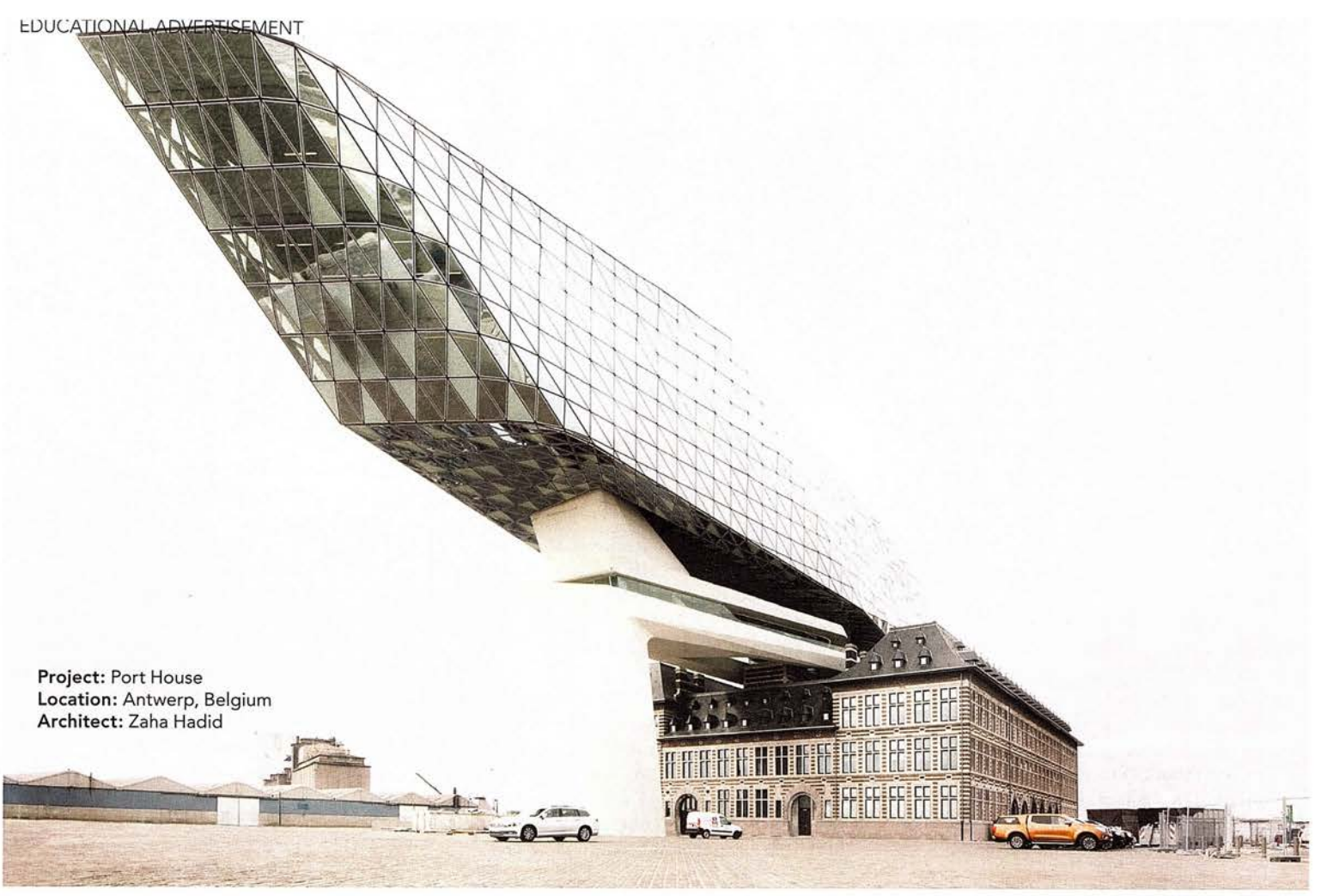

Project: Port House
Location: Antwerp, Belgium
Architect: Zaha Hadid

All photos courtesy ASI Group

Bathroom Design: The Differentiating Factor

How to help (or harm) your building's reputation with bathroom design

Sponsored by ASI Group | *By Amanda C Voss, MPP*

Thoughtful preservation of historic stonework. A sleek new glass facade married with modern steel elements. Your firm's latest project for one of the city's hottest restaurants is ready for its opening night. As a thank you, the design team is invited. Inside, the building glitters and the ambiance is perfect. You are commended by other guests on how well you captured the intent of the restaurateur. You are feeling very proud of what you have accomplished, until you overhear a few people commenting on how underwhelmed they were with the design and appointments in the washroom. The bathroom in this space could be the bathroom almost anywhere. Its aesthetic does not match rest of the building, materials feel cheap, and some of the layout is inconvenient. Overall, the design feels like an almost anywhere. You regret not allocating enough thought to this one very important space. Despite the initial positive impression created by the design, and the excellent dinner that follows, you leave with a bad taste in your mouth. But, it didn't have to be so.

Inherent in every project is the human experience, both aesthetic and functional, that occupants have within the building. Architects and owners frequently focus a great deal of attention on first impressions: facades, lobbies, and entryways. While storefronts can create a sense of awe and anticipation, the real working spaces that will generate lasting impressions are in the interior. For occupants that interact with a building on a daily basis, the restroom performs a crucial function and is also a lynchpin for perception, which can waterfall into their performance and

CONTINUING EDUCATION

1.25 AIA LU/HSW

1 GBCI CE HOUR

0.1 IDCEC CEU

Learning Objectives
After reading this article, you should be able to:

1. Discuss the importance of a restroom experience to building occupants and visitors.
2. Explain how functionality of restrooms affects not only perceptions of a whole structure but also the productivity and performance of its occupants.
3. Identify the elements of great bathroom design, and be equipped to defend against any negative design choices.
4. Describe how partitions and accessories support bathroom design and better understand the tradeoffs in durability, aesthetics, maintenance, user safety, and total life-cycle cost.
5. Understand the importance of collaboration on bathroom design with the building owner, manager, and manufacturer.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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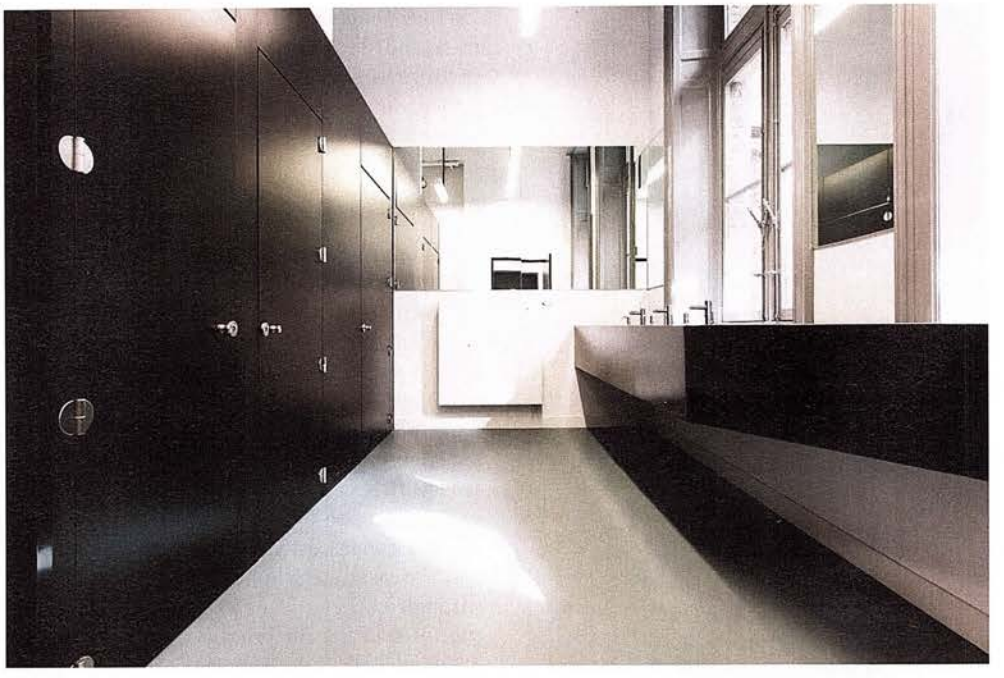

Iconic buildings deserve iconic washrooms.

productivity. For-first time patrons or visitors of a commercial space, the 'bathroom experience' can be the difference in whether they return or take their business elsewhere.

We inherently are asking people to do something very private in a public space, and almost all of our senses are engaged fully when we are in the bathroom even for such a short period of time. However, commercial restrooms are often relegated to an afterthought, a space designed and installed without a great deal of consideration for its impact on occupants and their experience. Bathrooms then become the weak link of the overall architectural experience of the building. Poor restrooms set a very negative tone and set back the occupants' perception of the entire building and business, regardless of how beautiful and functional the building may be in every other aspect. As many business owners know, the way their employees perceive the space in which they work is reflected in how they feel and perform.

Leon Shakeshaft, architect and partner, Arthur Gibney & Partners, Dublin, Ireland, notes, "Last year, I had the pleasure of having a private tour of one of New York's landmark office buildings. As I appreciated the architecture and the thought that went into the details of the building, I found a lack of harmony between the design choices in the bathrooms when compared to the rest of the building. At our firm, we recognize that all things being equal, the quality of bathrooms can be the differentiating factor when our clients seek to attract tenants. Good bathroom design does not have to cost more, but it pays great dividends."

"It's all about the restrooms!" proclaims Tom Peters in "The Little Big Things: 163 Ways to Pursue Excellence" (*Harper Business*, 2012). Why? Peters writes, "A sparkling restroom with family photos in a small restaurant in Gill, Massachusetts, shouts, 'We care.'" Therefore, "the devil—and a culture that demands excellence—really is in the details!" He continues, "To me, a clean and attractive and even imaginative loo is the best..."

QUANTIFYING THE BATHROOM EXPERIENCE: WHAT DO OCCUPANTS SAY?

People have very visceral responses to design decisions in commercial bathrooms. All five senses are engaged. Sounds in the bathroom play a very important role in how we feel. The way the bathroom looks aesthetically drives our perception of the space: Does the bathroom look clean and hygienic? Does it look like it is part of a cohesive design? Occupants expect that our bathrooms make them feel comfortable, safe, and private. Ensuring fundamental accessibility is crucial.

Restrooms impact building users in two primary ways: first, by their initial design, and second, by how they are maintained.

Design can either support or get in the way of proper maintenance. "Restroom cleanliness is always one of the top five drivers of customer satisfaction," reports Lysa Scully, Port Authority of New York & New Jersey. According to a survey by Zogby International, more than 80 percent of consumers would avoid a restaurant with a dirty restroom—not just avoid the restroom, but avoid the restaurant altogether.

An overwhelming majority—86 percent of U.S. adults—equate the cleanliness of a restaurant's restroom with the cleanliness of its kitchen, according to a Harris Interactive poll. The survey also revealed that 75 percent of U.S. adults would not return to a restaurant with dirty restrooms. Regardless of industry, clean restrooms directly impact a business's ability to attract and retain customers.

The poll drives home the importance of building user experience in the digital age. The survey found that 50 percent of people who encounter a dirty restroom would discuss it with friends and family. In today's highly visible and ever-prevalent social media platforms, patrons "discuss" this with a much wider audience than in yester year. These types of reviews can cost a business potential customers before many of them even set foot in the door.

Given the powerful impressions washrooms leave on consumers, businesses and building owners need to ensure that their facilities deliver.

A vast array of things—from bad lighting to too few toilets—may contribute to a user's negative experience in a bathroom. Empty or jammed toilet paper dispensers, poor sanitation, smells, lack of privacy, trash on the floor, and empty soap and paper towel dispensers are among top occupant complaints.

While poorly maintained and designed bathrooms have an outsized negative effect on a building, clean bathrooms can suggest many positive things to customers: a clean washroom is an indication that the establishment itself is clean; that the owner and manager pay attention to details; that the building's designer takes customers and their experience seriously; and ultimately, that customers can trust the business to take care of its customers.

The design and upkeep of a restroom plays a crucial role in shaping the kind of relationship formed between building designer, owner, and occupants.

QUANTIFYING THE BATHROOM EXPERIENCE: JUST WHY ARE BATHROOMS IMPORTANT?

Modern design seeks to be self-aware and occupant centric. Given these values, modern offices eschew cubicles and instead create flex space to encourage visual, verbal, and nonverbal social interactions between coworkers. The merits of this move to open plans and the resulting lack of privacy is debatable. For many, the lack of a private space is very detrimental, and it can be argued that open offices take away from the collective productivity of an organization. Regardless of the merit of lack of privacy in an office setting, as we continue using the theme of occupant-centric building design, it is even more critical that we pay added attention to the single most private spaces in any building. Whereas some people are just mildly uncomfortable in a public washroom, some suffer so extremely that they physically can't go in the presence of others. The public bathroom is a space that has deep-rooted behaviors and social rituals that we've all experienced, if not at the office, then out at restaurants, the mall, and airports.

Going to the restroom is a necessary element of everyone's life and work dynamic. With this in mind, *Work Design Magazine* (March 8, 2016) writes, "It will come as little surprise that thoughtful attention to the design and management of restrooms is more significant than often recognized. It offers the ultimate opportunity for employers and office managers to 'walk the talk' of a high-performance work environment."

Investment in spaces that are crucial to the occupant experience are seen as more transparent reflections of building owners' values. The design and upkeep of a restroom plays a crucial role in shaping the kind of relationship formed between building designer, owner, and occupants.

A 2011 study by John Goins, Center for the Built Environment, University of California, Berkeley, and Mithra Moezzi, Portland State University, shows that the organization that provides a bathroom that is thoughtfully designed and features materials that wear well will be more positively evaluated than those that don't. Poorly designed and managed spaces reflect poorly on the individuals and larger organization that provide them.

A University of Alberta study supports that "restroom cleanliness has a significant effect on people's perceptions of a building's overall cleanliness."

Washroom experiences are so important to occupants, there are even websites dedicated to restroom discussion. "The Happiest Potties on Earth" is an entire discussion board devoted to rating restroom experiences at Disneyland and California Adventure.

One-hundred percent of the opinion of the building can be affected by less than 1 pecent of the cost of the building. This is a profound statement. Proper design in the restroom can impact the overall experience and opinion of the building.

Changing stations at the Citifield Mets Stadium
One-hundred percent of the opinion of the building can be affected by less than 1 percent of the cost of the building. Proper design in the restroom—including the details, like accessories—can impact the overall experience and opinion of the building.

THE ELEMENTS OF GREAT BATHROOM DESIGN

Bathrooms designed for the optimal user experience can be the difference maker to the building owner who wants to rent space, or for the renter who wants customers to return and employees to perform at their best.

Practical considerations in bathrooms are crucial. Is the layout comfortable and accessible to a variety users? Does it accommodate higher traffic efficiently without sacrificing comfort? Does it accommodate strollers, wheelchairs, walkers, or luggage? Are the sightlines between partition walls and stall doors minimized? Does it have a cohesive style? Does is it look clean and hygienic? Will it be easy to maintain?

Today, most people living in developed countries expect privacy in the bathroom. Paradoxically, most bathrooms outside of private homes are designed for multiple, simultaneous occupants, writes Julie Beck in *The Atlantic*. Privacy and safety concerns are vital to a bathroom experience and must be addressed appropriately by the design team.

Touch and smell are critical to our peace of mind and play powerful roles in the perception of hygiene, cleanliness, and comfort. Particularly in public restrooms, occupants are hyper-aware of germs. The best design will carefully consider the surfaces an occupant has to touch and minimize contact with dirty surfaces. Are the fixtures touch free? Do the installed materials and fixtures promote ease of maintenanc and inhibit the spread of germs and bacteria?

Because every project is unique, recycling specifications is the greatest cause of poor restroom design. Convincing building owners and managers to invest care and protect the budget for restrooms is vital to preserving the occupant experience.

The first step is identifying the restroom's use based on building type and occupants. There are many different types of buildings and use cases. Each building needs to be viewed through a different lens to ensure that the right type of material and product are selected to optimize life cycle, create ease of maintenance, and ultimately provide the best customer experience. The types of products and materials used in bathroom furnishings for a university would vary greatly from that of a Class A office building, an aquatic facility, a restaurant restroom, or a high-frequency setting like that of a stadium or airport. Proper design reduces queuing, misuse, vandalism, initial costs, and maintenance costs.

High-demand facilities, like stadiums, that experience heavy volumes of users, must be designed to handle an extremely high volume of occupants. In this scenario, ensuring that the flow of the bathroom is seamless, allowing people to come and go while eliminating long lines, is crucial. There needs to be sufficient accessories, partitions, and flow to ensure that the

Project: Militiari Shopping Center
Loaction: Romania
Client: No Touch
Great bathrooms ask practical questions about user needs as well as aesthetics.

bathroom functions appropriately. If restroom facilities are poorly designed, sports fans may stand in line and miss part of the ballgame and have a negative experience with the stadium, team, and sporting event. Long lines can also have a negative financial impact on the stadium owners, private or municipal, as patrons waste time waiting in line for the bathroom, rather than waiting in line at a concession stand.

Shortfall in design often occurs when designers operate from a series of specifications that are either adopted from previous projects or are a part of an outdated master specification. ADA and building codes change, necessitating specification evolution to account for both changes in code and design requirements and the introduction of innovative products.

The design landscape is ever evolving, and relying on the past is not necessarily the optimal solution for a building owner. Even in a "budget bathroom" scenario, architects can use standard and basic materials in the right way to achieve great design on a low budget.

In addition to supporting overall building aesthetic and use, intelligent restroom design can also improve the performance of facility management in other meaningful ways, including through sustainability, cleanliness, and customer and employee safety.

UNIVERSAL PRINCIPLES: BATHROOM DESIGN CHECKLIST

Across the spectrum of bathroom design, there are universal principles we care about when it comes to restrooms, with each element interrelated and dependent on the others.

- **Privacy:** Privacy is vital in public restrooms and includes minimized sightlines in partitions, from doorways, and from mirrors.
- **Sustainability:** Material specification plays a big in durability and longevity, as well as cleanliness and occupant experience. By creating facilities that are accessible, can be readily cleaned, and can withstand predicted use, a designer will not only facilitate required maintenance but also ensure that the project elements work together to maximize the serviceable life of the design. A well-designed bathroom with materials that last the intended life of the bathroom will avoid an early demise in a landfill. The right products for the right application mean maximal life.
- **ADA code:** When designing a public restroom facility, designers must be aware of elements required by code, such as ADA standards and comprehensive universal design principles.

Project: ETU Auto Grill
Client: No Touch
Practical concerns, like safety, privacy, and accessibility, do not have to negate aesthetic goals.

Attention should be given to:

  - **Circulation paths and maneuverability:** As you move through the designed areas, carefully consider entrance to and travel about the restroom. Obstacles may need to be removed in order to create an acceptable passage width and circulation path. Partition layout and location of accessible toilet stalls become important here.
  - **Reach ranges:** Consider users of all heights as well as wheelchair users. Mounting heights for sinks, hand dryers, grab bars, and other fixtures should be reachable and unobstructed for all users.
  - **Mirrors:** Mirrors located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 40 inches maximum above the finish floor or ground.
  - **Door swings:** Maneuvering clearances shall extend the full width of the doorway and the required latch-side or hinge-side clearance.
  - **Clear floor space:** Lavatories should allow for open, easy approach.
- **Interior finishes and materials fire standards:** There are two standard test methods used to measure the fire performance of interior finishes. The first, ASTM E-84, tests the surface burning characteristics of building materials using a tunnel test method. The other standard is a room corner test, performed in accordance with NFPA 286, which measures the contribution of interior finish materials to room fire growth during specified fire exposure conditions.
- **Maintenance:** Making sure a space can be easily accessed and cleaned is a pivotal checkpoint for washroom design. Materials and systems must be maintained to be sustainable. Paying attention to material specification is vital because it will impact the durability, performance, and longevity of your restroom and also determine the maintenance schedule during operation.
- **Hygiene:** Does the overall design promote cleanliness? Are there antimicrobial materials incorporated in the design? Touch-free fixtures? Is it easy to maintain and keep clean?
- **Lighting:** Offer a combination of general lighting and task lighting that is flattering and complements the design and use of the space.
- **Safety:** Mitigate safety risks from hazards, such as wet floors. Wet floors are often a function of the location and number of drying stations in respect to sinks since water will drip from wet hands on the way to get them dry.

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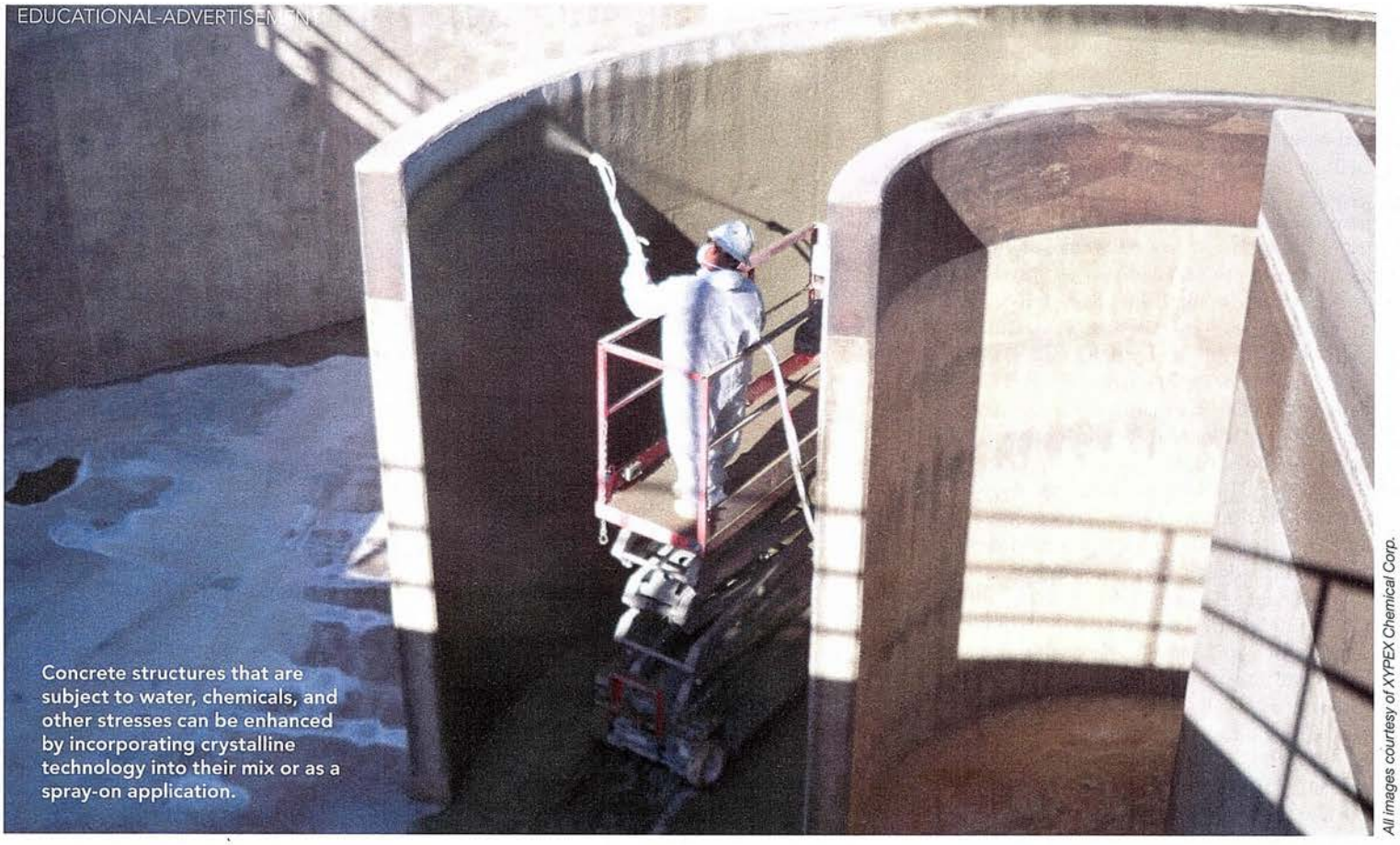
Amanda Voss, *MPP, is an author, editor, and policy analyst. Writing for multiple publications, she also serves as the managing editor for* Energy Design Update.



Concrete structures that are subject to water, chemicals, and other stresses can be enhanced by incorporating crystalline technology into their mix or as a spray-on application.

All images courtesy of XYPEX Chemical Corp.

Improving Concrete Durability with Crystalline Technology

Creating concrete that is inherently waterproof and more sustainable

Sponsored by XYPEX Chemical Corp. | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Concrete is known for being a strong and versatile material, and it's used in many cast-in-place and precast structures for a variety of infrastructure and engineering applications. However, in standard formulations, it also has some known limitations when subjected to harsh conditions. Those conditions can cause physical damage or deterioration of the concrete, leading to significant problems and shortening the useful life of the concrete structure. The use of chemical admixtures in the concrete mix can help change the nature of the concrete and overcome some of those limitations, particularly deterioration. In specific admixtures, the use of crystalline technology has been shown to be quite effective in terms of waterproofing the concrete and providing resistance to chemicals, extreme temperatures, and other conditions. Engineers who recognize the causes of concrete deterioration along with the best options to overcome them can create resistive concrete components that are more durable and more sustainable in the long run.

THE PROBLEM: CONCRETE DETERIORATION

Concrete is a mixture of natural ingredients and man-made processes. The particular ingredients used and their ratios in proportion to each other can create great variety and differences in the strength, appearance and functionality of concrete. Nonetheless, there are some fundamental characteristics of all concrete that are common—some of which help define its susceptibility to deterioration.

Typically, a concrete mix consists of about 60–75 percent aggregate (fine and coarse), 10–15 percent cement, and 15–20 percent water. It is the water added to the dry materials that causes the chemical reaction of hydration, which allows the cement to hold all of the other materials together. Often, more water is used than is needed for hydration for the convenience of making the concrete easier to pour and form. This practice plus the mixing process can produce air pockets or bubbles that take up another 5–8 percent of the

CONTINUING EDUCATION

1 AIA LU/HSW

PDH 1 PDH

Learning Objectives

After reading this article, you should be able to:

1. Discuss the types and causes of common forms of deterioration in concrete.
2. Explain how chemical enhancements, including crystalline technology, improve the durability of concrete structures and reduce maintenance.
3. Analyze how crystalline technology admixtures can produce very positive performance results.
4. Identify the role that high-performance concrete can play in achieving green and sustainable design solutions.

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total mix. As the water is hydrated, drained, or evaporated away, the cured concrete is left with a myriad of air gaps, holes, pores, capillary tracts, and other internal voids. Further, concrete shrinks in size as it cures, although if it cured properly, that shrinkage can be kept to a minimum. Nonetheless, visible cracks or much less visible micro-cracks can occur. The end result is that while concrete may appear strong and impenetrable on the surface, it actually ends up quite porous due to the variety of openings and voids inherent within it. This porosity means that water can penetrate into and even through a concrete structure, giving it properties of permeability that are often not desirable.

The limitations of concrete are exhibited in several ways. First, the surface can be physically damaged due to physical force, abuse, weather, etc. Such physical damage can cause the surface of the concrete to crack or break, exposing the inner aggregate and creating a rough surface that is vulnerable to further deterioration. Secondly, when chemical substances penetrate beneath the surface of the concrete, they can interact with the concrete and cause damage or deterioration. The extent and nature of the damage will depend on the types of chemicals or other substances that penetrate into the concrete. Finally, the permeable nature of concrete can allow water and chemicals to penetrate and cause corrosion on any metal components embedded in the concrete. This includes reinforcing steel, anchors, sleeves, post supports, angles, or any other metal that is used with concrete structures.

Recognizing all of these issues, the Portland Cement Association (PCA) has investigated these phenomena in some depth and identified a number of specific types and causes of deterioration in concrete. Some of them are summarized below.

Abrasion/Erosion

Abrasion damage is caused by rubbing and friction against the outer paste of concrete, exposing the fine and coarse aggregate that will cause additional degradation. The two most common and damaging forms of abrasion occur on vehicular traffic surfaces and in hydraulic structures, such as dams, spillways, tunnels, and even infrastructure piping. Traffic surface abrasion can be controlled by limiting the types of vehicles and tires that are used and selecting appropriately hard aggregate to withstand the weight and wear of vehicles.

Addressing abrasion damage in hydraulic structures is a bit more involved. High-quality concrete can resist water flowing over it, even at high velocities, for many years with little or no damage. However, concrete is susceptible to deterioration from the abrasive action of debris or solid materials in the water that grind or repeatedly impact on its surface. Spillway aprons, stilling basins, sluiceways, drainage conduits or culverts, and tunnel linings are particularly susceptible to this type of abrasion erosion. In hydraulic structures, it is readily recognized by a smooth, worn appearance on the surface of the concrete, suggesting that it can be reduced by using strong concrete with hard aggregates.

This concrete support has deteriorated due to abrasion and erosion in a tidal zone.

Freeze-Thaw Attack

When water freezes, it expands. If water seeps into concrete cavities, such as capillaries or pores, and then freezes, that expansion can produce pressure in the concrete. Once the pressure exceeds the tensile strength of the concrete, the cavities will burst. If those areas are small, then it may not be significant at first, but if that cycle is repeated over time through multiple events of water seepage, freezing, and thawing, then significant cracking, scaling, and crumbling of the concrete can occur. This phenomenon is important not only after the concrete is in place and cured but also during its placement. The common approach to improve the resistance of concrete against freezing is the use of intentionally entrained air. This creates more air voids in the concrete, which act as empty chambers for the freezing and migrating water to enter and expand into, thus relieving the pressure in the capillaries and pores and preventing damage to the concrete. A better solution is to create concrete with low permeability in the first place, which is better able to resist the penetration of water and, as a result, be less affected by freeze-thaw cycles.

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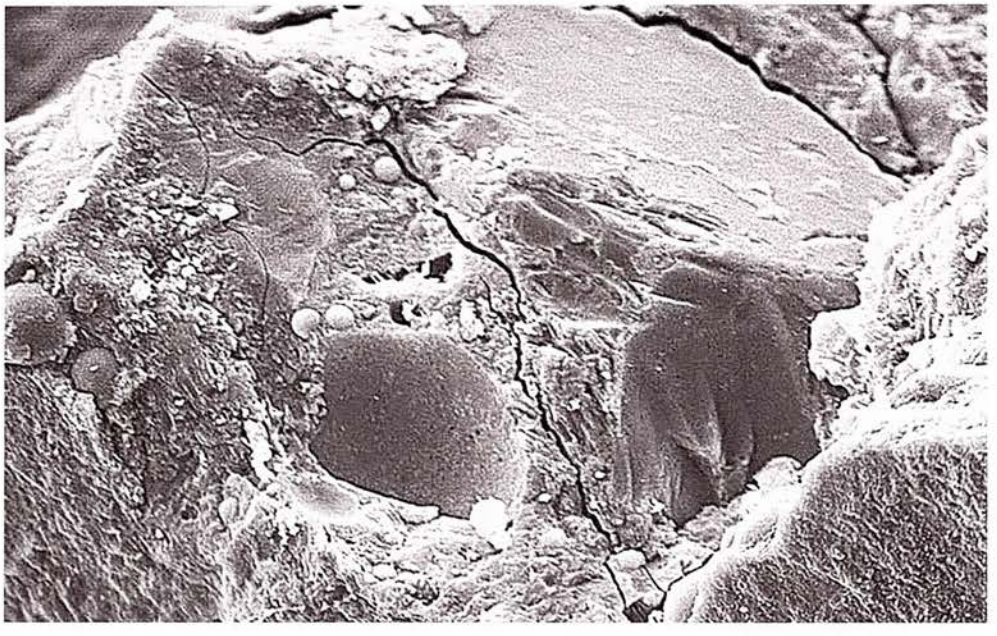
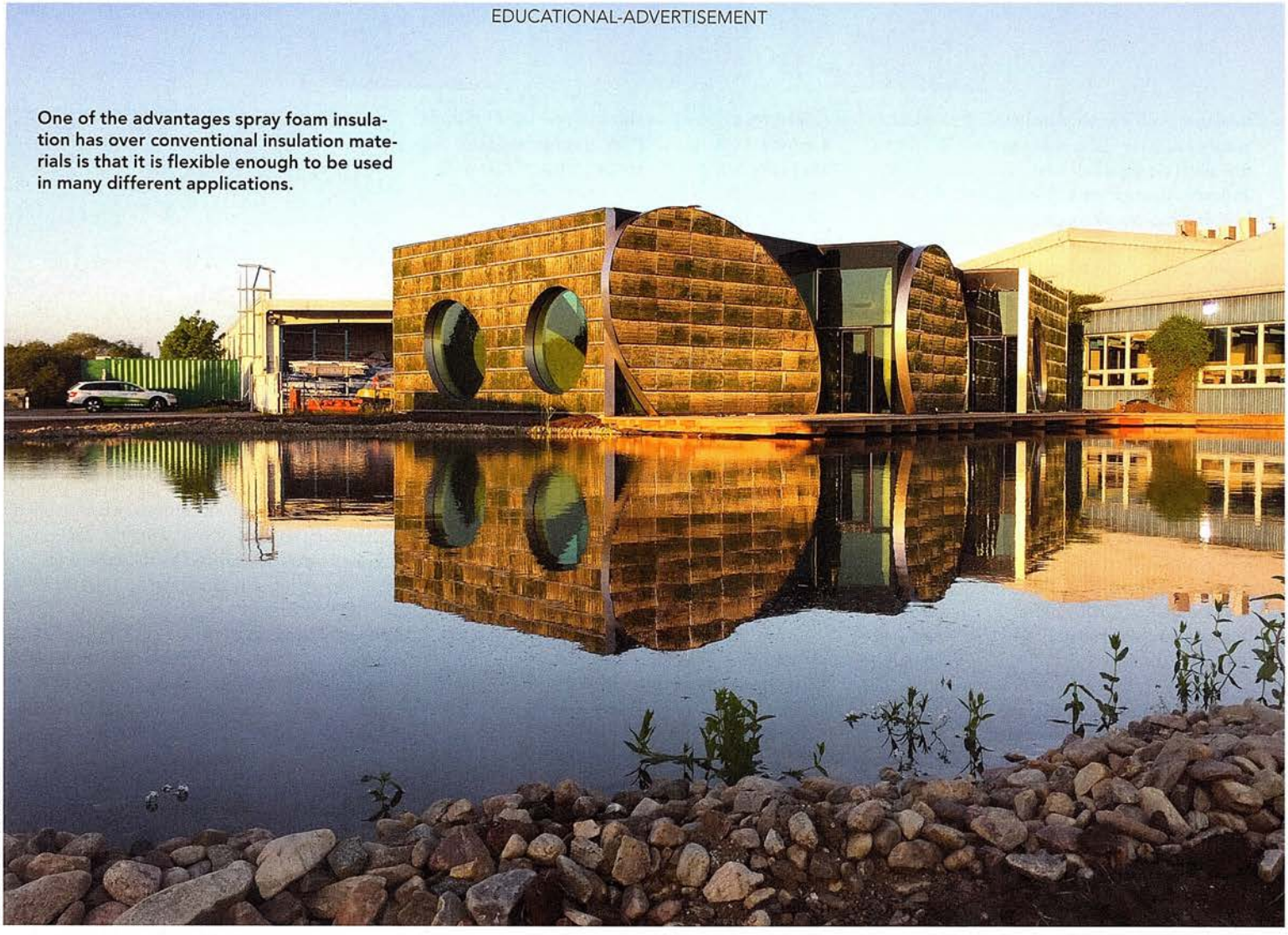


An electron microscopic magnified view of a micro-crack in concrete that can occur due to normal shrinkage.

Peter J. Arsenault, *FAIA, NCARB, LEED AP, is a nationally known architect, sustainability consultant, technical writer, and continuing education presenter who has authored more than 140 continuing education articles.* ***www.linkedin.com/in/pjaarch***



One of the advantages spray foam insulation has over conventional insulation materials is that it is flexible enough to be used in many different applications.

Photo courtesy of Icynene

Spray Polyurethane Foam: The Evolution of Building Insulation

Sponsored by Icynene

Of all the different insulation options available today in commercial construction, spray foam can provide outstanding thermal performance while also contributing to air sealing, moisture control, and even structural integrity. It can be an important tool in designing and installing a well-sealed, energy-efficient building envelope. Because of its superior insulating and air-sealing qualities, spray foam also saves energy and money over the long run by reducing energy demand. This course will provide an overview of spray-foam insulation, how it differs from conventional insulation types, its most appropriate applications, and how the material is allowed to be used in fire-resistant construction.

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Learning Objectives

After reading this article, you should be able to:

1. Explain the benefits of and the differences between open-cell and closed-cell spray-foam insulation.
2. Describe the most appropriate applications for open-cell and closed-cell spray foam in commercial designs.
3. Discuss how spray-foam insulation can be used in assemblies requiring fire resistance.
4. Define the differences between thermal barriers and ignition barriers, and explain insulation fire ratings.

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Beyond Airtightness: Factors to Consider When Selecting an Air Barrier

Code compliance, performance, and compatibility

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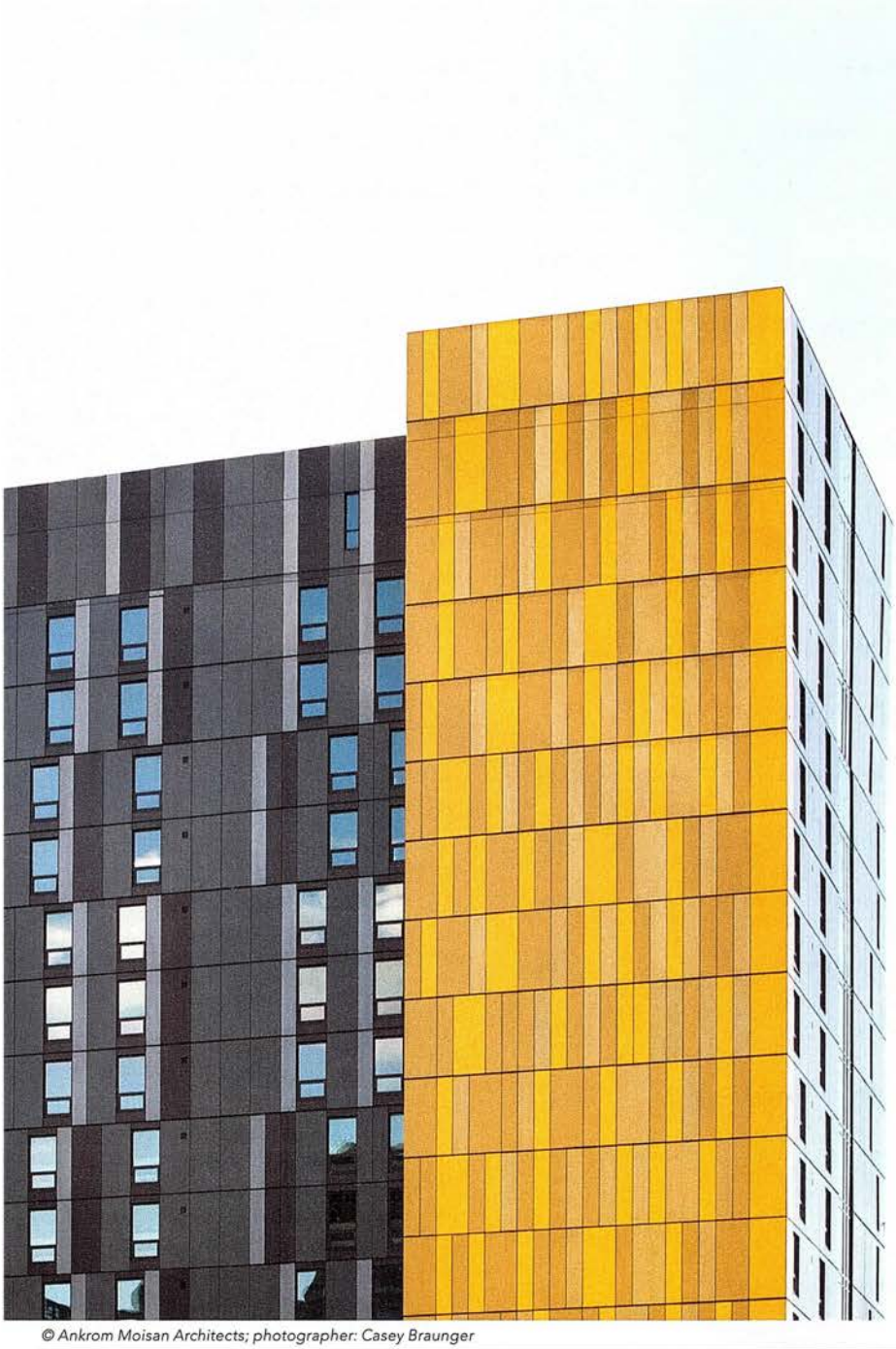

© Ankrom Moisan Architects; photographer: Casey Braunger

The value of a product or application stems from not only its technical appropriateness, but also its ease of use and the confidence it instills in those who specify and those who do the actual application.

Not surprisingly, following a prescriptive path for compliance with energy-code requirements in climate zones that necessitate a split-insulation strategy—a wall assembly with both cavity-filled insulation and continuous exterior insulation (CI)—will reveal that vapor-permeable capabilities are key for wall assembly breathability and, by implication, long-term durability.

In these climate zones, geographic regions often are encountered that have already become (or are now becoming) aware, through codification, of the need to include thermal control—particularly at interface locations—in addition to ensuring continuity of the air and water control layers.

CONTINUING EDUCATION

1 AIA LU/HSW

1 GBCI CE HOUR

Learning Objectives

After reading this article, you should be able to:

1. Define the basic requirements that air barriers must meet.
2. Describe the different types of air barriers on the market and their key differences.
3. Identify key areas within a wall system where detailing is important to system success.
4. Discuss the different solutions currently on the market for sealing penetrations and transitions to create a complete air-barrier system.

To receive AIA credit, you are required to read the entire article and pass the test. Go to **ce.architecturalrecord.com** for complete text and to take the test for free.

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CALL FOR ENTRIES

Record Houses

The editors of **ARCHITECTURAL RECORD** announce the **2018 RECORD HOUSES** awards program. Entry is open to any architect registered in the U.S. or abroad. Of particular interest are projects that incorporate innovation in program, building technology, materials, and form. Projects must be built and inhabited. They may be new construction or renovated and adaptive-reuse projects. Winners will be featured in the May 2018 issue. The fee is US$75 per submission.

SUBMISSION DEADLINE: **FEBRUARY 1, 2018**

CALL FOR ENTRIES

Good Design Is Good Business

The editors of **ARCHITECTURAL RECORD** are currently accepting submissions for the **2018 ARCHITECTURAL RECORD GOOD DESIGN IS GOOD BUSINESS** awards program. Good design is a priority for leaders of business and industry looking to boost productivity, rebrand, and attract customers. The Good Design Is Good Business awards honor architects and clients who best utilize design to achieve such strategic objectives. Winners will be published in the June 2018 issue. The fee is US$150 per entry and $50 for each additional project.

SUBMISSION DEADLINE: **FEBRUARY 15, 2018**

CALL FOR ENTRIES

Design Vanguard

The magazine is looking for the best emerging architecture firms from around the world to feature in our **2018 DESIGN VANGUARD** issue. Although we do not have an age limit, we try to select architects and designers who have had their own practices for less than 10 years. In 2018, for the first time, winners will be featured in the June issue (instead of December). There is no fee to enter.

SUBMISSION DEADLINE: **FEBRUARY 15, 2018**

For full details and to submit your entry, visit: architecturalrecord.com/call4entries.
E-mail questions to arcallforentries@bnpmedia.com. Please indicate the contest name as the subject of your e-mail.

New and Upcoming Exhibitions

Design Miami/
Miami
December 6–10, 2017
The annual global forum features exhibitions of furniture, lighting, and "objets d'art" along with lectures, panels, and other events. Special commissions for the 2017 fair include Swiss firm Christ & Gantenbein's wood-furniture series designed for hardware-free assembly in a Zambian school. More information at miami2017.designmiami.com

Howardena Pindell: What Remains To Be Seen
Chicago
February 24–May 20, 2018
Spanning the multidisciplinary artist's five-decade-long career, the exhibit features paintings, photography, film, and performance from various stages of her life. The underlying theme of the exhibition, cocurated by Naomi Beckwith and Valerie Cassel Oliver, reflects the shift from Modernism to contemporary art practices. At the Museum of Contemporary Art Chicago. For more information, visit mcachicago.org.

Ongoing Exhibitions

Living in America: Frank Lloyd Wright, Harlem & Modern Housing
New York City
Through December 17, 2017
This exhibit examines racial segregation and socioeconomic inequality through two housing projects designed by Wright—one occupied mainly by black residents, the other predominantly white. Curated by Columbia University's Temple Hoyne Buell Center for the Study of American Architecture, the exhibition relates to the Museum of Modern Art's ongoing Frank Lloyd Wright exhibition. For more information, visit arch.columbia.edu.

Designing Material Innovation
San Francisco
Through December 22, 2017
The exhibit at California College of the Arts' San Francisco campus consists of five full-scale prototypes built using new materials, fabrication techniques, and/or design approaches. Participating firms include T+E+A+M, using a material made from rock and reprocessed waste plastics; Matter Design, testing prehistoric approaches to installing large stone statues; and APTUM Architecture, with a pavilion built using high-performance concrete. Visit designingmaterialinnovation.org.

Albert Frey and Lina Bo Bardi: A Search for Living Architecture
Palm Springs, California
Through January 7, 2018
Part of a Getty Foundation–led initiative to explore the connection between Latin America and Los Angeles, the Palm Springs Art Museum presents an exhibition that shows parallels between the work of architects Albert Frey and the Italian-born Brazilian Lina Bo Bardi, who also designed furniture. For more information, see psmuseum.org.

Chicago Architecture Biennial
Chicago
Through January 7, 2018
The second edition of the Chicago Architecture Biennial features works by over 141 architects and designers on the theme of Make New History. Consisting of six community anchor exhibitions, two special-project sites, installations, performances, talks, and films, the Biennial is a citywide event that encourages visitors to explore Chicago with an architectural eye. For more information, visit chicagoarchitecturebiennial.org.

Scaffolding
New York City
Through January 18, 2018
Curated by Greg Barton with installation design by OMA New York director Shohei Shigematsu and graphic design by MTWTF, the exhibition explores the different forms and applications of scaffolding, as well as its relationship to architecture. At the Center for Architecture. Visit cfa.aiany.org.

No. 9
New York City
Through January 19, 2018
Designed and curated by architect Frida Escobedo, the exhibition examines the history of a public sculpture series in Mexico City, La Ruta de la Amistad, commissioned for the 1968 Olympic Games. Escobedo focuses the exhibit on the ninth sculpture, by American artist Todd Williams. At Columbia University's Arthur Ross Architecture Gallery. For more information, visit arch.columbia.edu.

Ai Weiwei: Good Fences Make Good Neighbors
New York City
Through February 11, 2018
The citywide exhibit by artist and activist Ai Weiwei creates a series of installations using the security fence to examine themes of displacement and migration. Sites in New York include the Washington Square Arch in Greenwich Village, the Unisphere at Flushing Meadows-Corona Park in Queens, and Doris C. Freedman Plaza in Central Park. Presented by the Public Art Fund, the exhibit also features images on lampposts and other spaces usually reserved for advertisement. Visit publicartfund.org.

Never Built New York
New York City
Through February 18, 2018
Cocurated by architecture critics Sam Lubell and Greg Goldin, the exhibition features original prints, drawings, models, and installations of unbuilt projects developed by architects including Robert Venturi and Denise Scott Brown, Rem Koolhaas, and Zaha Hadid. The Queens Museum exhibit was designed by Studio Christian Wassmann. For more information, visit queensmuseum.org.

Obdurate Space: Architecture of Donald Judd
New York City
Through March 5, 2018
The exhibit looks at completed and unbuilt architectural work by artist Donald Judd between 1984 and 1994. Featuring drawings, models, and photos, the display was curated by Claude Armstrong and Donna Cohen, who were both assistants to Judd. At the Center for Architecture. Visit cfa.aiany.org.

Frau Architekt
Frankfurt
Through March 8, 2018
Presented by the German Federal Cultural Foundation, the exhibition features portraits of 22 women who have influenced German architecture. Beginning in 1907 with Emilie Winkelmann, the first female founder of a German architecture studio, personal stories and projects showcase the role each woman played in shaping the profession in Germany. At Deutsches Architekturmuseum. For more information, visit dam-online.de.

Found in Translation: Design in California and Mexico, 1915–1985
Los Angeles
Through April 1, 2018
Displaying over 250 objects including drawings, photos, models, and film, the exhibition examines Modern and anti-Modern design movements in California and Mexico, along with their connections to each other. Richard Neutra, Luis Barragán, and Clara Porset are some of the architects and designers whose work is on display at the Los Angeles County Museum of Art exhibit. Visit lacma.org.

Gordon Matta-Clark: Anarchitect
New York City

Through April 8, 2018
Known for artwork that cuts through the facades of derelict and historic buildings, Gordon Matta-Clark's exhibit at the Bronx Museum of the Arts uses the artist's work in the borough as a jumping-off point for a display that includes 100 pieces, film, and rarely shown materials from his archive. For more information, see bronxmuseum.org.

Alex Schweder and Ward Shelley: Your Turn
Ridgefield, Connecticut
Through April 22, 2018
For this combined architecture and performance-art piece, Alex Schweder and Ward Shelley will build a 24-foot-high living environment that they will then inhabit, negotiating the shared use of nine basic amenities as an interactive performance for audience members. At the Aldrich Contemporary Art Museum. Visit aldrichart.org.

Floating Cube: 10 Years 10 Artists 10 Works
Giussano, Italy
Through May 31, 2018 (by appointment)
Curated by Cristiana Colli, furniture company Molteni&C's exhibition looks back on 10 years of photography published by its in-house magazine, *M&C*. The photos are displayed inside Ron Gilad's *Floating Cube*, a square white structure to which the photos are affixed. It appears to float atop about an inch of water—both the cube and water are enclosed by glass. At the Quadreria Contemporanea picture gallery. More information at molteni.it.

Lectures, Conferences, and Symposia

In Our Time: A Year of Architecture in a Day
New York City
December 9, 2017
The one-day symposium will feature project presentations, a panel discussion led by the Met's architecture and design curator, Beatrice Galilee, and a keynote presentation by Pritzker Prize–winner Wang Shu. Other participants include architects such as David Adjaye, Go Hasegawa, and Philippe Rahm, along with a creative leader at IKEA and artist Julie Mehretu. At the Metropolitan Museum of Art on Fifth Avenue. For more information, visit metmuseum.org.

Steven Holl-AIA/RIBA Keynote Lecture 2017
London
December 12, 2017
Jointly hosted by the AIA UK and the Royal Institute of British Architects, architect Steven Holl will speak on his recent work, including Maggie's Center Barts, which is slated to open in London by the end of the year. See aiauk.org.

IES Research Symposium 2018: Light + Human Health
Atlanta
April 8–10, 2018
The Illuminating Engineering Society is calling for papers that examine how light affects circadian, biological, and behavior responses. Posters showing research on or applications of lighting approaches will be featured in a dedicated session. Deadline to submit abstracts is December 15, 2017. For more information, visit ies.org/research/research-symposia-workshops.

New to New York: A Brighter BAM
New York City
December 16, 2017
Architectural historian Matt Postal will lead a tour in the neighborhood around the Brooklyn Academy of Music, exploring housing projects as well as civic spaces that have transformed the vicinity. Highlights include work by SHoP Architects, COOKFOX Architects, and TEN Arquitectos' Enrique Norten. Organized by the Municipal Art Society of New York. Visit mas.org.

Unlocking Public Space: Placemaking in Brownsville
New York City
December 18, 2017
A panel discussion moderated by *The New York Times*'s Ginia Bellafante on how the Brownsville Community Justice Center used urban planning tools to create new public spaces. At the Brooklyn Historical Society. More information at brooklynhistory.org.

Competitions

Beyond the Centerline
Registration deadline: December 15, 2017
This privately funded design competition run by Fisher Brothers is calling for proposals to reimagine Park Avenue in Manhattan by creating installations for the medians between 46th Street and 57th Street. Up to 10 designs will be selected to be built and displayed in February 2018. See fbdesigncom.com.

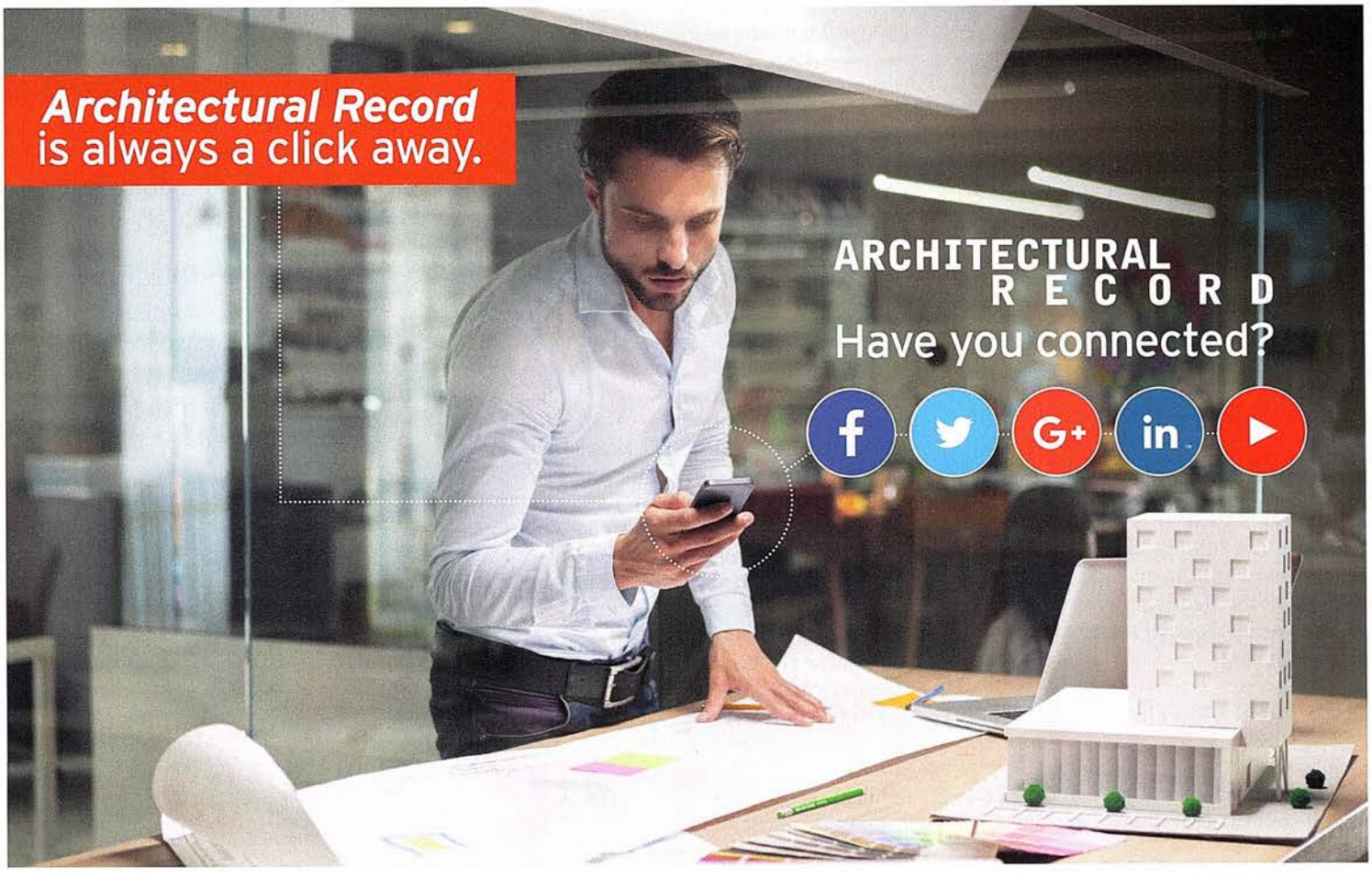
Reimagine the Canals
Submission deadline: January 5, 2018
The New York Power Authority and New York State Canal Corporation are inviting design proposals for infrastructure and new structures to further establish the state's 524-mile canal system as a tourist and recreation destination

while simultaneously implementing sustainable and financially viable systems. Submissions for the two-stage competition are open to international and multi-disciplinary teams. Details at canals.ny.gov/reimagine/overview.html.

Folly/Function 2018: Seats
Submission deadline: January 8, 2018
This edition of the Architectural League's annual design-build competition asks designers and architects to submit design proposals for movable single or double outdoor seating, which will be installed in Socrates Sculpture Park in Queens, New York. Proposals must seat a minimum of 25 people, using a $6,000 budget to fabricate, assemble, and install the project. The winning design will open to the public in June 2018. More information at archleague.org/folly18.

Architecture at Zero
Registration deadline: January 10, 2018
Open to students and professionals, Pacific Gas and Electric Company's competition invites design proposals for San Francisco State University's estuary and ocean science center in Tiburon, California. Proposals should include a site plan for the 53-acre plot and designs for two buildings, the university's education facility and visitors' center, both of which must meet zero net energy performance requirements. Details at architectureatzero.com.

E-mail information two months in advance to recordevents@bnpmedia.com.



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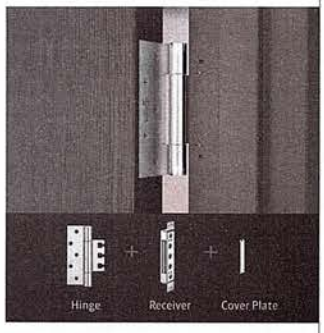

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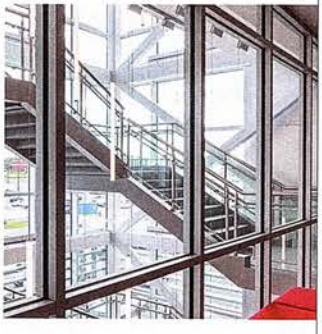

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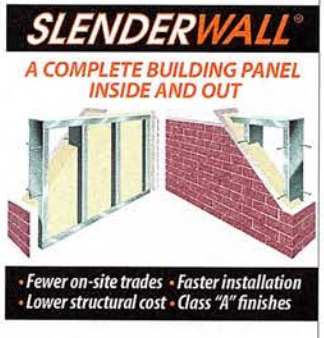

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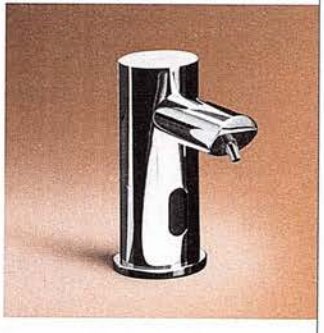

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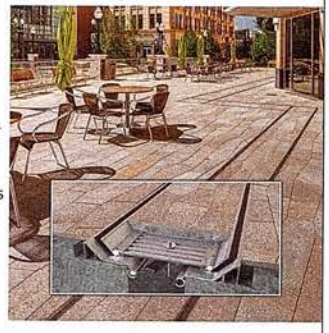

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snapshot

PROJECT SITE SANTA FE
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FOUNDED IN a disused beer warehouse in Santa Fe's once-gritty Railyard District, SITE opened in 1995 as the only international biennial of contemporary art in the U.S. It has since evolved into a year-round destination for avant-garde works. But as the small museum neared its 20th year, the facility no longer suited the vision of the board and the new director, Irene Hofmann, so they invited New York–based SHoP to transform it. The design team has created a seamless expansion, adding a multifunction lobby, flexible galleries, storage and office areas, and upgrading the HVAC. They also built a rear courtyard bordered by an event space and education lab. The main attraction, though, is the bold perforated-aluminum prow that stretches from the newly glazed entrance. Softly lit by integrated LEDs, this silvery marquee not only welcomes passersby—it signals that something exciting is happening here.

Linda C. Lentz

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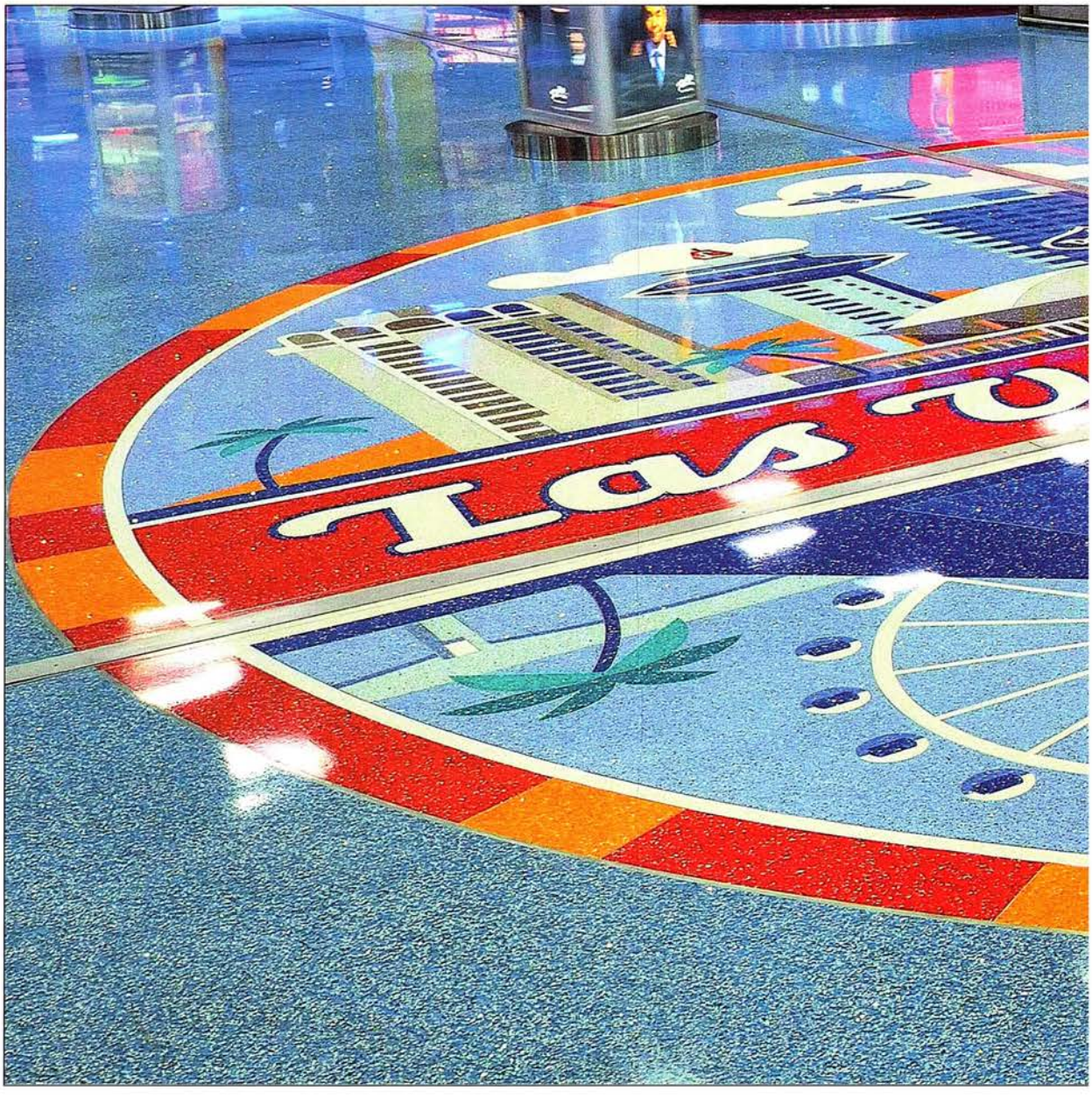

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