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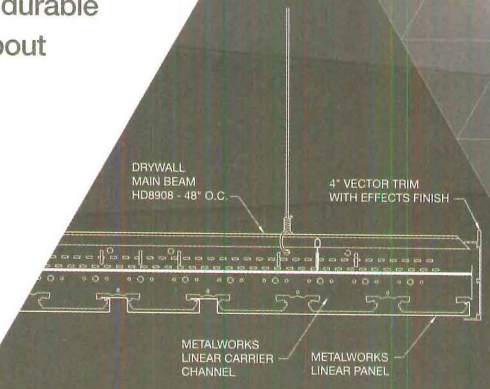

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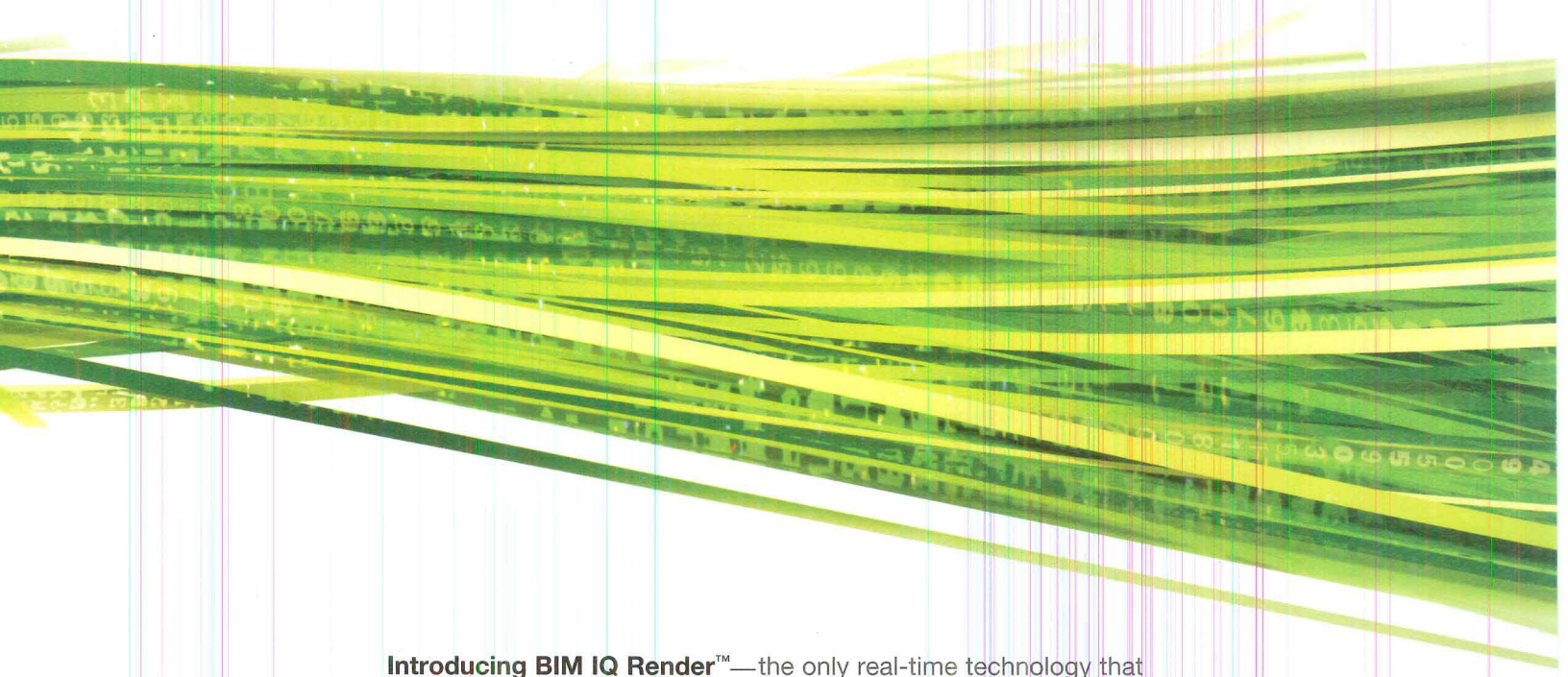

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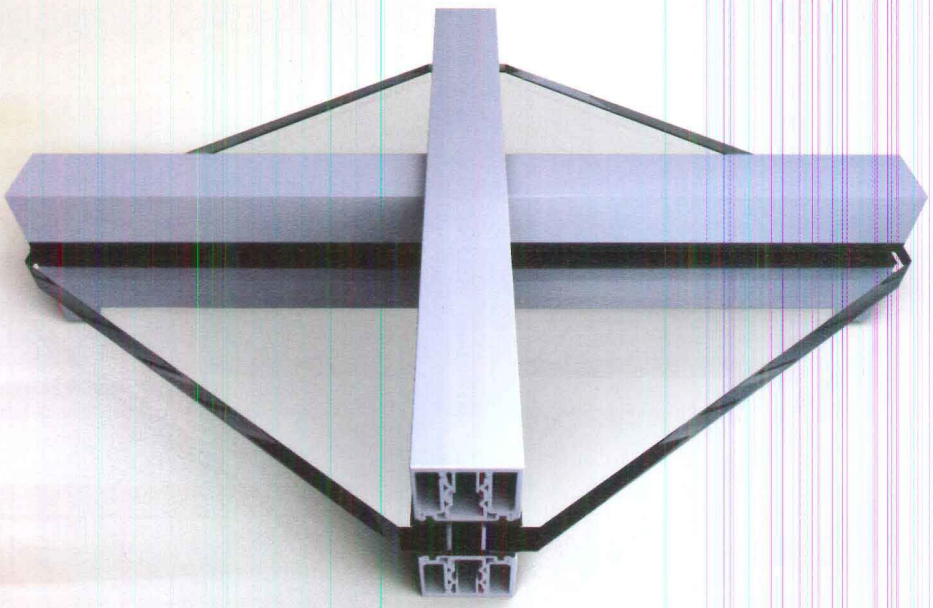

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Thérèse Lahaie collaborated with Kava Massih Architects, Sign Effectz-AFX, artifacts, and Equity Residential to create Crossing Signal Mosaic. Learn more at **thereselahaie.com**

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A ceiling-mounted sculpture that creates a symphony of light and color in Emeryville, California is this year's winner of the JUST IMAGINE Awards from Lucite International. Residents of the building describe walking through the outdoor entryway as a theatrical experience.

"Crossing Signal Mosaic" is part of an Art in Public Places project that combines technology and art to reflect the energy of neighboring businesses. The developer of the building wanted a dynamic work of art that would infuse life into the building and attract young renters.

Scale, weight and earthquake restrictions made the use of glass difficult, so artist Thérèse Lahaie looked for another material to provide light diffusion and luminosity.

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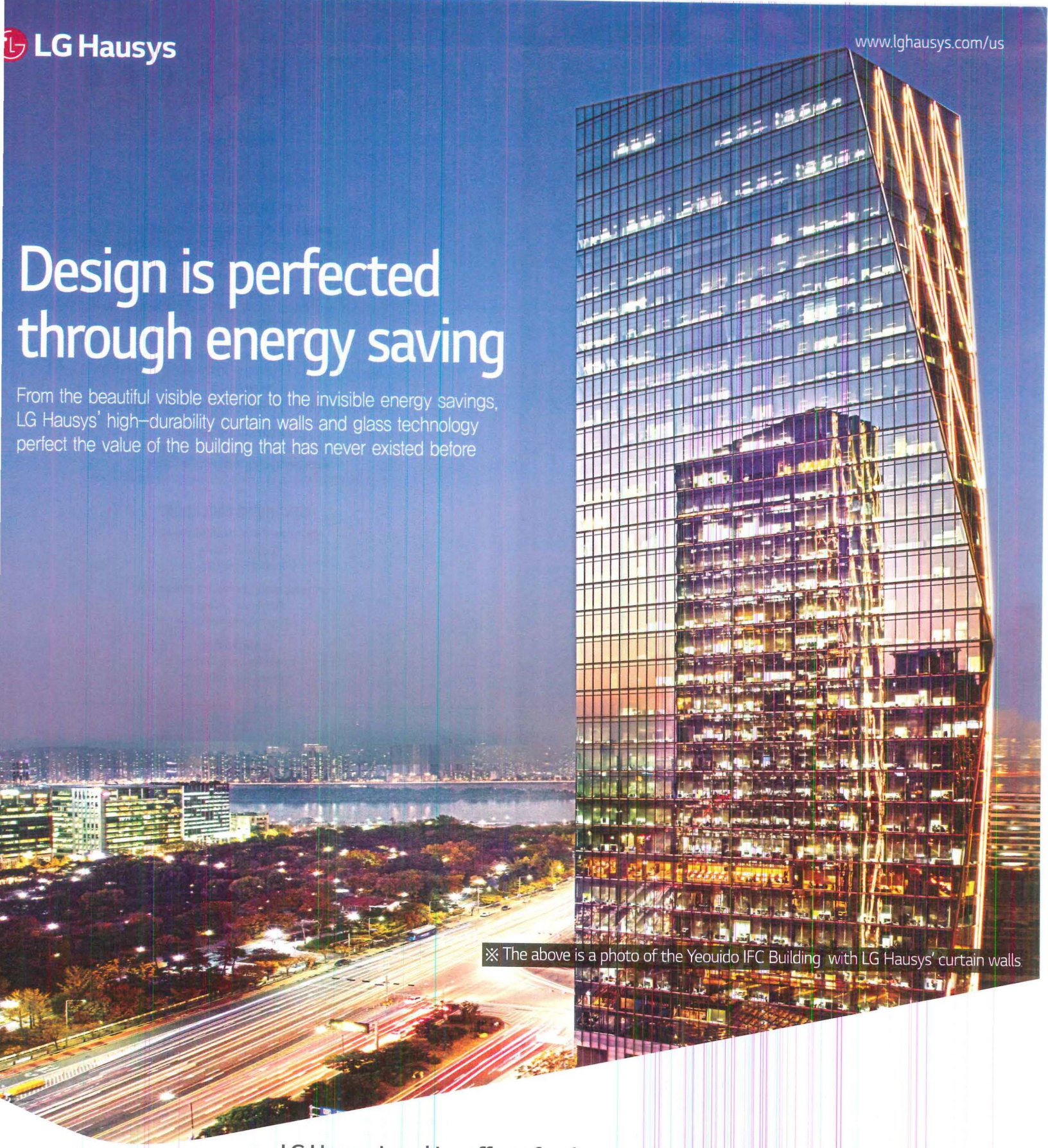

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Top - Yarrabilba Table; Bottom Left - Boulevard Wood Planters; Bottom Center - Yarrabilba Picnic Table and Benches; Bottom Right - Boulevard Thermally-Modified Decking.

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DEPARTMENTS

SPECIAL FEATURE

BUILDING TYPE STUDY 966 SCHOOLS OF THE 21ST CENTURY

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A Milestone for RECORD

The magazine celebrates 125 years of publishing.

IT'S A new year, a time for a fresh start. And while we at RECORD like to bring you the newest architectural projects and the latest in design ideas and technology, 2016 is a year in which we're looking back as well, reflecting on our rich legacy. That's because ARCHITECTURAL RECORD turns 125 this year, a longer run than almost any other brand in American publishing. Look for special features in print and online over the coming year.

Founded in 1891 as "the Magazine for Architects and all persons who take an intelligent interest in the design, the construction, and the embellishment of the buildings in which they live," the quarterly (it went monthly in 1902) arrived at a key moment in American cultural history. Magazines were becoming an immensely popular medium, at the same time that building technology and architecture were rapidly advancing, and modern ideas were capturing the imagination of the public.

The first issue of "The Architectural Record" expressed the broad vision of its editor, Henry Desmond, as Suzanne Stephens points out in an essay on the early years (page 44). Desmond, who fancied himself a literary figure, included poetry among articles on plumbing and Romanesque Revival architecture. He assured his readers that he was entering the field with a "serious purpose." "To amuse the public with Architecture obviously is out of the question," he declared. "Not that the art, as practised at present, is without a ludicrous side." Desmond would later entertain his readers with a regular feature called "Architectural Aberrations" that heaped scathing criticism on buildings the magazine deemed ridiculous. And while he provided an important platform for architectural thinkers—including essays by Frank Lloyd Wright, as well as leading critics—Desmond also continued to look at the wider culture, publishing, for example, the first American report from inside the Paris studio of a young artist named Pablo Picasso, in 1910. In "The Wild Men of Paris," about the avant-garde art scene, Gelett Burgess described Picasso as "a devil" in the "most complimentary sense": "I thought of a Yale sophomore who had been out stealing signs, and was on the point of expulsion . . . he is the only one of the crowd with a sense of humor." RECORD printed Burgess's remarkable photograph of the artist, sitting in his studio with two African sculptures hanging behind him, two years before he would first publicly exhibit his Cubist painting.

The technology and printing of photography was a special interest of Desmond's, and RECORD was innovative in its use of photographic images, printing halftones and experimenting with color tinting. While criticism and on-scene reporting has been central to RECORD's mission since the beginning, the quality of photography has been vital in defining the magazine as *the* record of the architecture of its time. RECORD even advertised its photographic services to architects and clients, who could hire the magazine to document their buildings, an early ancillary revenue stream.

Now that technology has advanced to the point that the Internet is flooded with photographs of buildings shot by both professionals and anyone with an iPhone6, the editors of RECORD keep a sharp eye on the integrity of the architectural image. It can be easy to be fooled. As one of our contributing editors, Blair Kamin, reported last month in *The Chicago Tribune*, the architect of a new building, El Centro, won a design award from the Chicago AIA after submitting a photograph of the project that photoshopped out the ungainly air-handling units on the roof. Two of the jurors told Kamin they would not have voted for the award had they seen the undoctored photo.

We do our best to publish accurate photographs in RECORD. Images have been submitted to the magazine that are clearly fake—airbrushed to impossible perfection, with photoshopped people inserted into a project. Once, a photograph arrived of a building that had actually been moved, through the wonders of digitization, from its true location in an upscale area of a foreign city to a poor neighborhood, to promote the idea that it had a socially responsible agenda. While we cannot always visit every project—we were not able to send writers to tour two remote schools in this issue, for example, one in northern Afghanistan (page 76) and one in the Democratic Republic of Congo (page 80)—we usually report directly from the major projects we feature in the magazine. That's one more way we ensure that photography in our pages reflects reality. Like Henry Desmond long ago, we are serious about how we publish the significant architectural achievements of our day. And if we sometimes amuse the reader along the way, that's okay too. ■

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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The Best of Both Worlds

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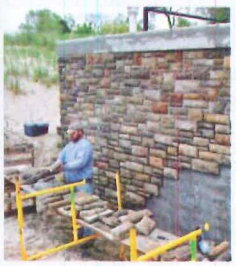

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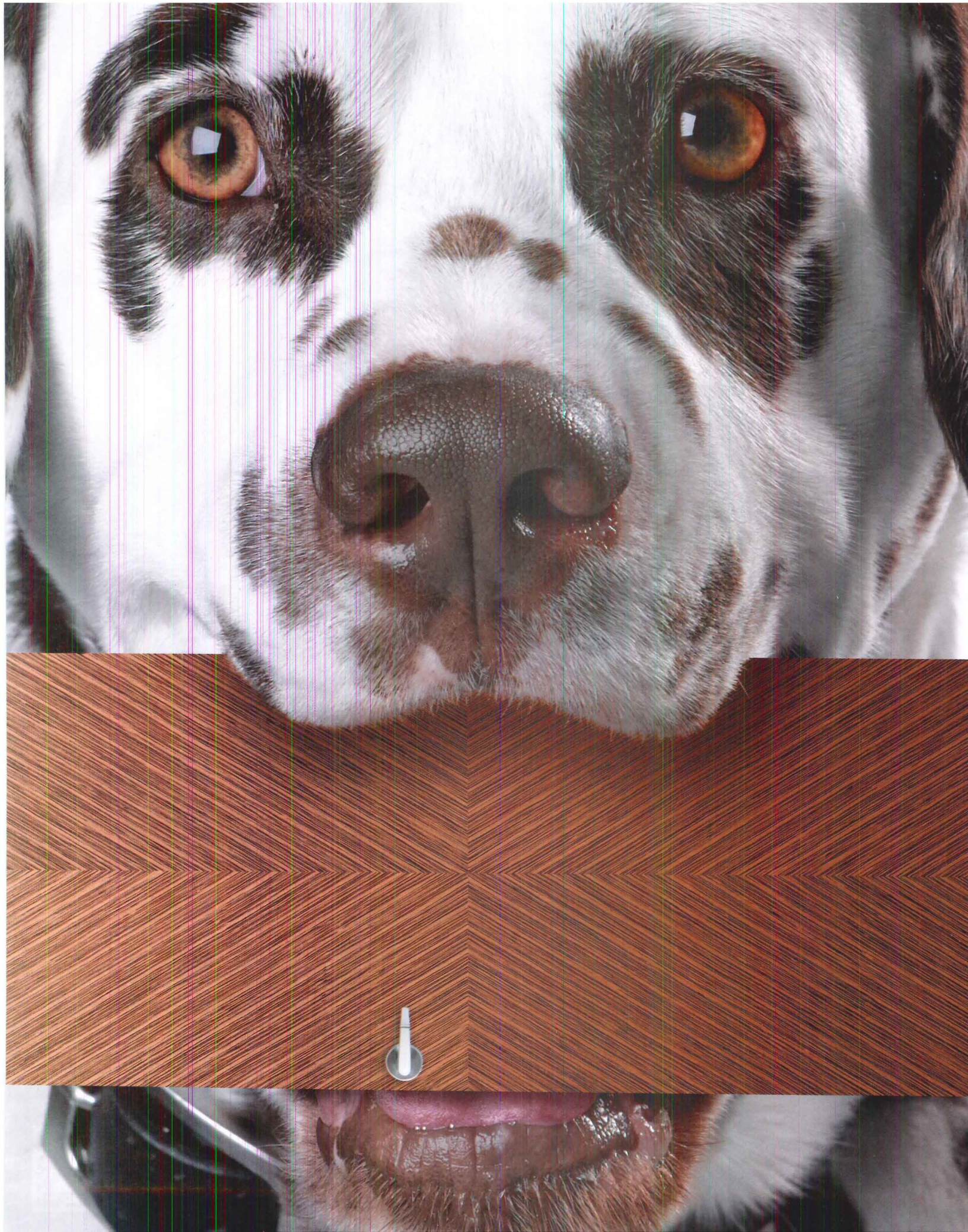

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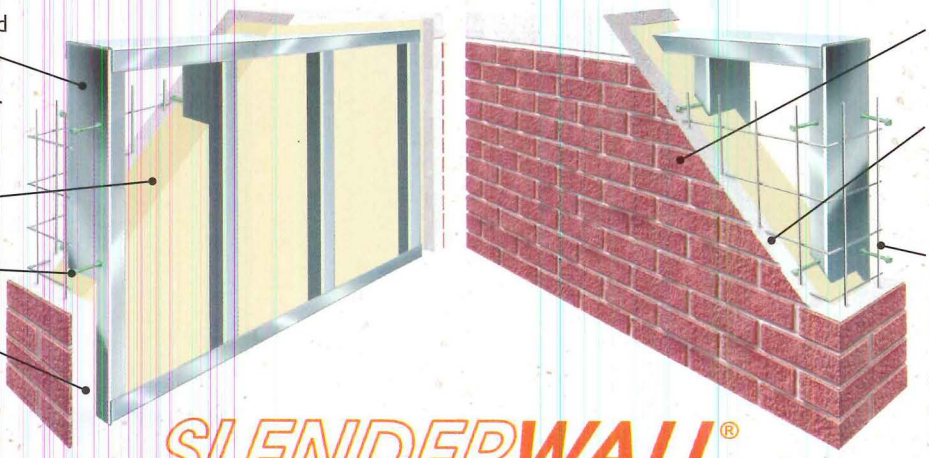

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perspective

"The measure of architecture is what is left after it becomes a ruin."
—David Chipperfield, speaking at the sales launch of his latest residential tower, the Bryant, in New York.

Green Design Takes Stage at International Climate Talks

BY CAMILLE VON KAENEL

Artist Olafur Eliasson collaborated with geologist Minik Rosing to create the installation *Ice Watch* at Paris's Place du Pantheon (this page) to raise awareness of climate change. Eighty metric tons of ice harvested from icebergs in Greenland melted away over the course of the COP21 climate talks. The estimated carbon footprint of the work—accounting for its transportation and installation—was 30 metric tons.

IN DECEMBER, world leaders came to Paris with an ambitious task: cut global carbon emissions to prevent the worst of climate change. They succeeded in reaching a historic agreement.

The United Nations has held international climate talks each year for more than two decades, but for the first time, this year, the official schedule included a "Buildings Day"—a meaningful if symbolic nod to the construction community. At the center of the COP21 conference—the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change—negotiators from nearly 200 nations hashed out a deal setting targets for each country to reduce greenhouse gases.

Past summits have largely ignored sustainable urban design and green construction. But diplomats have been increasingly acknowledging the role of businesses and cities in tackling climate change.

"People are getting it now," said Elizabeth Beardsley, a senior policy counsel for the U.S. Green Building Council (USGBC) in Paris for the talks. "Finally, we are seeing focus on buildings as part of the answer."

Host country France, the United Nations Environment Programme (UNEP), World Green Building Council, Architecture 2030, and other bodies organized the official Buildings Day, which centered mostly on panel discussions. The day also served as a launchpad for a series of novel initiatives, including a new Global Alliance for Green Building and Construction. Green building councils used the conference to create a "Build Better Green" campaign, setting fresh commitments to renovate existing buildings, certify just-finished green buildings, and train building professionals.

"It is really going to be the best and fastest way to get short-term improvements," said Beardsley of the initiative.

The Intergovernmental Panel on Climate Change says that designing energy-efficient buildings is one of the most cost-effective ways to cut back on emissions. Buildings account for about a third of all energy used worldwide and for a fifth of energy-related greenhouse gases, according to the scientific panel (other estimates are as high as a third). Those emissions could double or triple by midcentury, as cities expand and the world's population rises.

The growing awareness of buildings' role in climate change was evident in nearly a quarter of the voluntary climate plans prepared by countries attending the summit. But only one in 10 detailed concrete steps for improvement, according to an analysis by the World Resources Institute.

The presence of construction-sector representatives—from architects with booths in the

Visit our online section, architecturalrecord.com/news.

U.S. President Barack Obama shakes hands with U.N. Secretary General Ban Ki-moon while French President François Hollande looks on during Leaders Day at COP21 on November 30. On December 12, an international agreement was reached to limit global warming to 1.5 degrees Celsius.

business pavilion to members of green building councils crossing paths with national delegates—sends a signal to the global community that the technologies exist, suggested Jennifer Layke, the director of the building efficiency initiative at the World Resources Institute in Paris.

"If a [delegate's] business community is here from their country saying, 'We have solutions,' that matters to how ambitious they feel," said Layke. "There's a critical role for negotiations, and there's a critical role for how we deliver on those goals, and that's where buildings are really important."

Rallying these actors—investors, mayors, and construction firms—helped advance that argument, more so than top-down diplomacy, she said. Other discussions focused on topics including how cities could engage multiple stakeholders or how they could incorporate building energy efficiency into lasting sustainability plans.

Technology displays and presentations outlining waste strategies were meant to inspire private design firms, but a major group of stakeholders did not come to Paris. Rives Taylor, a principal at Gensler, had gone to the city to connect with potential clients, and was disappointed in what he saw as a poor showing of private developers. "The 'how to' seems to be coming at the city scale instead of at the individual building scale," he said. "It tended to be more academic, less practitioner-oriented."

While Building Day was a promising step forward, buildings are not explicitly mentioned in the international deal. Countries agreed to a goal of limiting global warming to 1.5 degrees Celsius, giving markets a strong signal to pursue a low-carbon future. But the countries' construction promises are nonbinding, and financing remains a key barrier to major building retrofits, especially in developed countries.

But on-the-ground changes will come from elsewhere, suggested Taylor: "It takes us, the design leaders, to be the coordinators of many different things beyond on-time design and construction," he said. "Manufacturers, transportation, even city utilities are getting it. The building industry needs to get there." ■

Camille von Kaenel writes about the business and politics of climate change for ClimateWire of E&E Publishing in Washington, D.C.

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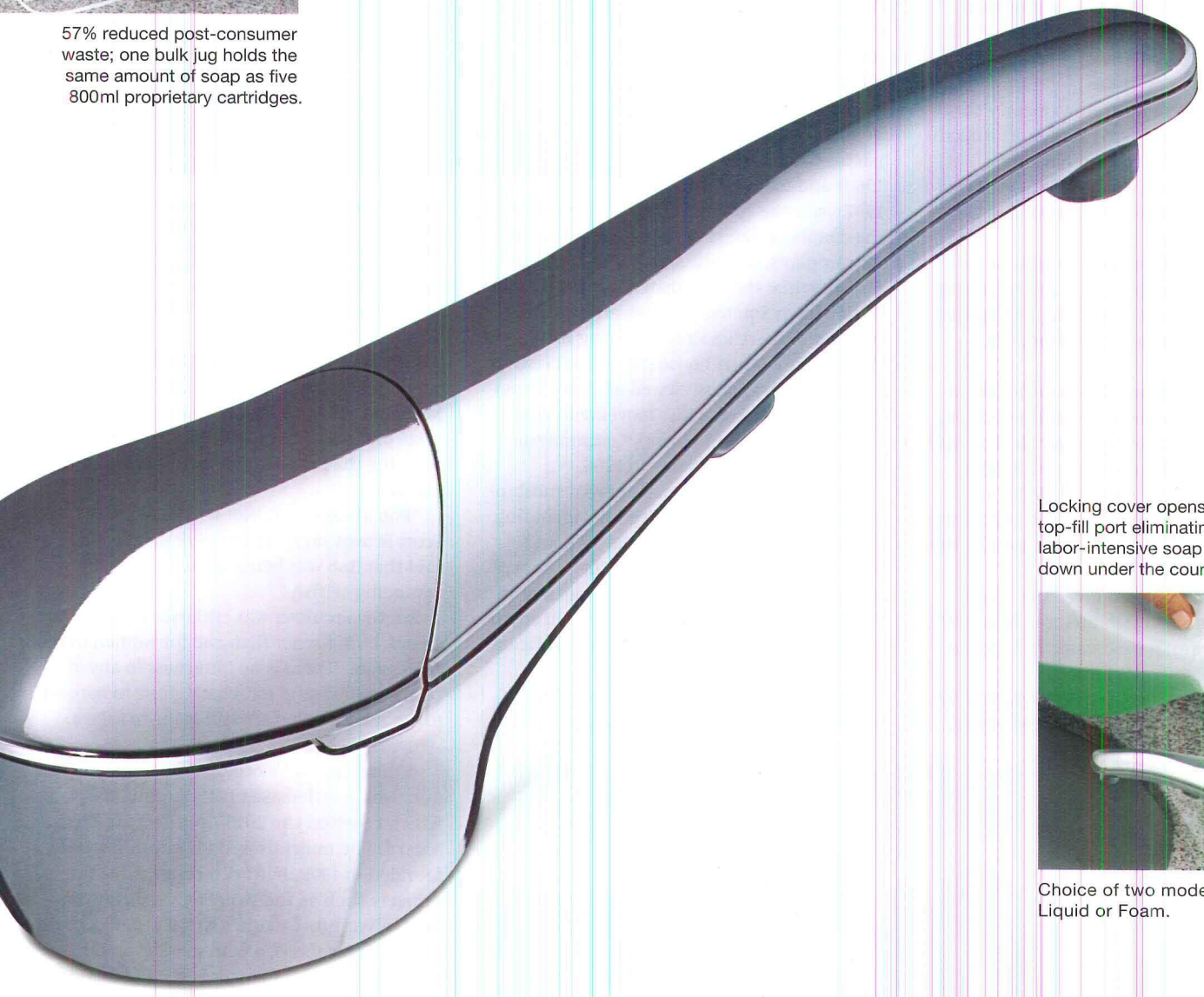

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CIRCLE 80

Denise Scott Brown & Robert Venturi Win 2016 AIA Gold Medal

BY ANNA FIXSEN

The AIA named pioneering architects Denise Scott Brown and Robert Venturi its 2016 Gold Medal Recipients (above). The pair has collaborated for 55 years. Meanwhile, Seattle firm LMN Architects was awarded the organization's annual Architecture Firm Award. The firm completed the Vancouver Convention Centre West in 2009 (bottom).

AT LONG LAST, Denise Scott Brown has been given her due. On December 2, the American Institute of Architects (AIA) announced Scott Brown and her husband and professional partner Robert Venturi as recipients of the 2016 AIA Gold Medal, the organization's highest honor.

The announcement follows nearly three years of campaigning by some in the architecture community for a retroactive Pritzker Architecture Prize for Scott Brown alongside Venturi, who was awarded the prize solely in 1991.

"There were a lot of people who were really passionate about them getting recognized as a team," said Caroline James, who was present for the announcement in Washington, D.C.

James, with Harvard Graduate School of Design classmate Arielle Assouline-Lichten, spearheaded efforts to try to get the Pritzker Prize givers to acknowledge Scott Brown. While thrilled about the Gold Medal announcement, James said they will continue to petition for Scott Brown's recognition by the prize's committee.

The night of the announcement, Scott Brown and Venturi celebrated the win over champagne, vanilla ice cream, and pizza at their home in Philadelphia.

"When I heard the voice of the AIA president [Elizabeth Chu Richter] on the phone, there was such joy in her voice that I was suspicious," Scott Brown said. "They were clapping on the phone when they told us. It felt like a real wave of joy."

Scott Brown and Venturi began their partnership in the 1960s and married in 1967. Over the course of their joint careers, the couple designed dozens of projects and master plans, including Franklin Court in Philadelphia; the Episcopal Academy Chapel in Newtown Square, Pennsylvania; and the National Gallery's Sainsbury Wing in London. The Vanna Venturi house (1964), in Chestnut Hill, Pennsylvania, is viewed as a major catalyst of the postmodernist movement, along with Venturi's seminal work *Complexity and Contradiction in Architecture* in 1966.

Venturi and Scott Brown enjoyed substantive academic roles at institutions including the University of Pennsylvania, MIT, and Harvard. In 1968, while at the Yale School of Architecture, the pair taught an influential third-year studio course with Steven Izenour on Las Vegas, which spawned the significant 1972 book *Learning from Las Vegas.*

Scott Brown is the first living woman to receive the Gold Medal (Julia Morgan posthumously received the honor in 2014). Over the years, Venturi was approached for the Gold Medal, but the pair was not eligible for the prize until the AIA changed its rules in 2013, allowing the prize to go to two architects, not just one.

"Bob always said, 'Not without Denise,'" Scott Brown said. "There were people who said that Bob was being quixotic, and that I was being selfish."

But the architect was enthusiastic about the award, both for her firm and for women in the profession. "There is no bitterness in any of this. It's wonderful for what's going to happen to architecture, but it's still going to take a struggle," she said.

Among the AIA's other Honor Award winners was Seattle-based LMN Architects, which received the 2016 Architecture Firm Award. The multidisciplinary design studio, founded in 1979, has been responsible for projects such as the Vancouver Convention Centre West (the world's first LEED Platinum convention center), a plan for Cleveland's civic core, Seattle's Foster School of Business, and the Tobin Center for the Performing Arts in San Antonio.

The AIA also honored Douglas S. Kelbaugh with the 2016 AIA/ACSA Topaz Medallion for Excellence in Architectural Education; R. Steven Lewis with the 2016 Whitney M. Young Jr. Award, which honors work that addresses social issues; and Terrance J. Brown with the 2016 Edward C. Kemper Award, recognizing service to the AIA.

Venturi, Scott Brown, LMN, and the other winners will receive their awards at the 2016 AIA Convention in Philadelphia this May. ■

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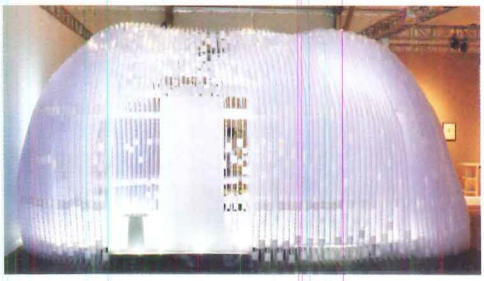
Brand Name Architecture Available to Go (and to Stay) at Design Miami

BY FRED A. BERNSTEIN

DESIGN FAIRS are crawling with collectors ready to drop tens of thousands of dollars on objects that promise immediate gratification. Case in point: beaded sculptures of mushrooms and animals by designers Nikolai and Simon Haas sold out in the first half hour of Design Miami on December 2 for up to $150,000 apiece.

But for architects, nothing happens in a half hour. That may be the lesson of *Unbuilt*, an installation by Harvard's Graduate School of Design outside the Design Miami tent. It consists of pink foam models of 198 unrealized buildings by students and faculty, raised on a steel frame. The intent is honorable, but the finished installation reduces buildings of different scales, functions, and materiality to tabletop objects. The school's dean, Mohsen Mostafavi, pointed out that signs direct visitors to the projects' websites. "It's an architectural archive masquerading as a pavilion," he said.

Inside the tent, entrepreneurs were selling architecture to go: Galerie Philippe Gravier displayed a pair of pavilions by Kengo Kuma, one with a wood lattice frame, the other made of polycarbonate sheets. At the other end was a pavilion by New York firm Gluckman Tang, a stylish lean-to meant to serve as an art gallery. Just beyond was a curvy picnic house by Zaha Hadid. Filipino developer Robbie Antonio commissioned the portable buildings—available for as much as $450,000—and calls them Revolution Pavilions.



For Design Miami, Kengo Kuma designed a mobile tearoom made of corrugated plastic panels (top). Harvard GSD created the entry pavilion for the exhibitor's tent—a display of 198 models of unbuilt buildings by students and faculty (bottom).

There are plenty of new buildings under construction in Miami, including a science museum by Grimshaw Architects and the Faena Forum, OMA's contribution to a $1 billion hotel-and-condo complex. At the southern end of the beach, Rene Gonzalez has completed Glass, a handsome condo tower, while at the northern end, Richard Meier's Surf Club is nearly ready for occupancy.

On the mainland, the Design District has become a showcase for up-and-coming architects including Sou Fujimoto and his blue-glass colonnade, IwamotoScott with a parking garage, and Aranda\Lasch's pleated building for Tom Ford. But, increasingly, architects in Miami are forgoing the chance to do what architects do—working with clients to meet specific programmatic needs—in favor of making objects that promote their brands. Let's hope it's a winning strategy for them and for the profession. ■

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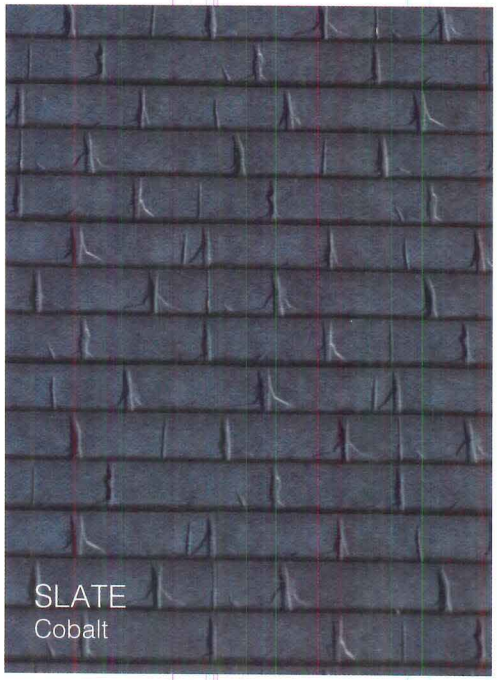

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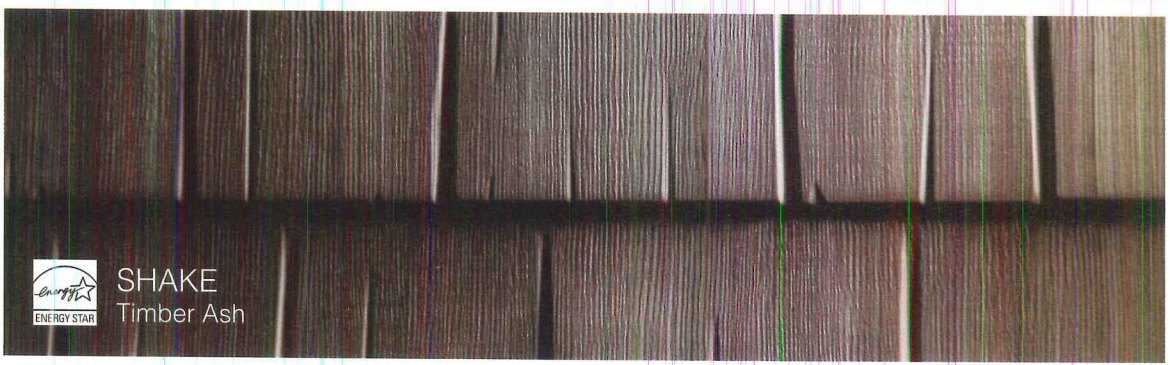

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CIRCLE 231

[NEWSMAKER]

Benjamin Prosky

BY ANNA FIXSEN

IN NOVEMBER, the American Institute of Architects New York (AIANY) and Center for Architecture selected Benjamin Prosky as its new executive director. Prosky, who is the assistant dean for communications at Harvard's Graduate School of Design (GSD), will officially take the reins of the chapter—the AIA's largest and oldest—next month.

Prosky holds a master's in Urban Planning from Columbia University's Graduate School of Architecture, Planning and Preservation (GSAPP) and a B.A. in Urban Studies from Vassar College. He returned to GSAPP in 2005 as director of special events and external affairs before moving to the GSD in 2011. Some of Prosky's achievements there include revitalizing *Harvard Design Magazine*, relaunching the school's Wheelwright Prize, coordinating student involvement in the 2014 Venice Architecture Biennale, and mounting a myriad of exhibitions.

He is gearing up for a busy tenure at AIANY, laying the groundwork for a robust schedule of events and preparing to host the 2018 National Convention. RECORD spoke with Prosky by phone in Cambridge, where he was just back from Design Miami, helping to direct the GSD's pavilion (see page 28).

What do you hope to accomplish during your tenure as AIANY's executive director?

I think the Center for Architecture is an absolutely crucial space in New York. And it needs to be a crucial space not only for architects, but also for local residents and those interested in architecture and beyond. In general, I hope this becomes a place that young people stepping into the profession see as not only relevant, but helpful.

For the last several years you have worked in an academic context. What are some takeaways?

I've learned a lot working in an experimental, academic environment. Architecture needs to be understood as a problem-solving profession. Students at Harvard and elsewhere are concerned about issues of equity. What are designers' roles in creating more equitable cities, especially when it comes to issues of race that have plagued our cities recently? Women in design is another issue; we are not seeing as many women leaders at firms as men. That's a push for change we've seen at Harvard, with [the student-led petition supporting a retroactive Pritzker Prize for] Denise Scott Brown, who just received the AIA Gold Medal. Something else I have learned is how important it is to be experimental and to keep up with changing technology. Harvard just launched a master's in design engineering [a joint initiative between the GSD and the engineering school], for example.

At the center, do you hope to encourage more cross-disciplinary discussions?

Absolutely. I would love to not just see architects talking to architects, but see architects speaking with people in other professions. If we are making cities, we want to be talking to lighting designers, landscape architects, and planners. I want this to be a place where design professionals can learn or talk about collaborating, and I think the center can really foster those kinds of interactions.

You mentioned students, but what are the concerns of AIANY members?

There are many wonderfully engaged members at AIANY. They are concerned about the future of the profession, which translates to young people seeing value in the career. But members are also concerned about how architecture relates to government policies. We need to keep in close contact with the city, state, and national levels to understand what changes affect the profession, how we design, and what we design for.

How do you plan to build upon the legacy of your predecessor, Rick Bell?

I am so grateful to Rick for leaving the center in a solid place. Building on his legacy is continuing to use that space to the best of its ability and build upon its programs. Rick was very visible and accessible, and I hope to continue to be a leader that members can come to.

What can RECORD readers look forward to seeing from AIANY and the center in 2016?

I think we are going to look at programs that engage young architects, and look at stepping outside our door. I can't declare anything in terms of exhibitions and programs yet, but I think you are going to see some real focus and curatorial intent. And I think you're going to see a quick response when issues come up; to be a gathering place for our community, the center has to be able to move and respond. ■

noted

Assemble Wins Turner Prize

Assemble has won the 2015 Turner Prize, Great Britain's most prestigious artistic honor, bestowed by the Tate. The London-based architecture collective, founded by Cambridge University graduates in 2010, is the first design group to win the prize, typically bestowed on an artist, since the award's inception in 1984.

MoMA Names Associate Curator of Architecture & Design

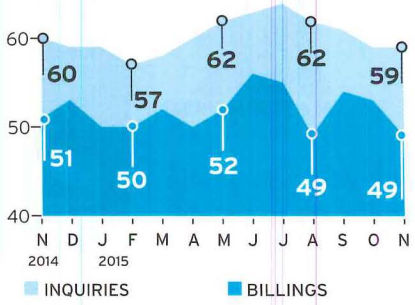
The Museum of Modern Art named Sean Anderson the associate curator of its department of architecture and design. He will work alongside chief curator Martino Steirli. Before joining MoMA's staff, he was a lecturer at the University of Sydney in Australia.

SCI-Arc Launches Shanghai Program

Southern California Institute of Architecture (SCI-Arc) has launched a new program in Shanghai, beginning this summer. The four-week graduate-level program will be led by designer Steven Ma, and will include courses in digital modeling, industrial design, and fabrication technologies. The Shanghai program will be the first in a series of upcoming international programs.

Columbia Names New Director for Preservation Program

Amale Andraos, dean of Columbia University's Graduate School of Architecture, Planning and Preservation (GSAPP), has appointed Jorge Otero-Pailos as the new director of the school's Historic Preservation Program. Otero-Pailos, who has been on the GSAPP's faculty since 2002, will step into the role this summer.

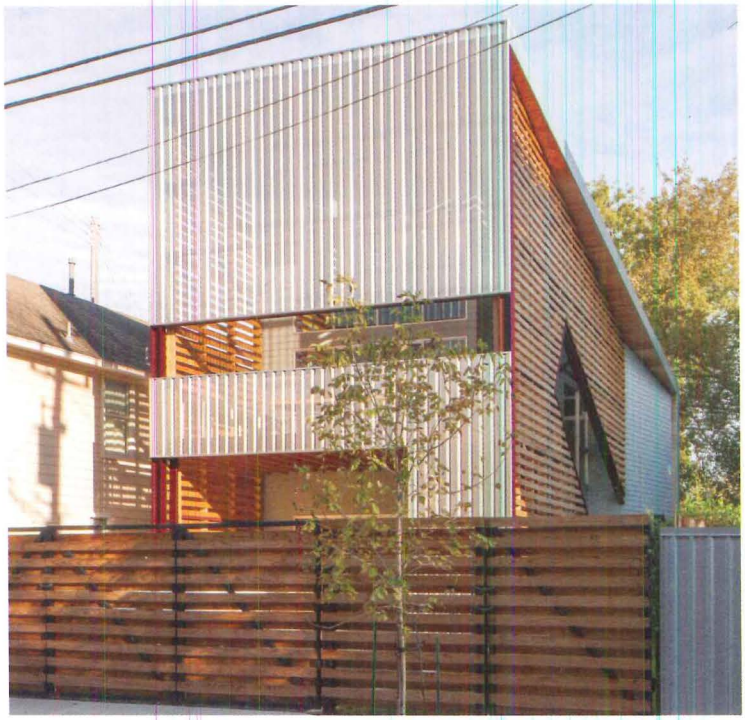


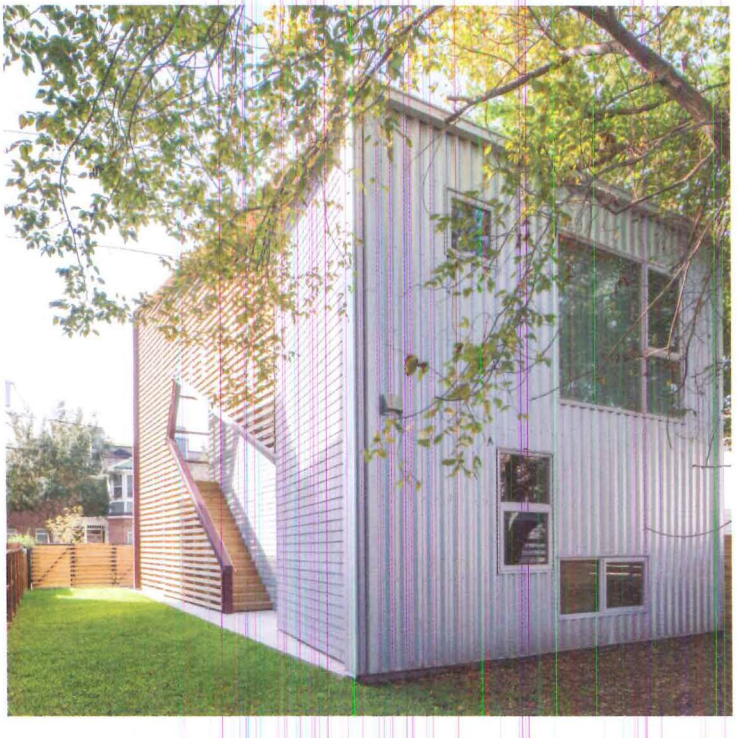
ABI Dips in November

The AIA reported that its monthly Architecture Billings Index (ABI) slumped in November to 49.3, down 3.8 points from October's score. Any score above 50 indicates an increase in billings. The new projects inquiry, meanwhile, increased slightly to 58.6. AIA economist Kermit Baker said this didn't indicate weakness in the construction sector, but rather uncertainty due to shrinking budgets and labor shortages.

perspective**house of the month**

AN ENVIRONMENTALLY EFFICIENT DESIGN-BUILD HOME IN HOUSTON RESPONDS TO ITS URBAN CONTEXT. **BY MIRIAM SITZ**





ARCHITECT ZUI NG'S flexible design for the Shotgun Chameleon house dates back to the 2006 Venice Biennale, where he exhibited plans for his post-Katrina New Orleans prototype. The Shotgun Chameleon, a part of the U.S. pavilion exhibition *Rebuilding After Katrina* (organized by ARCHITECTURAL RECORD for the Biennale), was never constructed. Nevertheless, the idea stuck with Ng for almost a decade and in 2015, he built the home in Houston's historic Fourth Ward neighborhood for himself and his young family.

The architect says he fell in love with the site, which lies in the midst of "a constantly evolving urban fabric," where older homes compete with new condominiums and residential towers. "The house had to reconcile with all the contradictions around it," he says.

Studying the vernacular architecture of New Orleans, Ng noted how owners of old shotgun houses often rent out their front rooms—which have their own entries—for extra income. That observation prompted him to add an external staircase to the Shotgun Chameleon, making the building easily divisible into a duplex or live-work space.

Much of the design-build project's modest budget (less than $300,000 for 2,000 square feet) went to the concrete foundation and steel-frame structure, filled in with 2-by-6-inch studs and plywood. Multiple windows in every room foster cross-ventilation: breezes flow through the south-facing porch and balcony to ventilate the house passively, while wooden slats on the sides and a perforated stainless-steel screen on the front afford privacy.

Ng calculated the angle of the roof over the balcony to shield the interior from the high summer sun but allow lower winter rays in. Other energy-efficient choices—a tankless water heater and mini-split air conditioners minimize energy consumption. Spray foam insulation and low-E, argon-gas-filled windows help maintain comfortable temperatures inside.

With 16-foot-high ceilings, the second floor living and dining room opens up to the balcony via sliding glass doors, creating an expanded living space. "We wanted to sustain the culture and history of the area," Ng says, "so we built the porch and balcony to be able to interact with our neighbors."

Faced with a diversity of architectural styles and a rapidly evolving neighborhood, the Shotgun Chameleon takes a subtle and smart approach to fitting in. "In Chinese, we have this saying: Slow water cuts rocks. Rather than confronting conflict head-on," says Ng, "the philosophy is about moving slowly to mediate dissonance all around." ■

An external stair on the side of the house offers an additional means of entry to the balcony and upper story (top). The perforated steel screen provides privacy and shade for both interior and exterior living spaces on the second floor (above), which face the street.

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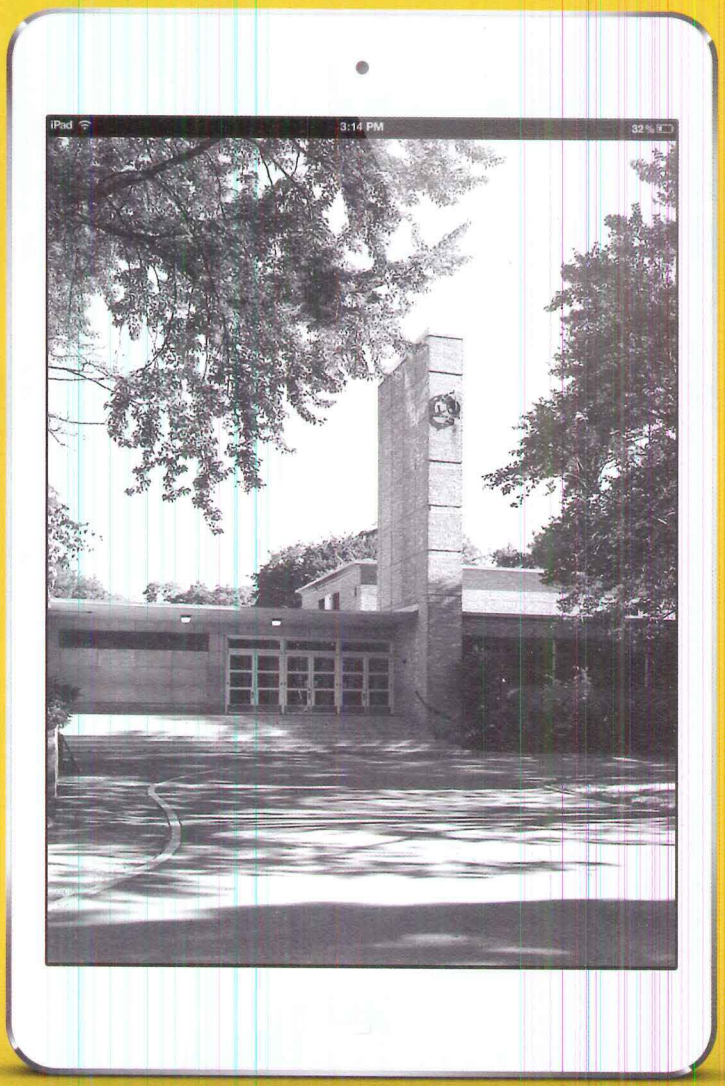

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TAKE A LOOK ON PAGE 41 ▶

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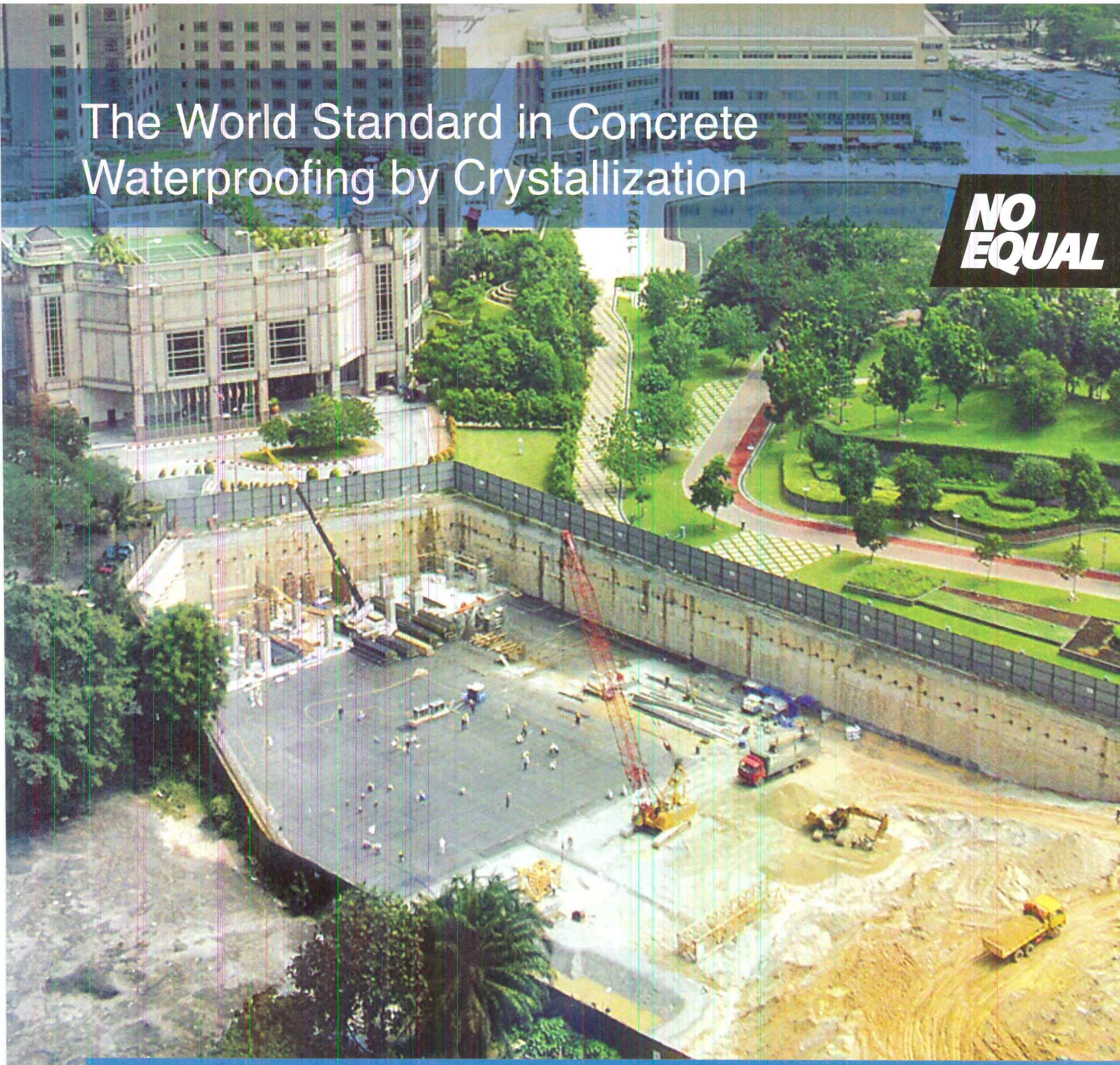

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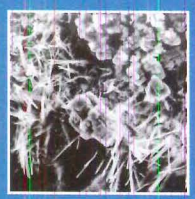
Concrete (Untreated)



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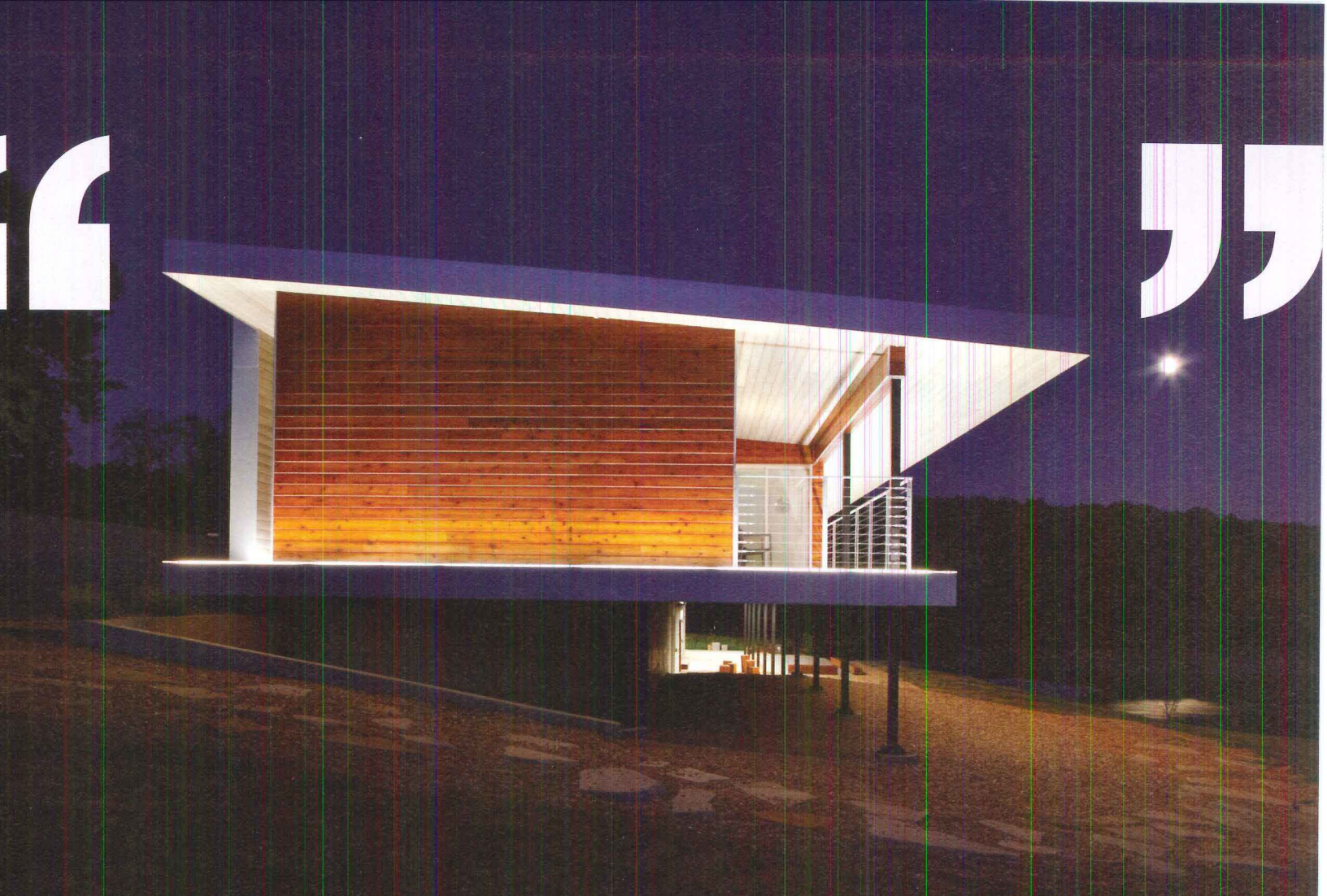

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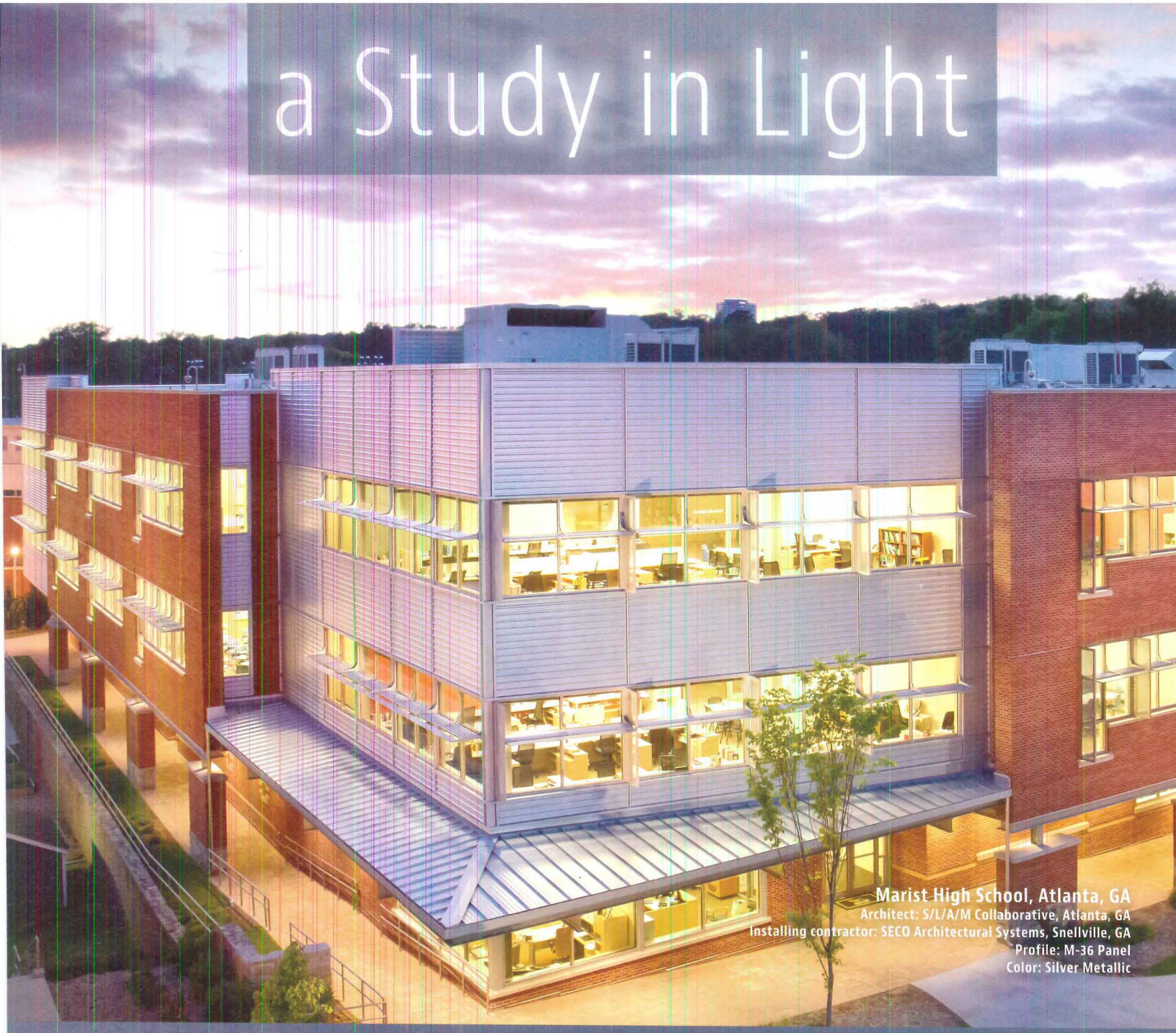
CIRCLE 246

a Study in Light



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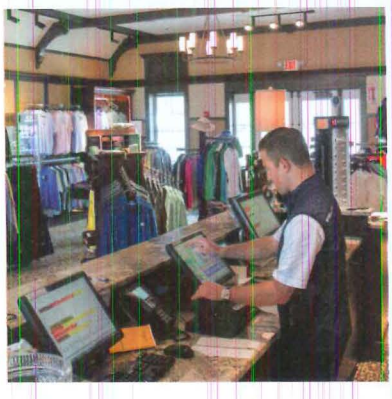

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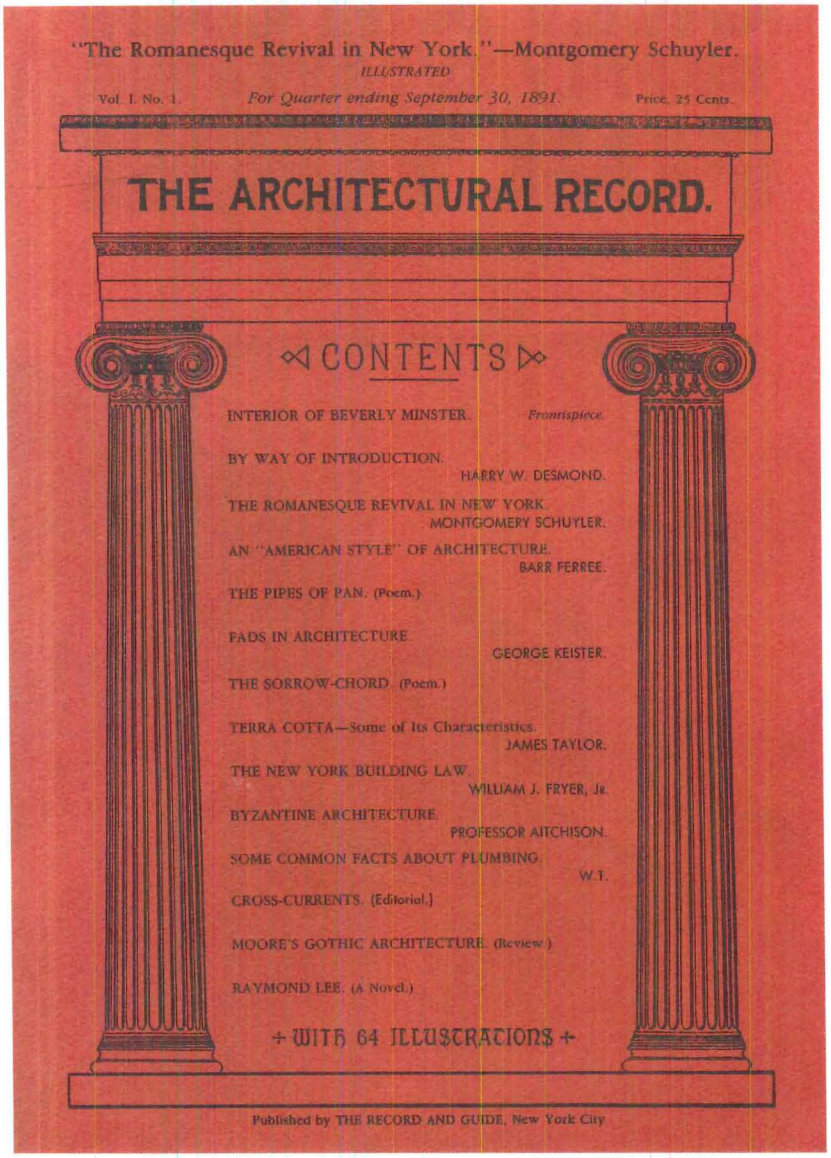
CIRCLE 195

The Formative Years

ARCHITECTURAL RECORD turns 125 this year. In celebration, we present memorable moments from the magazine's early days.

BY SUZANNE STEPHENS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CONTENTS

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Published by THE RECORD AND GUIDE, New York City

FRANK LLOYD WRIGHT did not take criticism lightly. He was furious at the stinging denunciation of his revolutionary Larkin Building in Buffalo that was published in ARCHITECTURAL RECORD in April 1908. Its author, Russell Sturgis, an eminent architect and historian who had written for RECORD since its inception in 1891, called Wright's office building for a mail-order soap company "ungainly" and "awkward." This "extremely ugly" structure of unadorned brick lacked "a play of light and shade" through moldings, and was without "a variety of color pattern." Wright retaliated in an unpublished reply that it was "pathetic" to see a well-respected critic "picking over bit by bit his architectural ragbag for architectural finery wherewith to clothe the nakedness of the young giant."

Apart from Wright's arrogance, it's easy to understand why he was upset: the month before, RECORD had published the largest presentation of his work to date (34 projects, with 87 illustrations). Wright's accompanying essay, "In the Cause of Architecture," set forth his organic approach to the design of open, flowing spaces, and the expression of natural materials. It was the first of a series of theoretical essays he would write over the years for the magazine. In 1908, however, the magazine just did what it would continue to do to this day: publish a serious critic's point of view, even if the editors did not necessarily agree with it.

In the late 19th century, before the advent of radio and television, magazines enjoyed phenomenal influence among a growing community of readers. By the 1890s, there were 5,000 magazines published in America, up from 700 in 1865. Industrialization, advances in education, and the institutionalization of the professions helped fuel this growth, as well as the expansion of the postal service that made second-class magazine delivery commonplace. And the electric light bulb encouraged more nighttime reading.

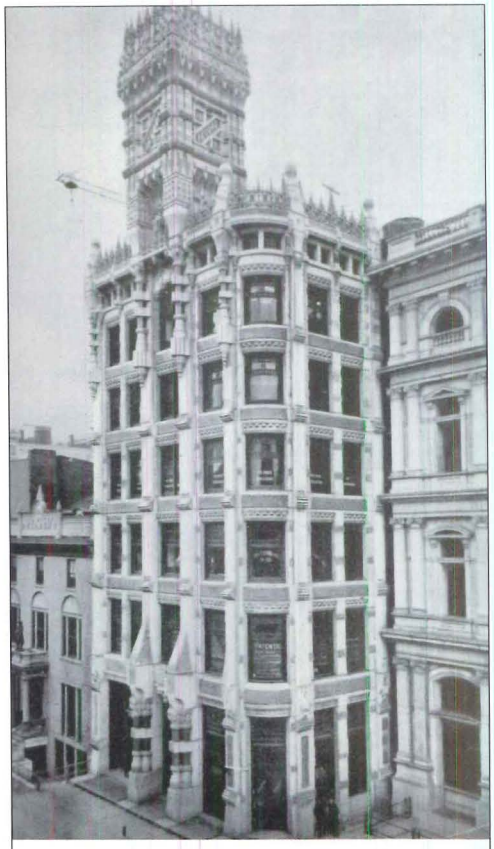
While magazines such as *Harper's* and *The Nation* covered architecture along with the other arts, the publisher of *Real Estate Record and Builder's Guide*, Clinton Sweet, saw the opportunity for an architecture magazine that would reach a professional as well as a general audience. Tall buildings were springing up in cities, thanks to the invention of the elevator and the development of steel framing. The expansion of the railroad, steel, and oil industries created the vast wealth of the Gilded Age, and the new plutocrats hired architects such as Richard Morris Hunt and McKim, Mead & White to design palatial city and country houses that rivaled the style of their European predecessors.

The planning of the World's Columbian Exposition of 1893 to celebrate the 400th anniversary of Columbus's arrival in America captured wide public attention. Though Congress had decided it would be held in Chicago instead of New York, Sweet was convinced that a quarterly could take advantage of increased curiosity about architecture, and provide a forum for important discussion.

Sweet chose Henry (Harry) W. Desmond, a 28-year-old Irish journalist, as his founding editor of RECORD. Though Desmond had edited the real-estate weekly, he aspired to be a poet, and he was determined to make the new magazine a force of intellectual thought, not "merely recording" news of contemporary work.

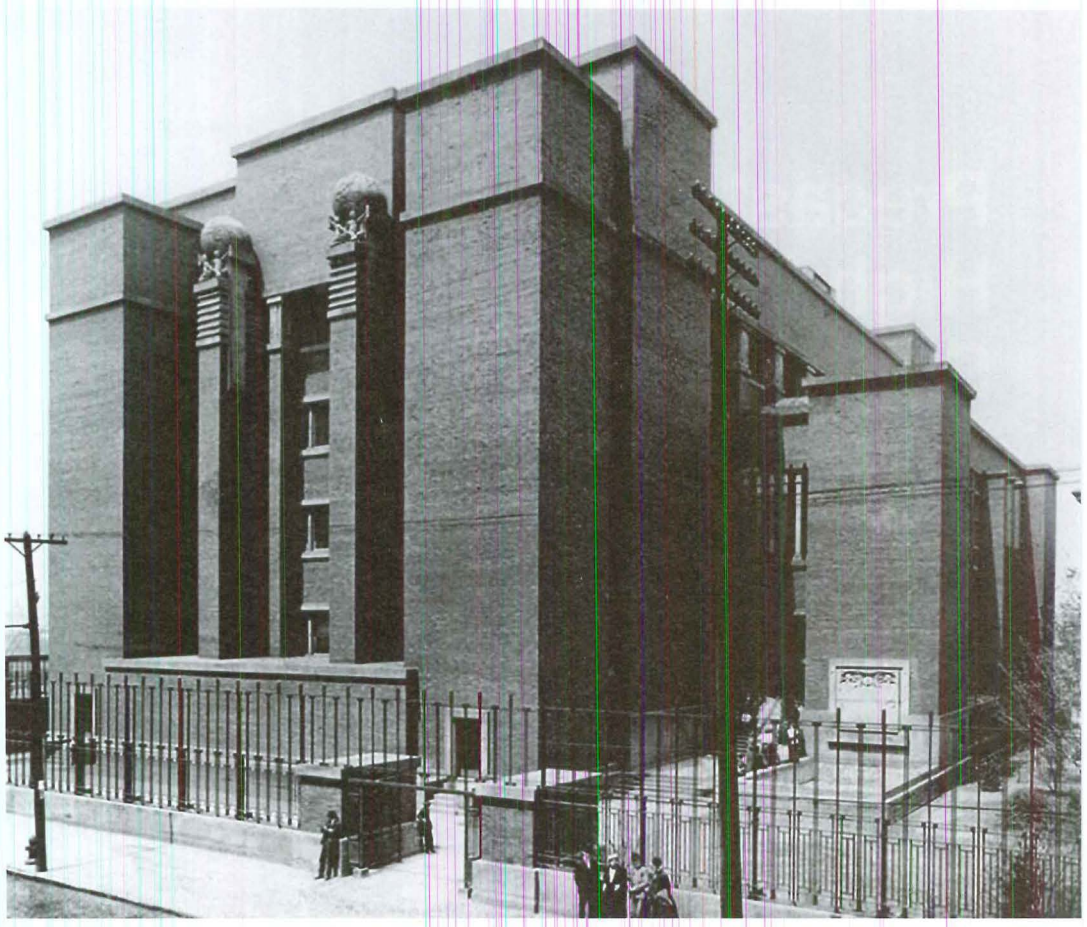
The first issue of RECORD, July–September 1891, included an essay, among historical and technical pieces, on the need for creating a genuine American style. Desmond also ran an installment of his own unpublished novel, *Raymond Lee*, subsequently serialized in the magazine, although it had little to do with architecture.

The young editor pushed for a larger cultural reach than was typical of other architectural periodicals by emphasizing the "vital" place of art. Under Desmond's tenure, RECORD published "The Wild Men of Paris" in 1910, considered the first publication about Cubist artists in the American press. The essay included photographs of both Picasso and his painting *Les Demoiselles d'Avignon*; the writer of the piece, Gelett Burgess, remarked that "Picasso was colossal in his audacity," adding that his "terrible pictures loom



ARCHITECTURAL ABERRATIONS.*

No. 2.—THE RECORD BUILDING, PHILADELPHIA.



through the chaos of his studio." But, Burgess noted, "He sells his work, nevertheless. Who buys? God knows! Germans, I suppose." In spite of his sardonic tone, Burgess prophesied that "Perhaps these Wild Beasts"—he included Matisse and Braque—"are really the precursors of the Renaissance."

RECORD's growing renown as a magazine of important criticism was consolidated by the contributions of Sturgis and of Montgomery Schuyler, who had already established their reputations in newspapers and other magazines. While Schuyler's protomodernist stance and his excoriation of thoughtless eclecticism would later earn him the respect of Lewis Mumford, his spiciest takedowns appeared anonymously under the rubric of "Architectural Aberrations." Here he attacked buildings going up everywhere that "collared the eye." The mélange of historical elements in the Philadelphia Record Building (designed in 1886 by Willis G. Hale) he deemed "restless," "monstrous," and "wild." While Schuyler, more than Sturgis, encouraged economy of expression, both battled against architecture that was eclectic and lacked proportion or unity.

Similarly, a young editor on RECORD's staff, the mild-mannered Herbert Croly, called for civility and propriety in the changing cityscape. His criteria were less aesthetic than his colleagues', for he framed his arguments within a social perspective, adding another voice and dimension to this magazine. In 1909, Croly published *The Promise of American Life*, a progressive political tract that called for a government run by "wise, humanistic, and well-educated" men instead of those who believed in "indiscriminate individualism." He suggested that the model for these attributes could be found in the architect who "would not cater to mass taste but adhere to a higher standard." Croly went on to become the founding editor of *The New Republic* in 1914, an influential voice in the world of politics, with a stable of writers that included Walter Lippmann and Oliver Wendell Holmes.

On the eve of World War I, RECORD was clearly prospering. Since Desmond had launched *Sweet's Indexed Catalogue of Building Construction* in 1906, the monthly had increased greatly, and the magazine had 11,000 readers, making it the leader in its field. After Desmond died in 1913, Michael Mikkelsen, who had a Ph.D. in history, economics, and politics, took over. RECORD was still edited for the general reader as well as the architect, but, by the 1920s, the focus shifted to practice and business matters surrounding the rapidly growing profession of architecture. The world of design and construction had changed, and RECORD was changing with it. ■

RECORD railed against brash eclecticism through the unsigned "Architectural Aberrations" feature (above, left). Russell Sturgis criticized Frank Lloyd Wright's Larkin Building in the April 1908 issue (above). In 1910, the magazine introduced Picasso (below) and other French artists to the U.S. in Gelett Burgess's "The Wild Men of Paris."

St. Mary's Catholic Church and School - Joplin, MO
Architect: RDG Planning & Design – Omaha, NE
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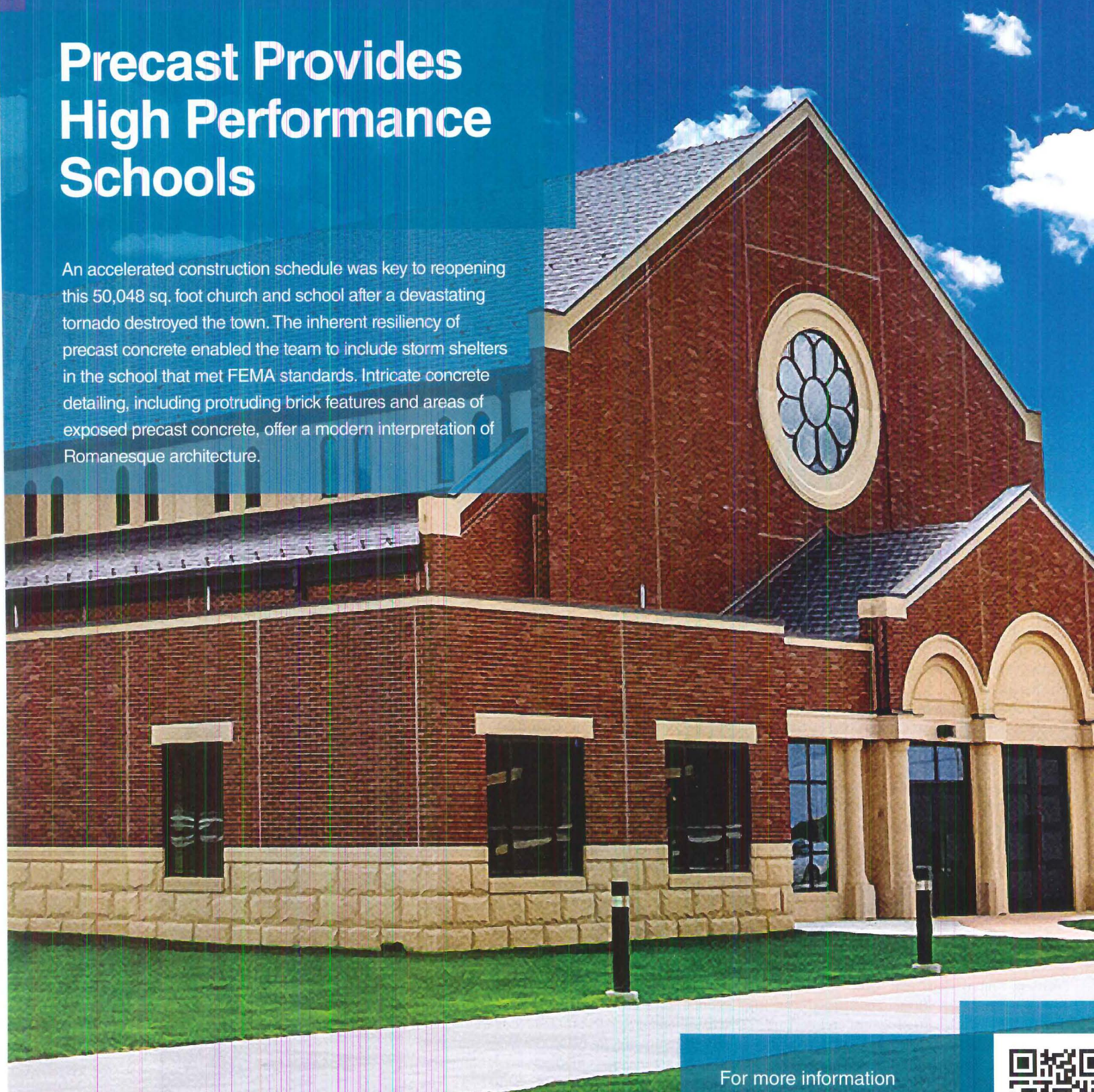

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Modernism's Backstory

Partners in Design: Alfred H. Barr Jr. and Philip Johnson, *edited by David A. Hanks. Monacelli Press, October 2015, 232 pages, $50.*

Reviewed by Suzanne Stephens

WE MAY think we know all there is about the most famous display of architecture to be mounted in the the U.S., the Museum of Modern Art's landmark show, *Modern Architecture: International Exhibition*, curated by Henry-Russell Hitchcock and Philip Johnson in 1932. But there's always more to dig up about this ultra-influential event and the fertile period from which it emanated, as we find in *Partners in Design: Alfred H. Barr Jr. and Philip Johnson*. The book explores the close collaboration between MoMA's first director, Barr, and the exhibit's curator, Johnson, in bringing modernist architecture to America. While Hitchcock, a Harvard-trained art historian, was important to the theoretical underpinnings of the endeavor, he was off teaching at Wesleyan University, while Barr and Johnson dealt with the show's gestation, production, and promotion in New York City.

Surprisingly, the Montreal Museum of Fine Arts (MMFA)—not MoMA—has taken on the mission of illuminating the relationship of the two, with the handsomely illustrated book that functions as a catalogue to an exhibition of the same name, scheduled to open in April in Montreal. Both the show and book were assembled and edited by David A. Hanks, curator of a collection belonging to the Liliane and David M. Stewart Program for Modern Design within the MMFA, which provided pieces for the show.

Barr was only 27 in 1929, when he became the director of MoMA, a museum founded by well-heeled arts patrons such as Miss Lillie P. Bliss, Mrs. Cornelius J. Sullivan, and Mrs. John D. Rockefeller, Jr. A year later, Barr asked Johnson, who was just 24, to be the curator for the architecture show. Their travels abroad to research the lean, new work coming out of Europe may not have generated the rich anecdotes of Hemingway and Fitzgerald in Paris, yet the essays by Hanks, Donald Albrecht, Barry Bergdoll, and Juliet Kinchin fill in a lesser-known backstory of Barr and Johnson's commitment to "exploring modernism in both their personal and professional lives," as Hanks puts it. For example, on Johnson's first visit to Dessau in 1929, he wrote to Barr

that Gropius's design for the Bauhaus was "the most beautiful building we have seen of the larger than house variety . . ."

Partners also offers glimpses into the architectural and artistic milieu of New York from the 1920s to the 1940s. Dramatic black-and-white photographs and classic modern graphics by the Montreal design firm Paprika heighten the period aura. As Hanks notes, Barr's and Johnson's apartments functioned as laboratories for modernist ideas. In 1930, Barr and his wife, Margaret (Marga), moved into the Southgate building on East 52nd Street, where Johnson (whom Marga referred to as a "delectable and plushy boy") had a place right under them. Marga recalled: "We were in and out of our apartments—Philip constantly offering hospitality because he had a German butler named Rudolph." Marga added that the young curator "helped us in the excruciating problem of furnishing our apartment because Alfred wanted it 'modern' and it was so very hard to buy simple furniture." Since the Barrs kept to a tight budget, they found low-cost pieces designed for the Ypsilanti Reed Furniture Company in Michigan by Donald Deskey (who was generally considered too Art Deco-ish by the Bauhauslers). Johnson had the wherewithal to hire Ludwig Mies van der Rohe to design his apartment, but he still wrote his mother to ask if she thought Mies would be too expensive.

Johnson could afford the cost: in one photograph of his later apartment at 216 East 49th Street, we see Oskar Schlemmer's painting *Bauhaus Stairway* (1932) that he gave to the museum in 1942. It soon heralded MoMA's ties to the Bauhaus from its singular position on the grand stair of the museum's new West 53rd Street home.

The ultramodern residences of the Barrs and Johnson were apt settings for entertaining the art and architecture world, which Albrecht brings to light in his essay, "The High Bohemia of the 1930s." The two also joined parties at the East Side brownstone of art dealer Kirk Askew and his beautiful wife, Constance, where you could also find Lincoln Kirstein (cofounder of the New York City Ballet with George Balanchine), critic Carl Van Vechten, and composer Virgil Thomson. Hitchcock would be there holding forth, sipping both a demitasse and a brandy. Art dealer Julian Levy called it "the best and most culturally fertile salon I was to know in the thirties." Johnson referred to the Askew evenings as a "concatenation of Harvard and homosexuals, and modernism as a creed."

In another essay, Bergdoll points out the difference between the 1932 exhibition and Hitchcock and Johnson's concurrent book, *The International Style: Architecture Since 1922*, which became synonymous with the *Modern Architecture* show. The I.S. book, Bergdoll notes, favored four architects and rendered Germany "more emphatically the epicenter of modernism." Left out were the American architects—such as Frank Lloyd Wright, Raymond Hood, George Howe, William Lescaze, and Richard Neutra—who were featured in the exhibition and its accompanying paperbound catalogue. Even Gerrit Rietveld's Schroeder house, also in the show, didn't make the cut for the book. Bergdoll calls the book's editing and condensation "complicated and ideologically driven."

Kinchin explores the 1934 *Machine Art* show, also curated by Johnson, at MoMA. Again, the modernist agenda is underscored by the photos and her discussion of Barr's inclusive vision and how Johnson, who installed the show, played up its "eye appeal." As Kinchin argues, it was "an exhibition of beautiful products, rather than an industrial show or an art exhibition." Precision instruments, watch springs, glassware, and other such objects emphasized the "sensuous beauty" of such materials as porcelain, enamels, copper, and steel, wrote Barr in the catalogue.

The two collaborators eventually would go their own ways: Johnson, who was director of the first department of architecture and design in any museum, left that post in 1934 to pursue conservative political agendas in the U.S. and an inexplicable infatuation with Nazi Germany. He would soon return to Harvard, this time to earn a B.Arch., and then resume his old MoMA post in 1946. Barr would be dethroned from his directorship in 1943, but also would come back, as the director of museum collections, from 1947 to 1967. Those early, heady years were long gone. But *Partners* helps fill in important gaps in our understanding of the history of this significant time. ■

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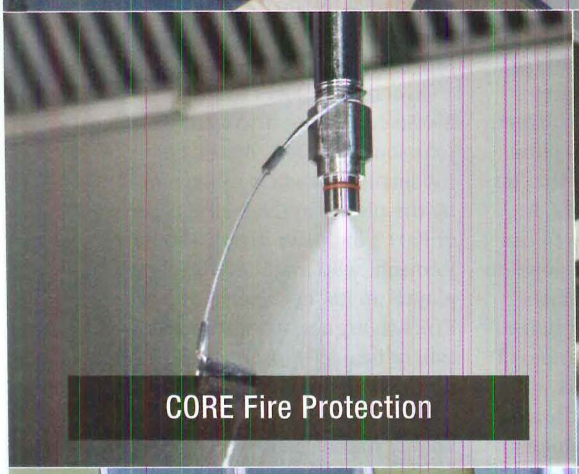

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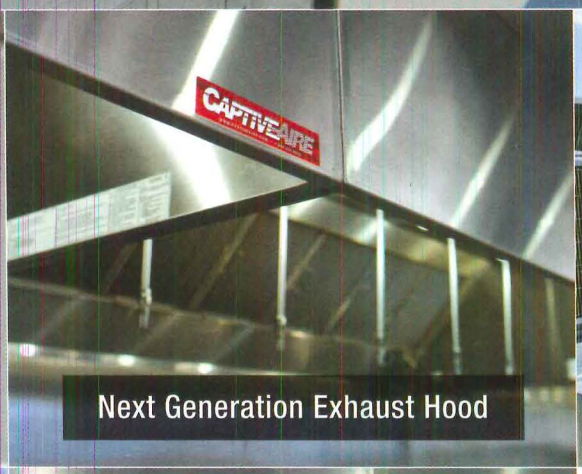

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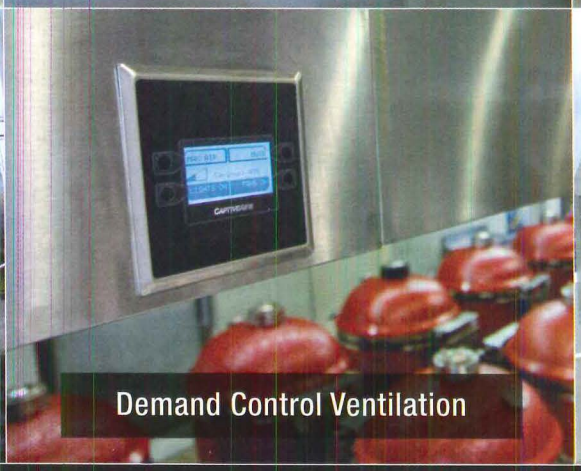

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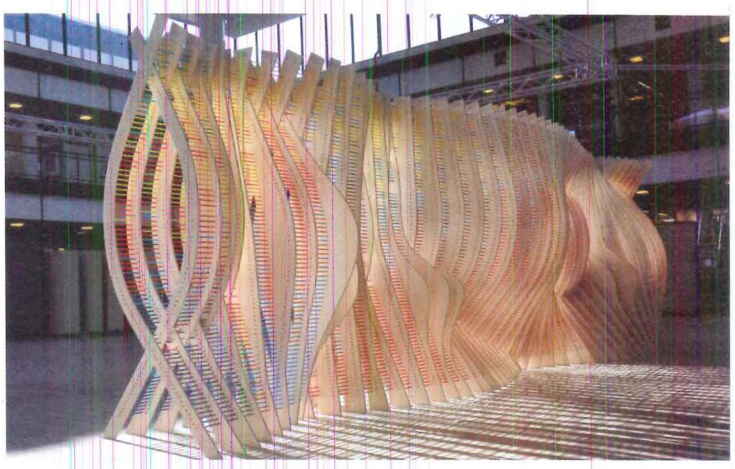
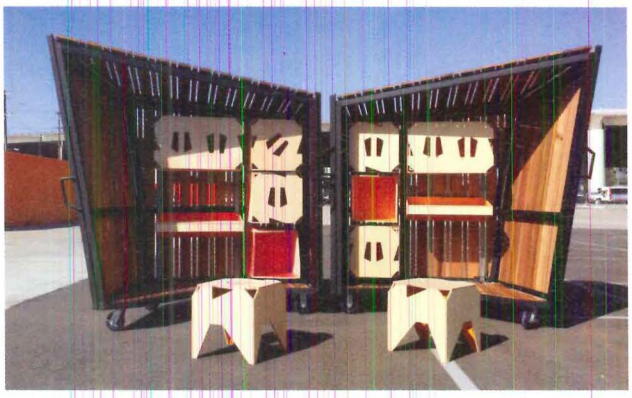




Centennial Chromograph is an installation at the University of Minnesota (top). Marcus with his CCA studio-designed *Mobile Craft Lab*, a mobile lecture, work, and exhibition space (above). A research project, called Modular Variations, is made from reconfigurable CNC-routed molds that can be stacked to make hand-cast plaster components (below).

ADAM MARCUS may count robots, 3-D printers, CNC routers, and enormous data sets as part of his typical design arsenal, but for his built work, he often returns to something as rudimentary as a pencil. In fact, one of the architect's projects involved 8,080 of them: for an installation at the University of Minnesota's School of Architecture called *Centennial Chromograph*, Marcus used polychromatic No. 2's to fasten together a series of robotically routed wood ribs, each of which signified a year in the school's history.

This interplay between the digital and the handmade has come to define Marcus's sensibility since he opened his Oakland office, Variable Projects, in 2011. His creations—which he often describes as "data spatialization"—investigate how new technologies can physically (and practically) be applied to traditional architecture processes.

The architect labels Variable Projects as "post-digital," which may sound arty and esoteric, but to Marcus signifies the contrary: making digitally designed work accessible using a human touch and simple materials. With *Centennial Chromograph*, for instance, viewers were invited to take pencils as souvenirs.

"I am part of a generation of architects who were educated at the height of the digital computational turn in architecture," explains Marcus, who received his M.Arch. from Columbia in 2005. "Now we can question the naiveté of that time."

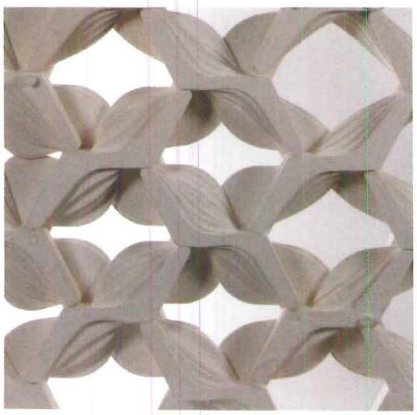
After graduating, he spent two years in Bernard Tschumi's office and six years at Brooklyn firm Marble Fairbanks. Then he won a two-year teaching fellowship at the University of Minnesota's architecture school. His time in Minneapolis was productive—he began to develop Variable Projects and also formed Futures North, an art collective exploring the aesthetic possibilities of big data. One sculptural installation illustrated shifts in the contours of the Mississippi River, created by fusing data from early 19th-century maps and Google satellite images to determine the form of 15 columns. The pillars light up as information from the river is transmitted to crystalline LED lanterns on top.

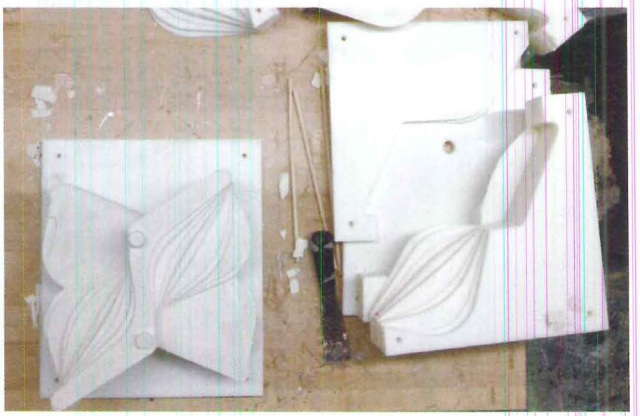
Intrigued by the intersection of tech and maker culture in the Bay Area, Marcus moved in 2013 to become an assistant professor at California College of the Arts (CCA) in San Francisco. He encourages his students to have a pragmatic approach to design. "I often say to students, 'OK, you can model it, but how do you *make* it?'" he explains. "For me, it's about how computation can be leveraged to further architectural, social, or programmatic goals."

A current undertaking combines digital design with ecological goals. Marcus and his studio are collaborating with biologists, Autodesk's Pier 9 Workshop, and Kreysler & Associates (the fabricator responsible for SFMOMA's fiber reinforced plastic [FRP] facade) on a project called Buoyant Ecologies to design synthetic habitats for marine invertebrates. Otters devoured the first critters that took to the initial FRP substrate, so the studio adjusted the geometry to protect the fledgling community. "Prototyping is important. Experiments are usually failures, but you have to get that out of the way," he says.

The profession seems to regard him as anything but a failure. In 2013, *DesignIntelligence* named him one of America's 30 Most Admired Educators. Last year, *Centennial Chromograph* received an AIA Small Project award. Marcus keeps his practice lean—just a few student interns—but he has a lot on his plate: he is converting a 20,000-square-foot warehouse into artists studios, further refining Buoyant Ecologies, and experimenting with algorithmically generated and parametric drawing techniques.

"I try to use the word fabrication instead of *digital* fabrication to bring a sense of craft into this work," he says—"that it didn't just come out of a 3-D printer but has the sense that a human made it." ■





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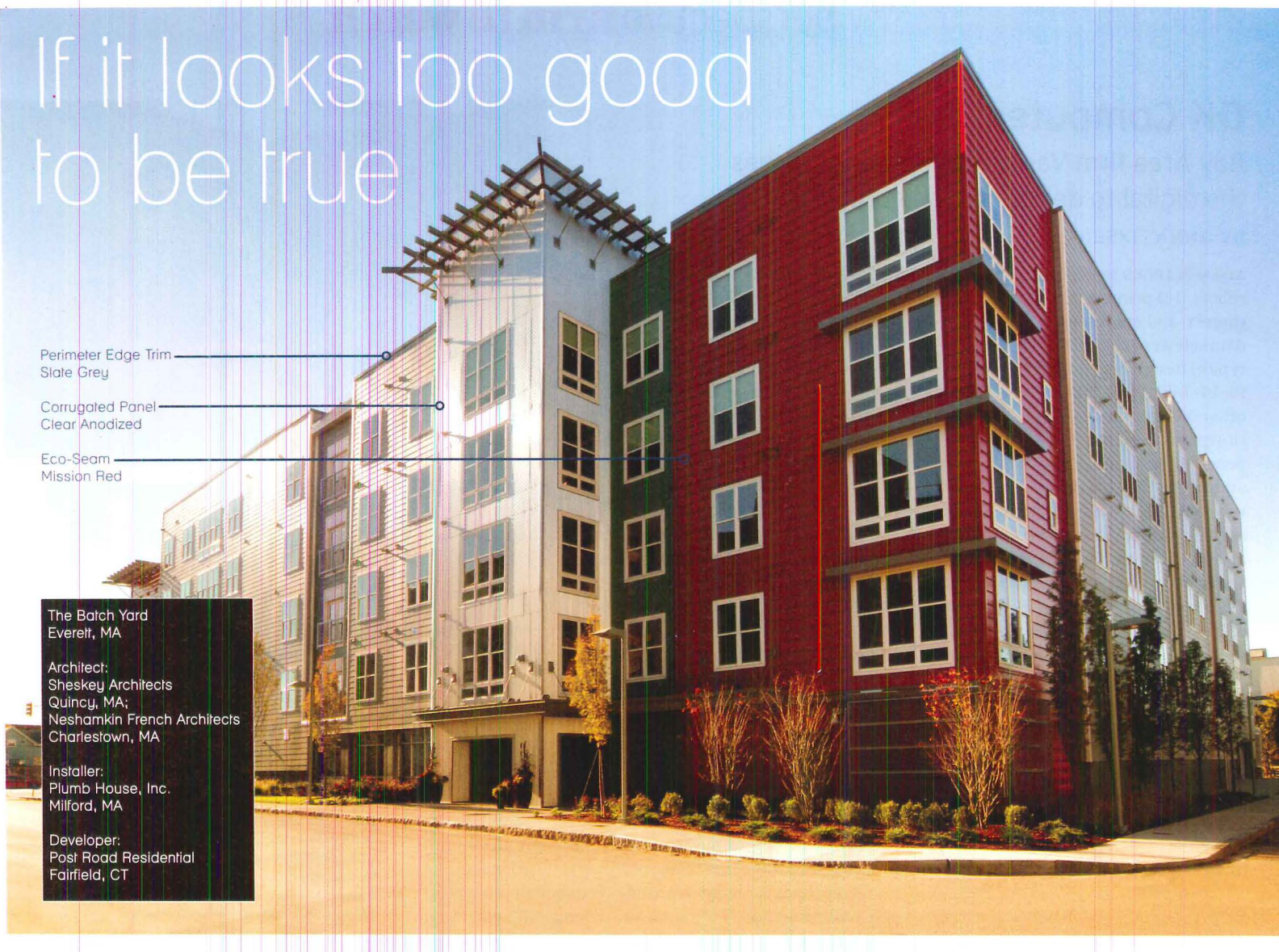

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Works in Progress

Four ongoing projects address diverse educational needs.

BY REBECCA SEIDEL

Mount Si High School Redevelopment, Washington Located 45 minutes outside Seattle, Mount Si High School nests in the shadow of its namesake mountain—as well as within the floodway of a river. To respond to those natural conditions, NAC Architecture's redesigned school (above) will be elevated above flood levels, not only safeguarding the facilities but also maximizing views of the mountain range. The 350,000-square-foot project will stitch together four three-story academic buildings, a performing-arts center, and a gymnasium. As a carryover from the school's current layout, the new complex will include a building just for ninth graders, called the Freshman Campus.

The new buildings will stand on what are now baseball fields and a parking lot, allowing the existing facilities to remain open when construction begins in 2017. The building is scheduled to be 85 percent completed and occupied by fall 2019, with the remaining site work complete by December 2020.

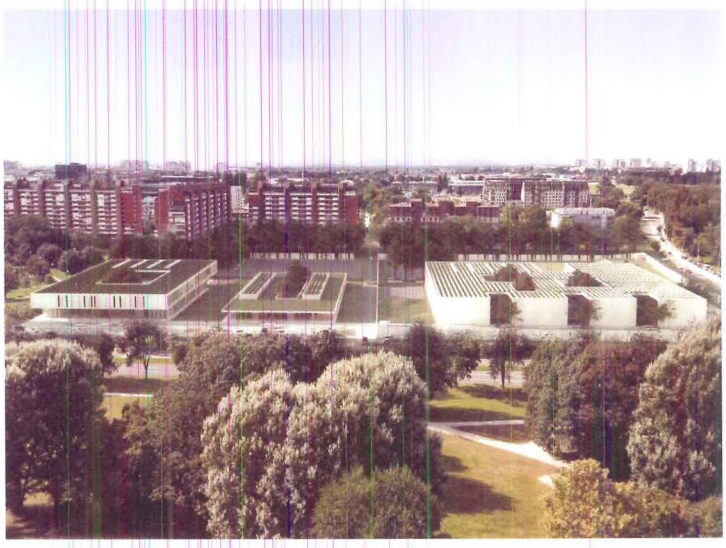
French International School, Hong Kong With four campuses already sprinkled throughout the city, the French International School strives to be a hub for French culture in Hong Kong. The newest campus, designed by the Denmark-based Henning Larsen Architects and expected to be complete by fall 2018 (above), will serve 1,050 students in kindergarten through middle school, in addition to opening up for public events on evenings and weekends. The 18,000-square-meter complex will capitalize on flexible open-plan layouts and ample outdoor space. The ground level will house the school's 300-seat auditorium, 600-seat cafeteria, and kindergarten, while two elevated bars will harbor the primary and middle schools. The middle school building will also contain a gymnasium and swimming pool.

Especially compelling will be the 1,000 colored ceramic tile frames, each customized by a student, that will comprise the facade of the campus's main entrance. Glazing within the frames will diffuse daylight into the gymnasium. According to the architects, these tiles symbolize the school's diversity and spotlight how individual students will shape the school's future.

Središče Educational Complex, Zagreb, Croatia A compact, monolithic aesthetic will unify three schools within the Središče Educational Complex in Croatia: the American International School of Zagreb, a Croatian kindergarten, and an elementary school. Boston-based Flansburgh Architects and the Zagreb firm Sangrab+AVP won an international competition last October to design the complex (below). It is rare to find a private international school alongside two public schools; according to Flansburgh president David Croteau, this unusual consortium arose from the city's desire to boost international relations while serving local educational priorities.

The architects aim to celebrate the schools' common educational goals while tailoring the design of each to the needs of distinct age groups and teaching methods. The scheme of the international school—a private school with an American-style curriculum—minimizes lecture-style spaces, with glass walls visually connecting classrooms to common areas; the Croatian elementary school will feature more self-contained classrooms.

Forming a straight line along the eastern edge of the site, the three buildings will be organized around inner courtyards, with a promenade separating the international school from the two local schools. Each roof will be covered by photovoltaic panels, intended to supply 100 percent of the schools' heating and cooling energy. Sports fields along the site's western edge will provide a buffer between the schools and adjacent 10-story residential buildings. Construction is anticipated to begin in fall 2016 and be completed by fall 2017.



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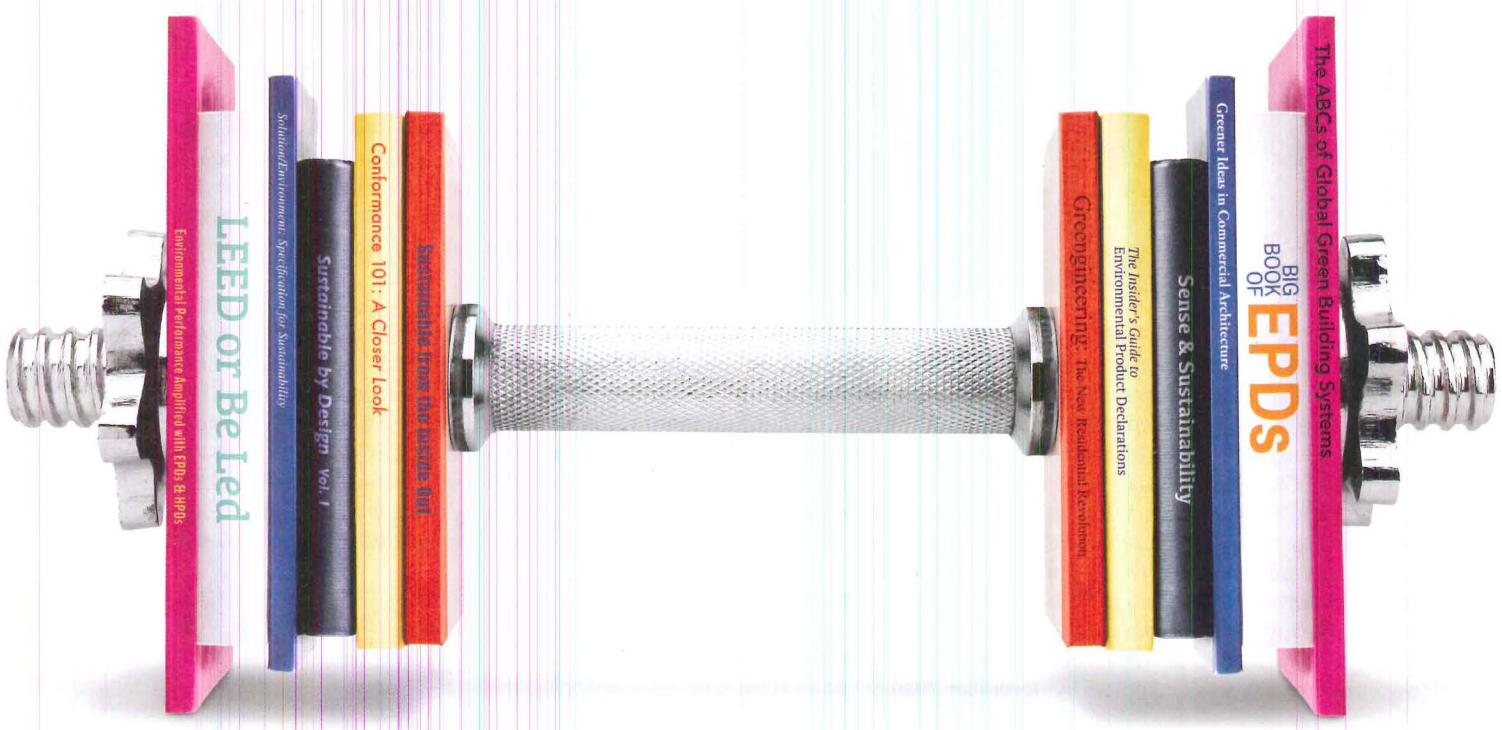

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Riverdale Country School, New York

The younger students of Riverdale Country School, a private pre-K–12 school in the Bronx, have plenty of breathing room on an eight-acre campus that dips toward the Hudson River. But the school's 1960s-era Perkins Building, which housed a theater along with fourth- and fifth-grade classrooms, had a stifling layout that didn't match the school's ethos of collaborative learning. Architecture Research Office's (ARO) design for a replacement on the site of its predecessor features a central corridor to streamline access throughout. ARO worked with Mathews Nielsen Landscape Architects to contend with a sloping construction site.

Clad in zinc and blue-toned concrete panels, the two-story, 23,000-square-foot building will be anchored by a theater on one side and a cafeteria on the other. ARO is collaborating with design studio Open on graphics that will function as pedagogical tools throughout the building, such as a series of skylights that will illustrate cardinal directions and the color spectrum as well as other sunlight-inspired lessons.

Happy Trailers

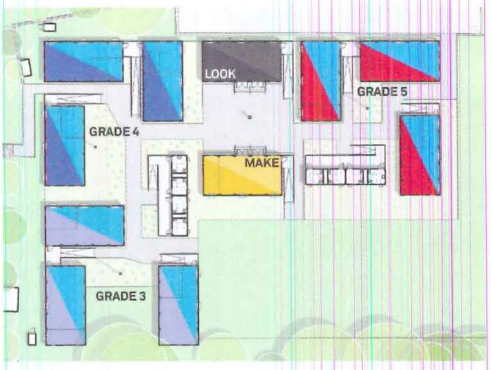
ARO makes the best of a temporary site with bright graphics and playful design.

WHEN ARO began designing a new building for the Riverdale Country School's third through fifth graders, to be located on the site of the existing elementary school, it faced a familiar challenge: where would they house students and teachers during the year-and-a-half construction project?

Instead of the typical cluster of dreary modular classrooms crammed in a schoolyard or parking lot, ARO devised a playful solution for a corner of the private school's lush campus overlooking the Hudson River. The architects mapped out 13 trailers: three classrooms for each grade, plus restrooms and two shared creative spaces. While the units themselves are standard trailer-like structures—prefabricated off-site by Williams Scotsman—the architects configured them to form their own mini-campus, collaborating with the Rockwell Group and Open to determine a site plan that would establish insularity while maintaining access to nearby facilities. The school gave the site its own name: the Learning Complex.

Eye-popping super-graphics define each unit, infusing the site with youthful energy. Open, a design studio, offered each grade a selection of colors and cheerful insignia and asked them to vote for their favorites; the winners were painted onto the trailers. The units' interiors vary by grade as well; ARO worked with the Rockwell Group to determine the fit-out of each classroom, choosing and arranging furnishings to suit various co-teaching models.

According to ARO principal Kim Yao, the temporary site also functions as a testing ground for the new building, which is scheduled to be completed in time for the 2016–17 school year. "The Learning Complex has to enact the things we want the building to enact," she says. Central to this experimental outlook are the complex's "Make" and "Look" units, which face each other at the site's core. The former is filled with resources for art projects and science experiments; the latter offers room for students to pin their work on the walls or gather for presentations. These collaborative spaces will be scaled up in the new building.

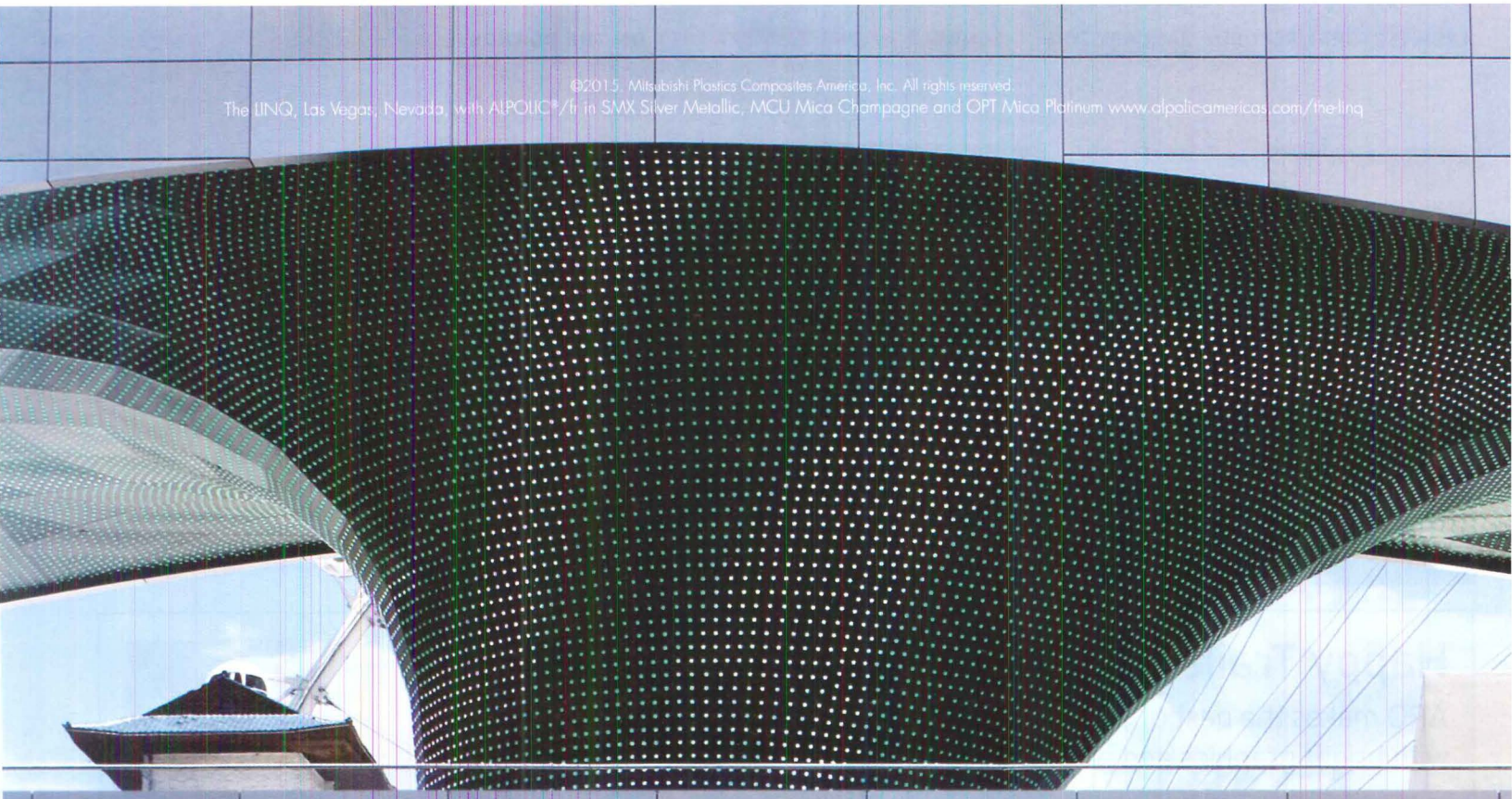


To add pizzazz to these modular structures, each class voted on colors and graphics created by Open, a New York-based design studio, in which to wrap their modular classrooms. The site plan clusters the classrooms by grade around exterior courtyards (left); a custom-stitched flag flies outside the fifth-grade classrooms (above).

Planted on the stretch between the Make and Look spaces is a signpost that cheerfully points students to an array of locales, nearby and global, that includes each grade's classrooms, the Hudson—and Mount Everest. To the north, though not noted on the signpost, construction workers have just topped off the steel structure of the new building.

Administrators had worried about how students and faculty would adjust to the temporary quarters. But, according to Tim Sacks, codirector of Lower School Admission, people have embraced the situation.

"It's been a reflective year for the school," he says. "We're learning to be more fluid in the way we work." ■



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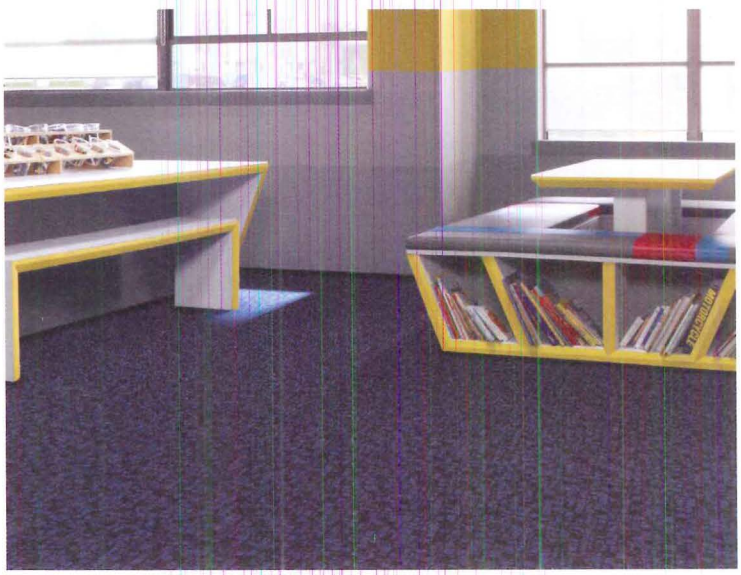
Sound Advice

An acoustic consultant explains how to make classrooms more conducive to hearing–and learning.

By Julie Taraska



QUIET, PLEASE Armstrong's Total Acoustics ceiling panels (far left) absorb background noise and block sound coming from adjacent spaces. Autex's Composition acoustic panels (left) double as display boards. Mohawk Group's Get Smart carpeting (below) mitigates sharp noises made by one surface scraping against another.

A SCHOOL might have a stellar faculty and engaging curriculum–but students won't benefit if they can't hear their teacher. The most common culprits: excessive background noise and levels of reverberation, both of which hinder speech intelligibility. Sometimes the solution is as simple as relocating the HVAC equipment. But the next line of defense is "softening" a room so that the sound waves don't bounce off all the hard surfaces.

In public school classrooms, where cost and maintenance are priorities, "acoustic ceiling tiles give you the biggest bang for the buck," says Michael Newson, principal of Santa Monica–based Newson Brown Acoustics. Products like Armstrong's Total Acoustics ceiling panels, which absorb and block exterior sound, offer a high noise-reduction coefficient (NRC). They also take in all the sound frequencies, not just the short-wave high ones that contribute to speech intelligibility.

However, in situations where ceiling treatments aren't possible or aesthetically desired, a combination of carpeting and panels can work. Floor coverings are a relatively inexpensive means to reduce a room's Impact Insulation Class (IIC) rating–the acoustic disruptions caused by movement such as chairs scraping against a wooden floor. Options like Mohawk Group's Get Smart broadlooms can serve as a buffer between the objects and surface, reducing the attendant noise, as can resilient flooring and underlays, which are ideal if allergens are a concern.

As for wall panels, "the thickness of the material is just as important as NRC," says Newson. Since NRC is an average of absorption over a range of frequency bands, thin materials "may absorb the high frequencies, but that's all." Felt products are a favorite of Newson's (he specifies thicknesses of 1" or 2"), as are Echo Eliminator's recycled-denim options. New products such as Autex's Composition, which double as pin boards, also add a decorative dimension to classroom sound abatement.

Newson notes that tiles, carpeting, and panels suffice for most K–12 classrooms. It's only when you start designing for specialized or multifunctional spaces, such as music rooms and auditoriums, that expensive products are needed. Says Newson about the over 30 K–12 schools he has consulted on: "Our emphasis is always on durability, simplicity, and getting everything out of harm's way." ■


photography:naohiro tsukada design:omdr
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Class Acts

While these educational goods won't take away students' first-day jitters, they will make schools more comfortable.

By Julie Taraska

EzH2O Bottle Filling Station

Elkay updates its popular filling stations with a bevy of energy-saving features, including an option to turn off the unit's refrigeration when not in use and sensors that self-diagnose maintenance issues. Other time-savers include lights that automatically—rather than manually—reset after each filter change.

elkay.com

CIRCLE 100

Ballo

An imaginative take on traditional ball chairs, this active seating by Don Chadwick keeps kids moving as they learn. Ballo features a compact central column, weighted base, and air-filled domes on each end; it is covered in nonslip TPV so over-enthusiastic users don't fly off the seat. Available in eight vibrant colors.

humanscale.com

CIRCLE 101

PlayForm 7

A play structure that doubles as interactive art, PlayForm 7 inspires physical, open-ended activity for children ages 5 and up. Measuring roughly 58' x 25', the tubular metal frame features multiple nonslip bridges, hammocks, and sunshades that kids can lie on, play under, or climb up. The unit is available in multiple color combinations and with optional bamboo panels.

playworldsystems.com

CIRCLE 102

Loch

These semi-rigid, slide-on acoustic desk dividers provide privacy in open-plan settings such as libraries. Made of polyester fiber, the panels are free of Red List chemicals and manufactured using a minimum of 65% post-consumer recycled material. The three styles and 12 colors serve a multitude of interior schemes.

autexacoustics.com

CIRCLE 103

Noraplan Valua

With its 32 hues inspired by colors found in nature, this Greenguard Gold–certified rubber resilient flooring is free of PVC, plasticizers, and toxic heavy metals. It is resistant to slips and bacteria, and offers excellent footfall sound absorption. It comes in 2mm and 3mm thicknesses, as well as in square tile or rectangular plank form.

nora.com

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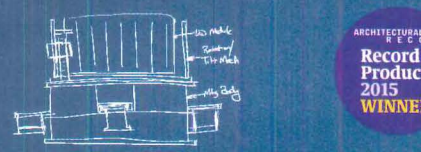

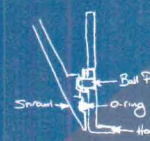

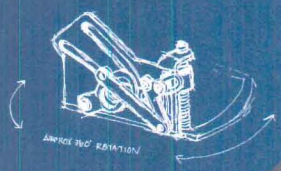

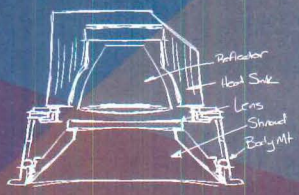

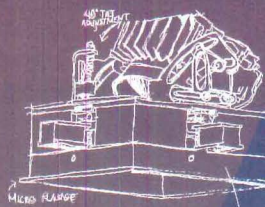

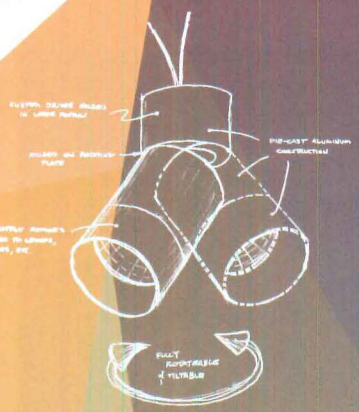

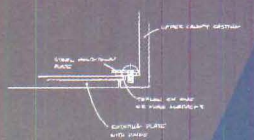

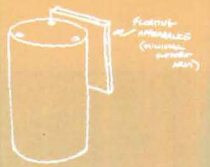

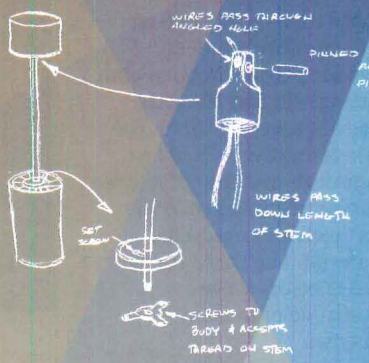

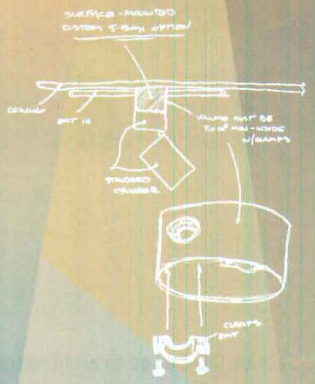

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CIRCLE 245

courtesy of Architectural Nexus

THERE'S ALWAYS A SOLUTION IN STEEL.

courtesy of Architectural Nexus

Ethan Bedingfield
Architectural Nexus

The AISC Steel Solutions Center is a free service for people who need technical assistance, innovative ideas or tools to make structural steel design easier.

Just ask Ethan Bedingfield, AIA, NCARB who works at Architectural Nexus in Salt Lake City, Utah. Ethan was designing University Place Building One in Orem, Utah, part of the University Mall being developed by Woodbury Corporation, one of the West's largest and most experienced full-service real estate development firms.

"Building One includes about 26,000 square feet on the ground level, and then approximately 139,000 square feet on levels two to five," he says, "and sits in the parking lot of the existing mall, which meant we had to replace and add parking by going below ground. The changing axis of the building as it rises (the parking level below a level of retail with 4 levels of office space that have a separate axis) is what made the steel design so complicated."

His inspiration came from the site constraint itself. The project used all steel moment framing, affording him extraordinary flexibility. Costs also played a role, and was one of the reasons he reached out to the AISC Solutions Center.

"The base is a rectangle that fills the whole site we had available to us," Ethan explains. "We are within a foot of hitting utilities. We twisted the top of the building rather than following the grid of the immediate context, relating it to the major additions that will happen behind the mall and also facing it to the extremely busy intersection on which the project sits. That's where we landed in our initial studies. Once we had it to that point, I remembered meeting Tabitha Stine, S.E., P.E., LEED AP from the AISC Steel Solutions Center at a conference. I called, and we sent over Revit files and the narrative we had describing our intent. University Place was the first time I used the Solutions Center. I've used it a few times since, but this was the most impactful experience. I will definitely use them again."

Ethan explains that some of the options they received were unexpected, but they all stimulated his thinking, including the one that grabbed their attention the most. "It was the use of SidePlate for our moment frame for the lateral system," he says. "We ended up saving around $70,000 because of it and the aesthetic design was unimpacted."

Ethan says the AISC Solutions Center does two things: adds to creative thinking and validates your own design. "I don't know why you wouldn't call them on every project for the second set of eyes," he adds.

From typical framing studies to total structural systems, including project costs and schedules, the AISC Steel Solutions Center can provide you with up-to-date information and innovative solutions for your project. The AISC regional staff covers eight different geographic regions across the U.S. They give more than 50 presentations a year on various steel topics. Learn how our regional staff can work with your company. Call 866.ASK.AISC (866.275.2472) or email us at solutions@aisc.org

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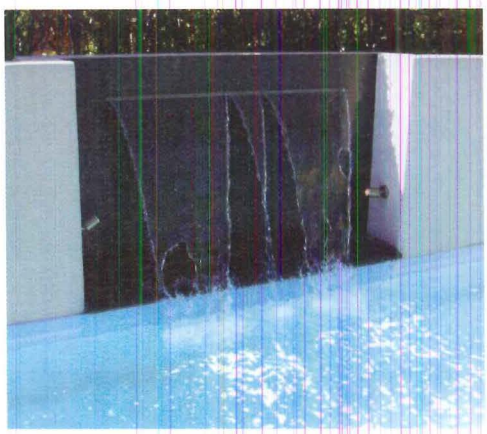
CIRCLE 229

Tough Stuff

New designs add visual interest and durability to building exteriors.

By Julie Taraska



NaturaStone Engineered Quartz

Made from a mixture of natural quartz and high-performance acrylic polymer, this non-porous material is UV-stable; it is also extremely resistant to heat, scratching, staining, and impact, and comes in 32 colors.

naturastone.com.au

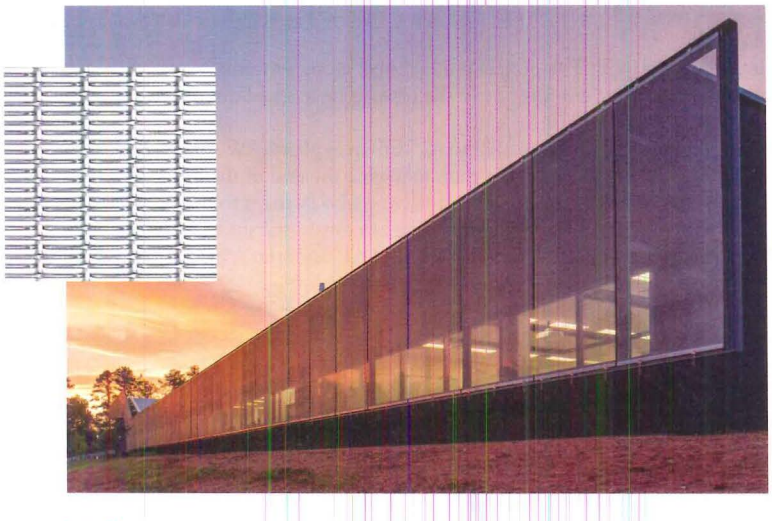
CIRCLE 106

Columbus Museum of Art Extension

Pre-patinated copper panels treated with a proprietary Zahner finish cover the second-story exterior of the Columbus Museum of Art's new Margaret M. Walter Wing. Local architects DesignGroup created a custom pattern for the rainscreen, recessing LED fixtures by Philips behind sections of the cladding and then covering the openings with frosted acrylic panels.

designgroup.com

CIRCLE 105



Lanier

Named after Lanier Lake in Georgia, this stainless-steel architectural mesh has a standard 50% open area that can be expanded by removing wires as the pattern repeats. It's suitable for interior partitions, solar shading, and exterior facades (such as on the Georgia BioScience Training Center, pictured) and can be woven into panels up to 100' high.

cambridgearchitectural.com

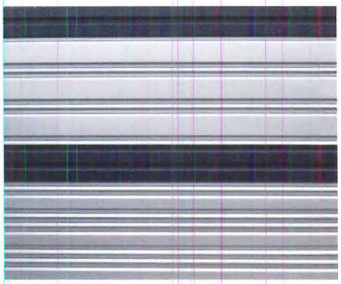
CIRCLE 108

Cascade

Featuring soft curves and angular slopes, the Cascade system of single-skin metal panels offers architects the ability to add shadow play to a building's exterior. Nine new profiles, which may be hung horizontally or vertically, expand the options. Each features concealed fasteners and common-lock joints that allow it to be mixed and matched for a seamless look.

centria.com

CIRCLE 107



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Comprising zinc, aluminum, and magnesium, ZAM extends the life-span of galvanized steel, protecting it against corrosion. The Wheeling-Nisshin coating, which eliminates the need for post-dip galvanizing, is available in North America only on Knight Wall Systems products, including the HCI attachment system, shown.

knightwallsystems.com

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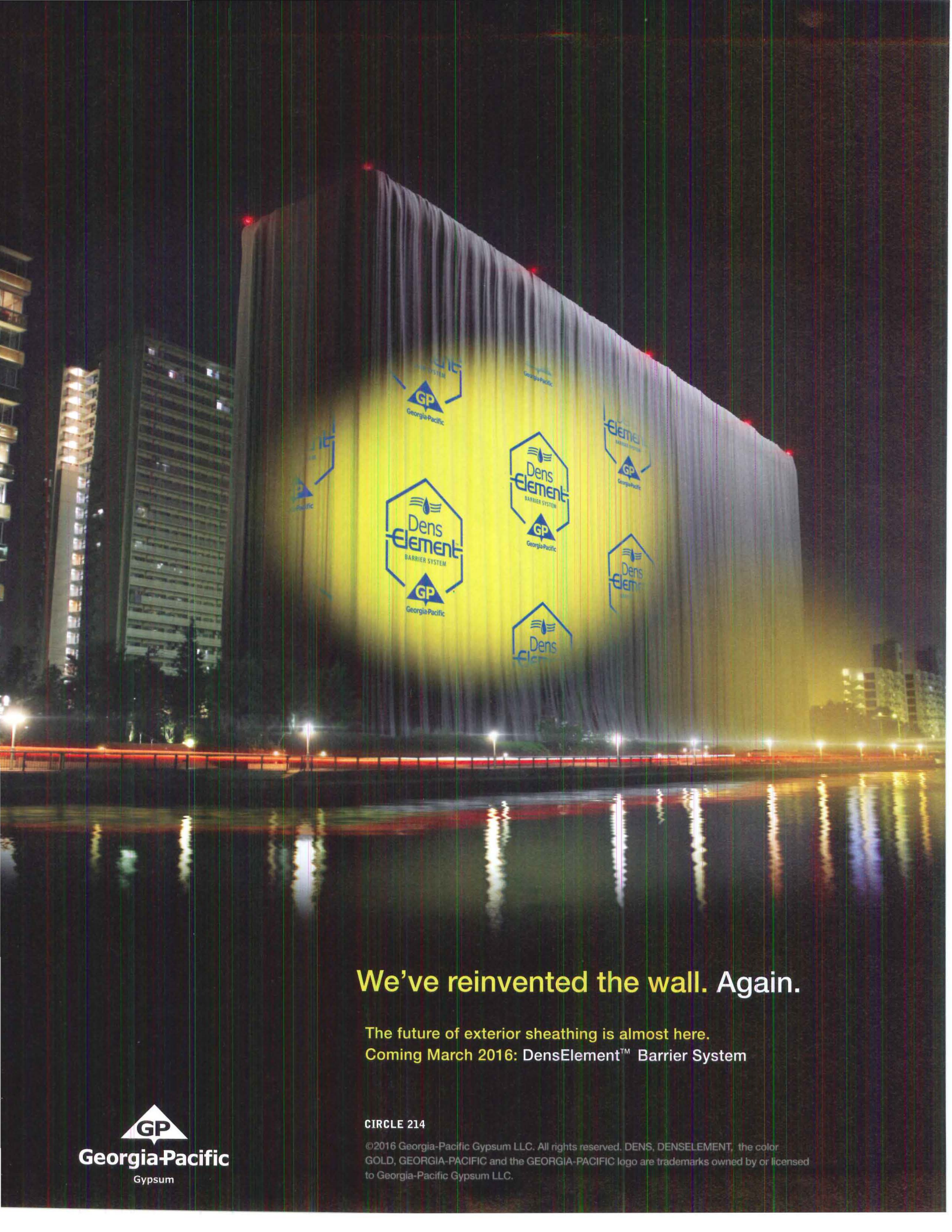

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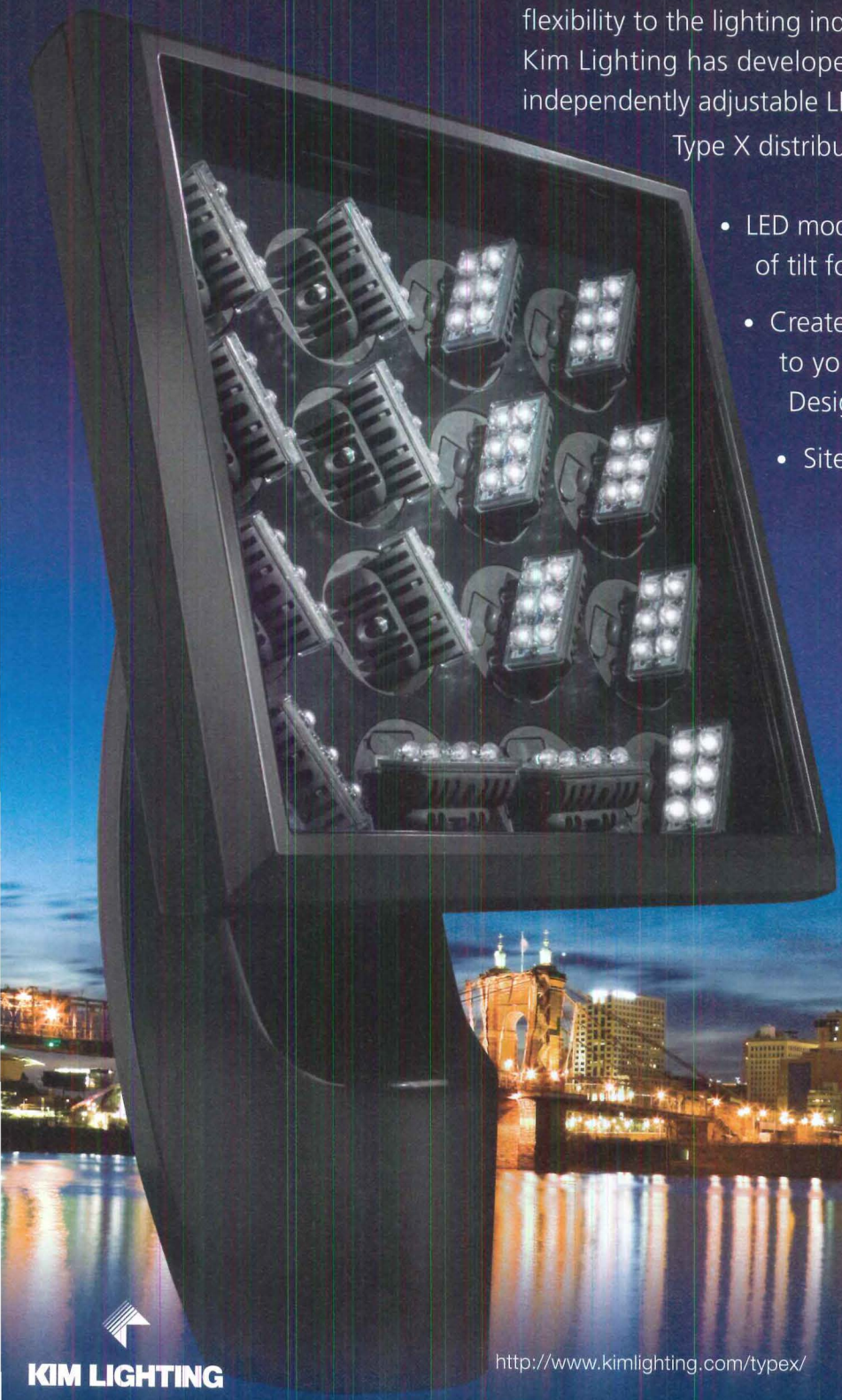

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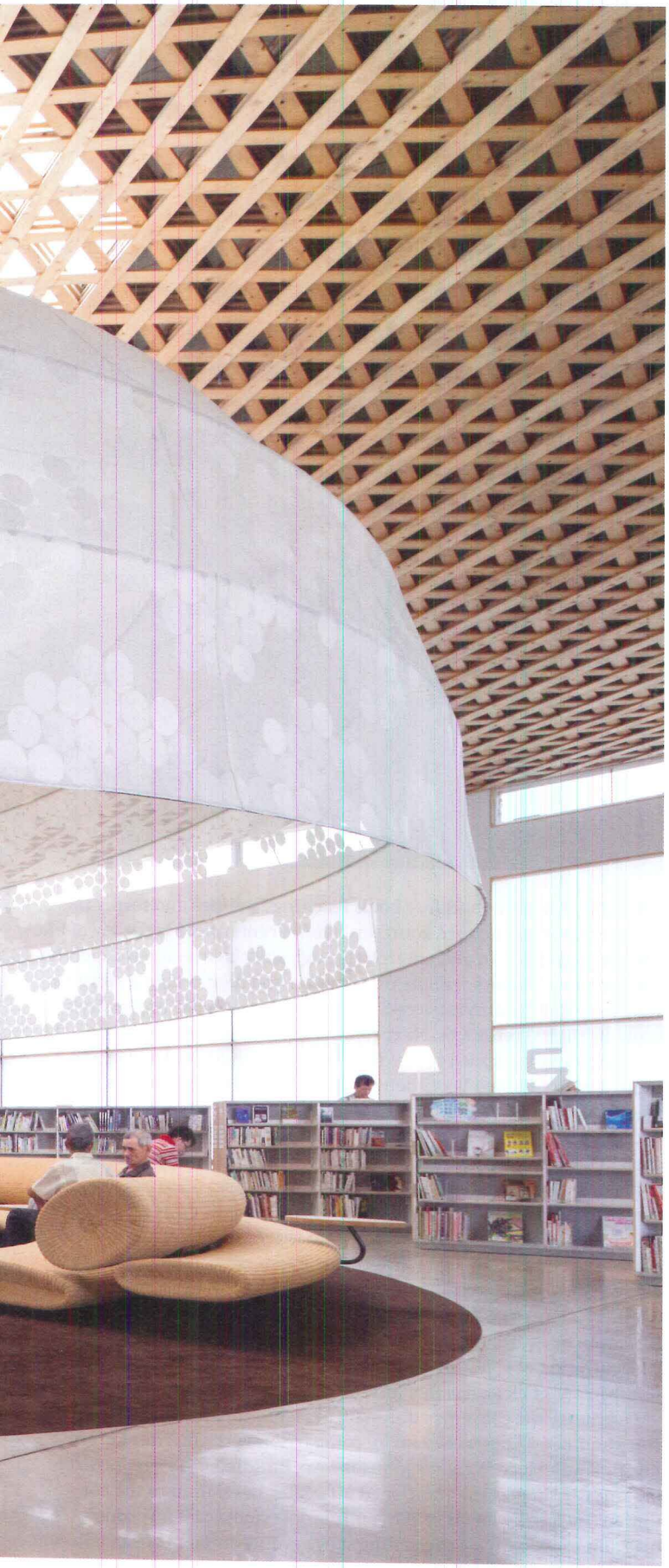
CIRCLE 232

LET IT FLOW Each library is essentially one large room topped by a soaring ceiling. Hanging from a wavy wood roof, lightweight domes define functional areas in Gifu, Japan (this page), while column placement determines open seating areas in Taipei, Taiwan (opposite).



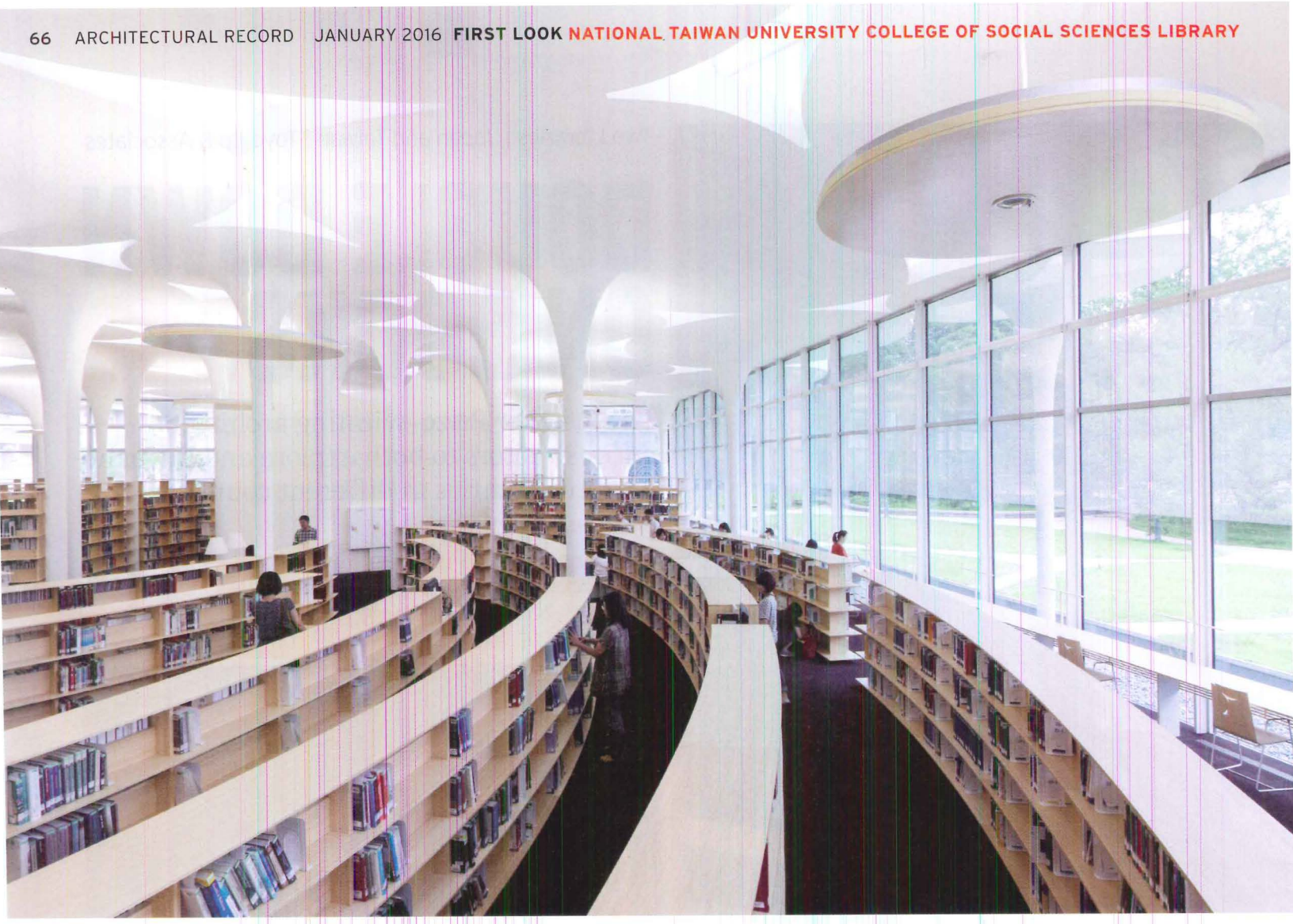
Two Libraries | Japan and Taiwan | Toyo Ito & Associates

DOUBLE DOWN ON BOOKS

The Pritzker Prize–winning architect entices visitors to both explore and linger at a pair of libraries in different countries.

BY NAOMI R. POLLOCK, AIA

PHOTOGRAPHY BY IWAN BAAN



With the proliferation of digital data, the private laptop has been taking a toll on the public library. But two recent buildings by the Pritzker Prize laureate Toyo Ito suggest that the traditional typology is not heading for the archives anytime soon. "In terms of public facilities, the library is actually quite a contemporary building type," says Ito. The Tokyo-based architect's library at the National Taiwan University College of Social Sciences in Taipei and the Gifu Media Cosmos in Gifu City, Japan, are as much communal gathering places, where people interact face-to-face, as places to gather information.

Celebrating the bound book, these two libraries refuse to kowtow to the ever-changing landscape of electronic media. In both buildings, visitors may come with particular quests in mind, but the flowing space, easy shelf access, and inviting furniture entice them to stay longer, search deeper, and mix with others. Yet the architectural expression of both buildings is forward-looking, even futuristic. Their defining elements—sensuously funnel-shaped columns in Taipei and softly patterned suspended domes in Gifu—effortlessly mask underlying geometric complexity. That's not surprising from the designer of the Sendai Mediatheque, the multistory media center in Japan that blended structure and design in an entirely unprecedented way. Opened in 2000, that building features irregularly shaped, eccentrically placed hollow columns that serve as structural elements, but also connect floor levels vertically and channel circulation horizontally.

As in Sendai, columns dominate the library in Taipei, a single-story structure designed in tandem with an eight-story bar building directly behind it. The taller building holds teaching facilities and forms the fourth side of an enclosed courtyard whose centerpiece is the jewel-like library. Embedded in and entered through the classroom building, the library greets visitors with its information and digital media sections, where computers provide access to the Internet and the university's growing digital resources. Next come study and storage areas housed in a single glass-encased room. The main space is articulated by columns and arc-shaped bookshelves; the only full-height dividers are the freestanding wall panels for lateral bracing.

Supporting the vertical load, the reinforced-concrete columns measure 10 inches in diameter and 20 feet in height, and are arranged using a double-spiral algorithm. "Usually columns are organized with an orthogonal grid, but here we wanted a more natural way," explains Ito. So the column plan propagates from three centers in the ground plane, each one encircled by five points. From every point, two sets of curved lines extend outward in opposite directions, as if tracing the petals of a lotus flower. Ito placed columns at their cross points. As the lines spin outward, the distance between intersections grows, and the concentration of columns disperses, creating pockets of open space reminiscent of clearings in a forest.

Overhead, the columns culminate in flared capitals that spread like tree canopies. Though they invite comparison with the circular capitals in Frank Lloyd Wright's Johnson Wax Building, Ito's versions are organically shaped and positioned off-center in relation to the columns. The quirky forms of these mini-roofs stem from a Voronoi diagram used to divide the ceiling space evenly among trios of adjacent

columns. Between slabs, laminated-glass and polycarbonate inserts admit soft daylight from above.

Each roof pad is topped with artificial turf, relating the architecture to the landscape. Beyond the building envelope, patches of grass dotting the ground plane extend the roof's cell-like pattern into the courtyard. As at Mediatheque, glass walls define the perimeter of the library's rectilinear volume. "It was simply cut to fit the site," says Ito. Together, the continuation of the greenery and the clear enclosure merge inside and out, an idea the architect pushed even further at Gifu.

For Ito, creating indoor space with an outdoor character is a recurring theme. But at Gifu, he not only evoked the natural environment, he actually brought it inside, through a permeable skin and an assertive energy conservation agenda. A hybrid municipal building, it contains a variety of public amenities on its ground floor, including galleries, a lecture hall, and a civic activity center, as well as the library upstairs. Again, the library is one large reading room, but this time it is supplemented with additional stacks contained within a transparent, two-story open

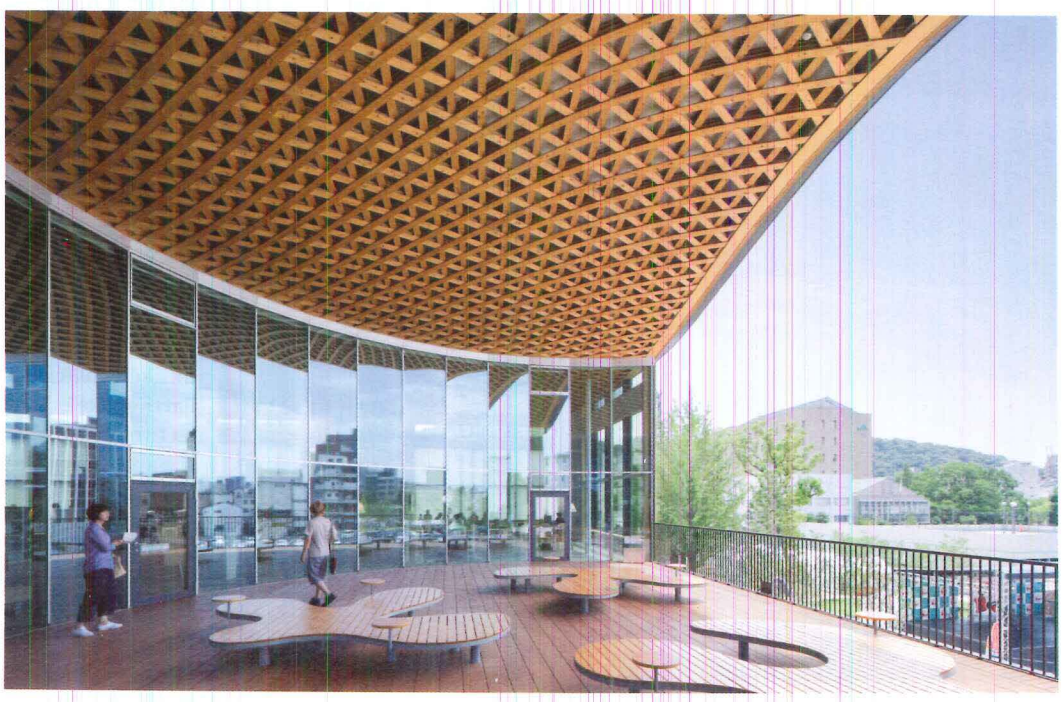
LAND FORMS Blurring the line between inside and out, Hariu capitals double as roof slabs and extend past the Taipei building's glass skin (this page, top and bottom). Glass and polycarbonate inserts between the capitals bring daylight into the reading room (opposite).

glass box. Embedded in the center of the rectangular floor plan on both levels, it makes a bold visual statement that places books at the heart of the building.

Within the reading room, 11 suspended domes designate the library's subject and functional divisions. Though all of the domes start 8 feet from the floor, they vary in height and range in diameter from 26 to 46 feet. The smallest ones hover protectively over the children's sections, while the biggest ones cover the literature and entrance areas. Made of lightweight polyester mesh adorned with bold graphics, the domes are topped by operable skylights. Working in conjunction with the building's operable transom windows, as well as doors that open onto terraces and covered porches, the openings release hot air in summer, contain it in winter, and fill the room with daylight year-round. Additional energy savings come from using the site's underground water for the radiant heating and cooling system.

Below the domes are open areas, many ringed with desks or seating. Spiraling out beneath the domes, wooden bookshelves have concrete tops to prevent the spread of flames in case of fire. Ito chose concrete, too, for columns downstairs, and steel for the ½-inch-thick shear panels embedded in the exterior walls and columns upstairs. Positioned in relation to the domes, these slender supports, 7 inches in diameter,

A PATTERN LANGUAGE
Made of polyester mesh supported by glass fiber reinforced plastic rings, the domes in Gifu are adorned with patterned appliqués created by graphic designer Kenya Hara and textile designer Yoko Ando (opposite). Extending beyond the exterior walls, the woven ceiling covers terraces on the building's front (left) and east (below) sides.

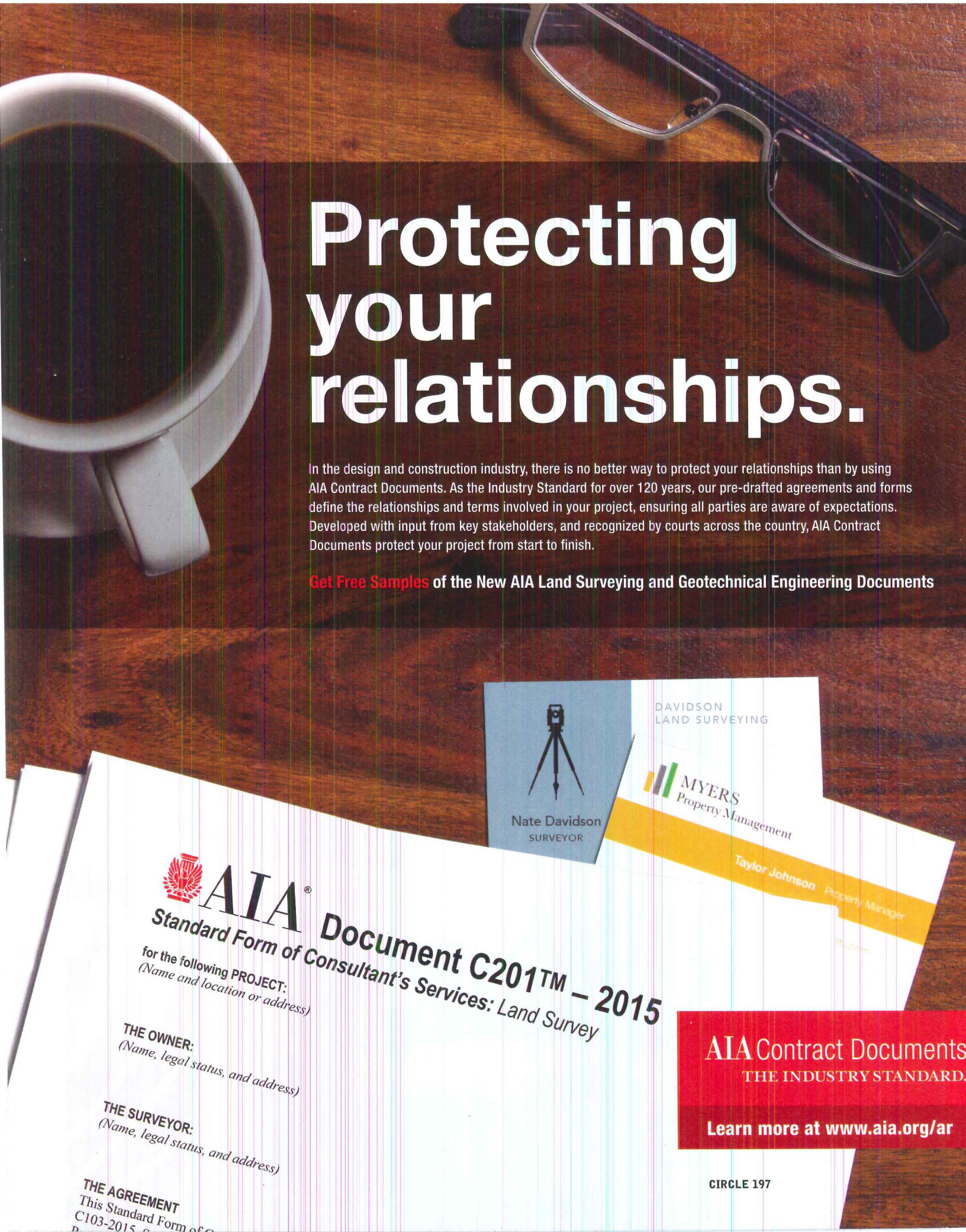


ROUND ABOUT At dusk, the Gifu building glows like a lantern (bottom). Inside, domes reflect daylight onto the ceiling, while suspended fixtures provide electric light to particular spaces, such as a reading area (opposite). An escalator leads to the library on the second floor (this page, top). Ito created the furnishings with designer Kazuko Fujie.

practically disappear into the woodwork–especially the building's distinctive woven ceiling.

Designed to harmonize with mountains in the distance, the ceiling is made with layered strips of local cypress arranged in a triangulated pattern. The undulating form, which behaves like a shell structure, is expected to hold up well in an earthquake, yet over half of its area is actually flat, since the ceiling only rises up around the domes. Like periods at the ends of sentences, the domes punctuate the space, while the dynamic ceiling conveys a sense of movement that extends out to the terraces.

For an architect known for slender proportions and sharp edges, as exemplified by the library in Taipei, wood is an unlikely material of choice. Yet the Great East Japan Earthquake of 2011 has had a profound impact on Ito's architecture in the blighted region and elsewhere. Considering the area's survivors' comfort, he used this warm and familiar material in his reconstruction projects. Those works dovetailed with the Gifu library, commissioned just a month before the tragedy. Open and inviting, a library built with timber expands our understanding of this typology. More than a receptacle for books, it demonstrates the timeless value of community-oriented buildings, even as technology zooms ahead. ■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(Name and location or address)
THE OWNER:
(Name, legal status, and address)
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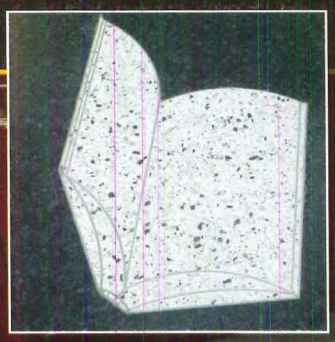
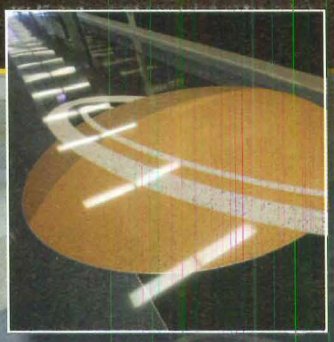
Terrazzo: Infinite Possibilities

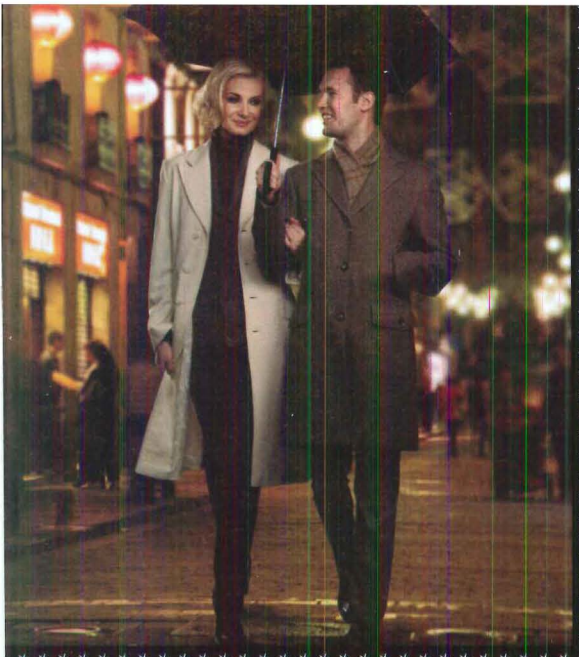
West Ridge Elementary Chicago, Illinois

Mindy Viamontes,
Assoc. AIA
Project Architect at
Muller+Muller, Ltd.
www.muller2.com
photos by John Faier

"In addition to being a durable, long lasting solution, terrazzo offers infinite possibilities when it comes to design. At West Ridge Elementary, the three distinctive terrazzo floor patterns engage and inspire young minds. Corridors are turned into a life size text book, allowing students to move outside of the classroom and providing educators with an interactive teaching tool. Vivid colors and dramatic visual designs captivate the imagination of students, teachers, and people of all age levels."







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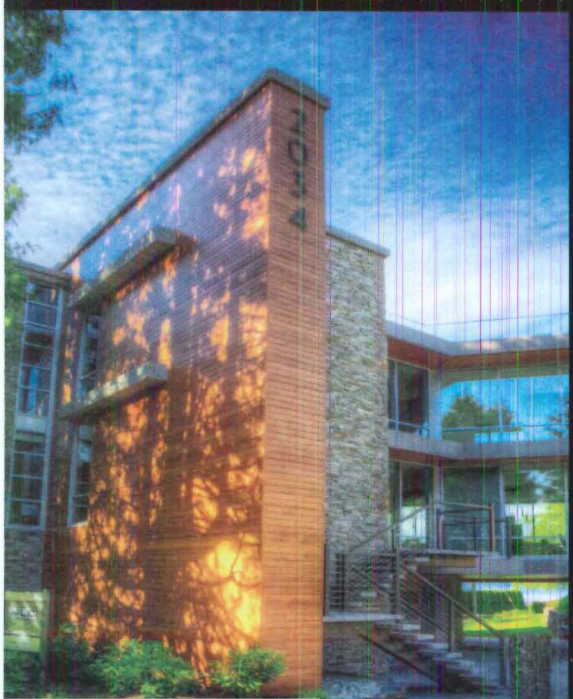
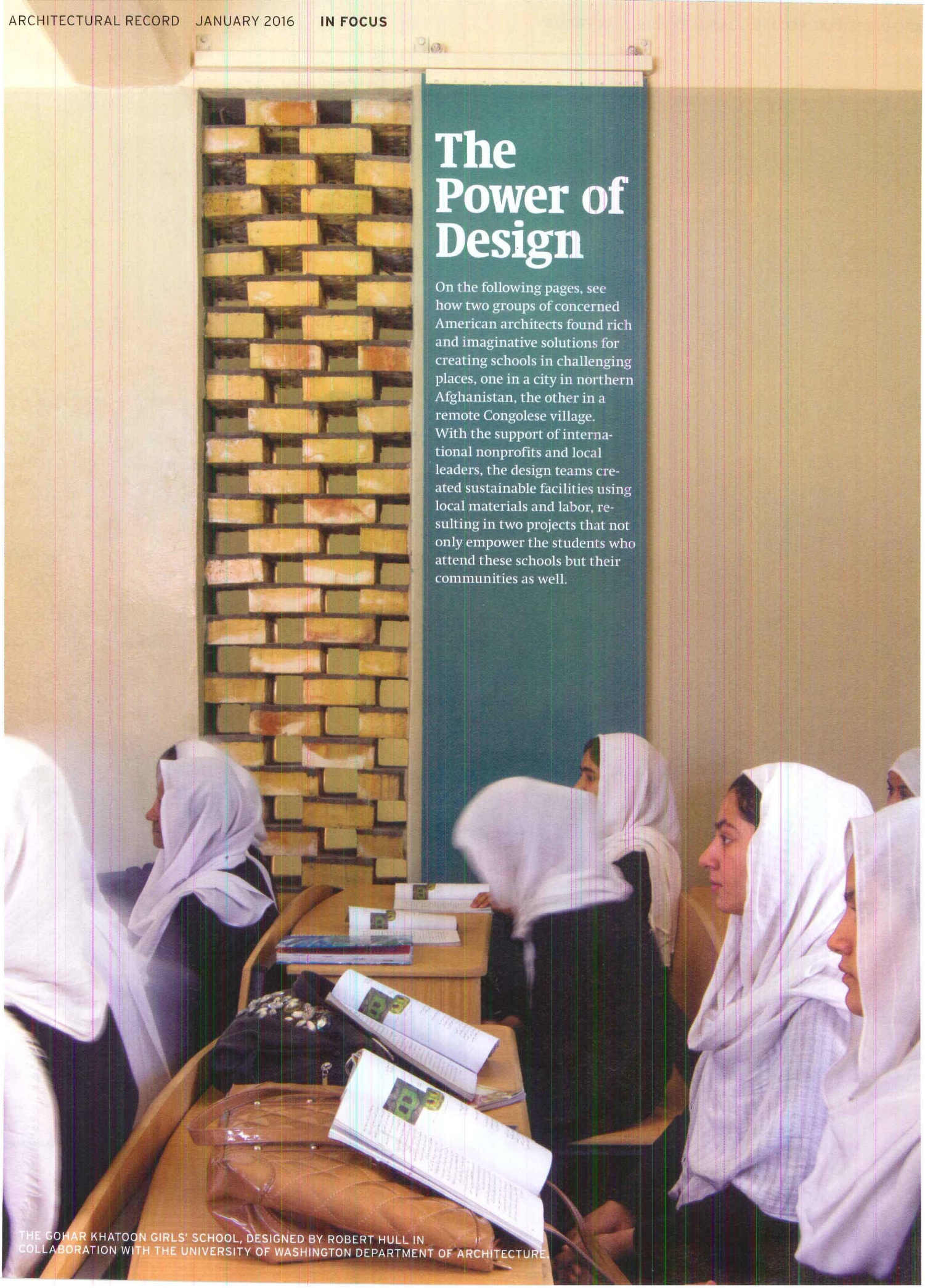


The Power of Design

On the following pages, see how two groups of concerned American architects found rich and imaginative solutions for creating schools in challenging places, one in a city in northern Afghanistan, the other in a remote Congolese village. With the support of international nonprofits and local leaders, the design teams created sustainable facilities using local materials and labor, resulting in two projects that not only empower the students who attend these schools but their communities as well.



THE GOHAR KHATOON GIRLS' SCHOOL, DESIGNED BY ROBERT HULL IN COLLABORATION WITH THE UNIVERSITY OF WASHINGTON DEPARTMENT OF ARCHITECTURE.

Gohar Khatoon Girls' School

A sustainable campus in Afghanistan raises the bar for women's education.

BY LINDA C. LENTZ
PHOTOGRAPHY BY NIC LEHOUX

The concrete-frame and brick building faces a sports field to the south and landscaped grounds to the north (bottom, right). Glazed stairwells, or "sunspaces," warm the interior and circulate breezes when the doors are opened. Operable windows, rimmed in colors inspired by the city's Blue Mosque, are deeply set, to shade classrooms.

AN OASIS in a crowded city center, the Gohar Khatoon Girls' School in Mazar-i-Sharif, the capital of Balkh Province in northern Afghanistan, was built under the auspices of two American aid organizations, which brought together a U.S.-based design team, Afghan construction crews, and local government in a unique collaboration to restore and elevate a battered educational infrastructure for young women.

The school—founded more than 50 years ago—has survived decades of war and political upheaval and had been operating in a dilapidated building since the Taliban was defeated in the city in 2001. Four years ago, the Balkh Ministry of Education asked Sahar Education International to help replace it. The nonprofit found a donor in philanthropist Janet Wright Ketcham. She agreed to fund the project, with one stipulation: that she be instrumental in selecting an architect, who would be free to break from the bland standard school plans typically mandated by the ministry.

Sahar executive director Ginna Brelsford says such quickly built, pro-forma schools don't hold up over time. Ketcham, a patron of architecture and founder of an eponymous foundation that, like Sahar, is devoted to educating Afghan girls and women, wanted a prototype for future schools that melds the latest sustainable methodologies with local building traditions. With a proven track record of school projects for the ministry, the Seattle-based groups got the go-ahead.

The school's new 43,000-square-foot campus was designed by the late Robert Hull, working pro bono in partnership with University of Washington assistant professor Elizabeth Golden and graduate students in a design studio taught by Golden and Hull. Hull, who died in 2014 and was a founding partner at the Miller Hull Partnership, had designed schools and a national tourism headquarters in Afghanistan during a Peace Corps stint between 1968 and 1972. In the course of the studio, he traveled to the site, while Golden and their students remained at the university, communicating with a Sahar team in Mazar-i-Sharif to explore the needs of local women and to study the region's culture and climate.

Adhering to international seismic codes, the architects devised a scheme using passive-energy strategies and local materials that, in addition to providing jobs and facilitating maintenance, eliminated the need for an HVAC system, a luxury in Afghanistan. An 18,000-square-foot, two-story classroom building is central to the campus and stands between a sports field to the south and a landscaped court-

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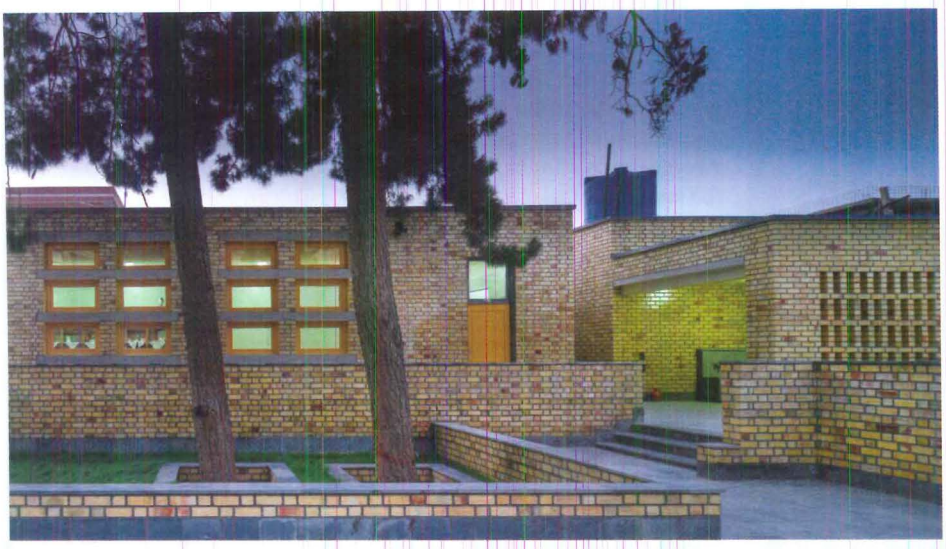
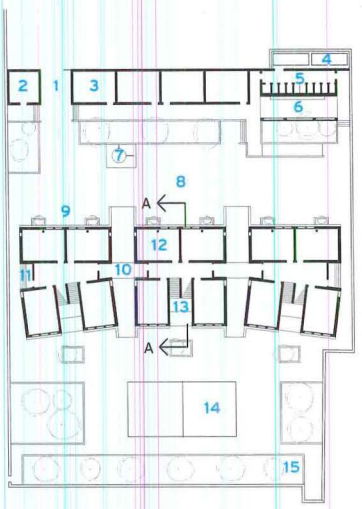
The campus provides a calm oasis with shade trees and a central groundwater well for drinking (left). The restroom has a separate handwashing station screened by an openwork brick wall (below). Freshwater for plumbing is fed from a rooftop tank; wastewater is treated in an adjacent autonomous biological system and reused for irrigation.





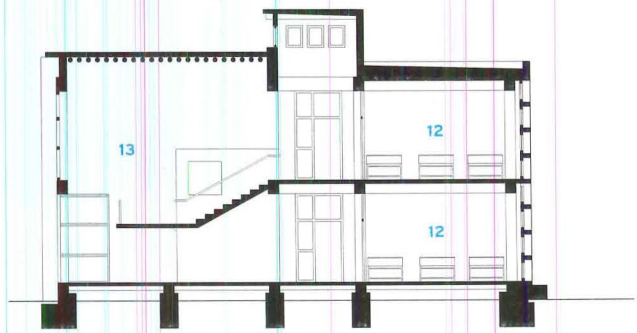
GROUND-FLOOR PLAN

0 30 FT.
10 M.

1 ENTRY GATE
2 GROUNDSKEEPER
3 STAFF OFFICE
4 WASTEWATER SYSTEM
5 RESTROOMS
6 HANDWASHING STATION
7 WELL
8 COURTYARD
9 SEATING AREA
10 MAIN ENTRY
11 SECONDARY ENTRY
12 CLASSROOM
13 STAIRWELL/ "SUNSPACE"
14 SPORTS FIELD
15 GARDEN

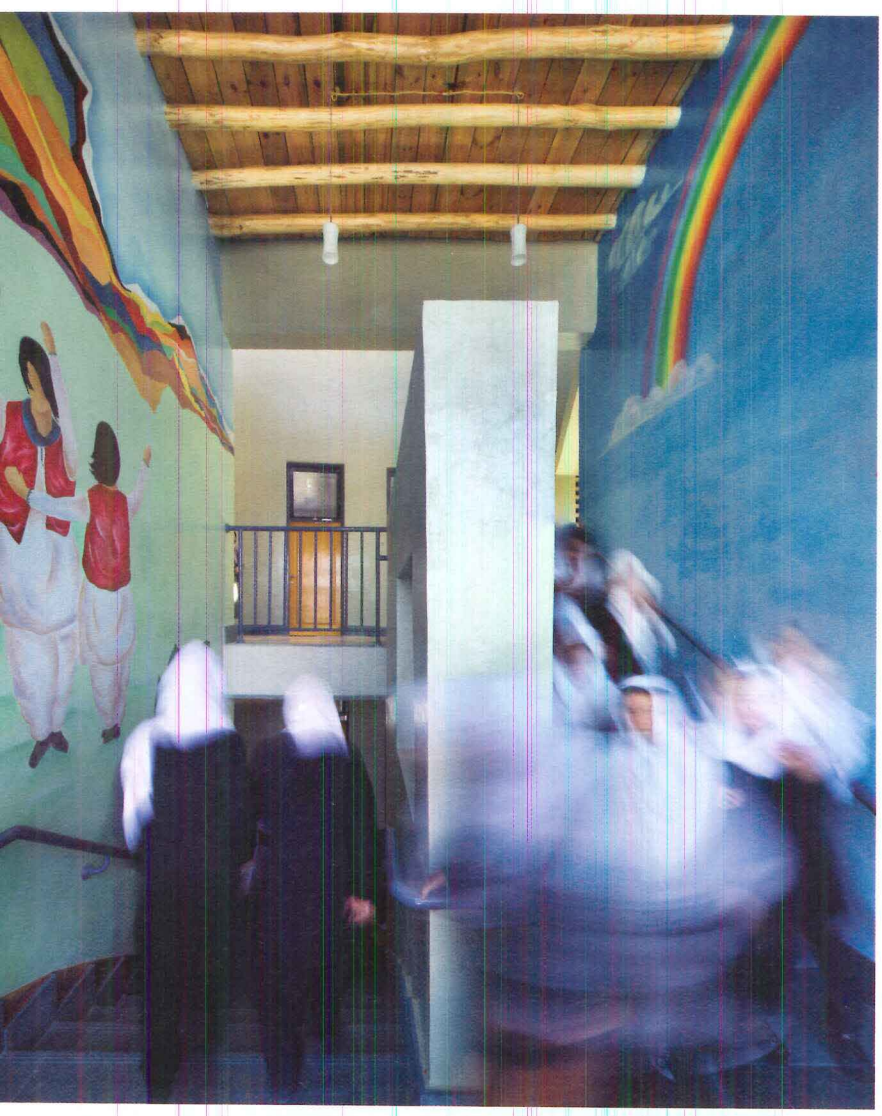
yard to the north—situated to provide privacy for the students and to maximize solar-heat gain. Across the courtyard, a row of similar one-story structures houses additional classrooms, offices, and restrooms, where an adjacent biological treatment system filters wastewater for irrigation.

The concrete-frame structure supports 12-inch-thick brick-infill walls on the buildings' exterior and throughout the interior that provide substantial thermal mass. Organizing the building to augment natural ventilation, the architects created three seemingly independent volumes linked by a central corridor at grade and bridges above. Inside, the design team inserted glazed double-height "sunspaces" around the stairwells on the south. These warm up in winter and serve as breezeways, along with the corridors, when large steel-framed doors are left open in summer. The designers also developed an operable-fenestration system with a playful arrangement of deeply punched windows on the north and south elevations, and transoms at the top of each volume. Openwork brick screens aid airflow to the classrooms.



SECTION A - A

0 16 FT.
5 M.



Stairwells feature murals by Afghan women, winners of a national competition, and traditional poplar ceilings (above). Operable transoms at the top of each volume and doorways between them (right) maximize airflow, while brick screens and windows carry warm and cool air into classrooms (below).

The school serves about 3,200 kindergarten-through-12th-grade students attending two sessions per day. Throughout the design process, the American contingent involved them, the community, religious leaders, and school officials in such decisions as color selection and the development of a computer center—even working with the authorities to hold a national competition for women to create murals for the stairwells.

This inclusion was instrumental in the warm welcome the Gohar Khatoon Girls' School received when it opened in June 2015. According to Brelsford, who attended the festivities with Hull's widow and Ketcham, "The girls feel such a sense of empowerment in this building." Local officials were just as enthusiastic, she adds—so much so that they gave Sahar a green light to initiate a program for young women that addresses alternatives to early marriage. ■

credits

ARCHITECT: Robert Hull with the University of Washington Department of Architecture – Elizabeth Golden, project architect; Yasaman Esmaili, Christopher Garland, David Miller, project team

ENGINEER: Solaiman Aalahi (structural, civil)

CONSULTANTS: Michael Gilbride, University of Washington Integrated Design Lab (lighting); PAE Engineering (ventilation); Argent Fabrication (metalwork); Mariam Kamara (systems research)

GENERAL CONTRACTOR: Afghanistan American Friendship Foundation – Jason Simmons

CLIENT: Sahar/Janet W. Ketcham Foundation

OWNER: Balkh Province Ministry of Education

SIZE: 43,000 square feet

COST: $885,000

COMPLETION DATE: June 2015

Ilima Primary School

A remote Congolese village promises to protect the rain forest in exchange for an innovative school building.

BY LAURA RASKIN
PHOTOGRAPHY BY THATCHER BEAN

MASS DESIGN GROUP is used to working in remote places. Building schools or health centers where there were none and training local labor is practically written into its DNA. Michael Murphy and Alan Ricks founded the Boston-based nonprofit architecture firm in 2010 during the design and construction of the Butaro District Hospital, the first of its kind in the rural Burera district of northern Rwanda.

The Ilima Primary School, in a Congolese jungle village, is remote to an extreme even for MASS. In 2013, MASS was approached by the African Wildlife Federation (AWF) to design and build the school as part of the organization's efforts in the continent's most environmentally vulnerable places. AWF offers an unusual barter: it will provide a "conservation school" if a community promises to protect thousands of acres of rain forest from hunting, logging, and agriculture. In the case of the village of Ilima, it's more than 600,000 acres.

"The first thing we ask about a new project is, 'What impact will it have? Will the community embrace it?' " says Murphy. The answers were clearly positive in the case of Ilima. Deforestation and poaching of endangered species such as bonobo apes have global implications, as well as local ones. These problems stem, in part, from poverty and lack of access to education. "We know that one school will not solve all of that, but we can ask if our investments in primary infrastructure are a step in the right direction in stabilizing the most vulnerable," says Murphy.

Andrew Brose, a MASS project director based in Kigali, Rwanda, moved to Ilima for a year with his wife, Rachel Brose, to lead the construction. Working with two Congolese interns, Jeancy Mulela and Jonathan Bongi, the team overcame challenges "maximized to the power of 10," as Brose put it. Sited along the village's main road, the one-story building also serves as a community center—it's the largest and most complex structure many of the villagers have ever seen. "Because we were working with unskilled labor, to get the idea across through drawings and descriptions wasn't adequate," says Brose. "It

MASS Design Group staked out two circles at the site and placed the curving arcs of the school where the circles meet (above). Many of the villagers had never seen such a large or complex structure before the school was built (right).

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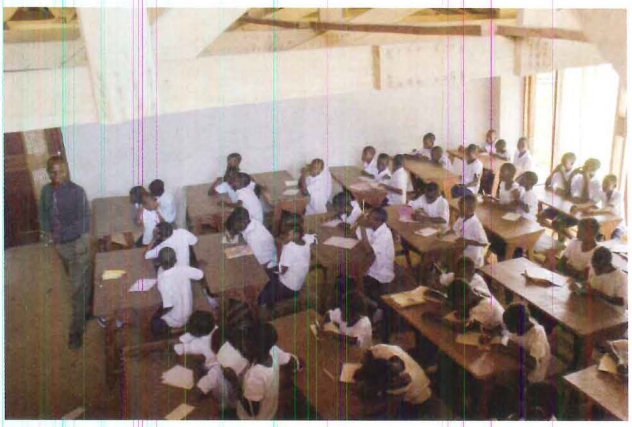
ILIMA



Dried and plant-dyed vines were woven into screens for the Lifake doors and window frames. The frames are mounted to pivot hinges fabricated from bicycle-wheel hubs (top). Horizontal openings in the roof increase airflow and daylight into the classrooms and central corridor (above). All of the furniture was designed and built on-site by local carpenters (above, right).

wasn't until the building took shape that it was clear what the goal was."

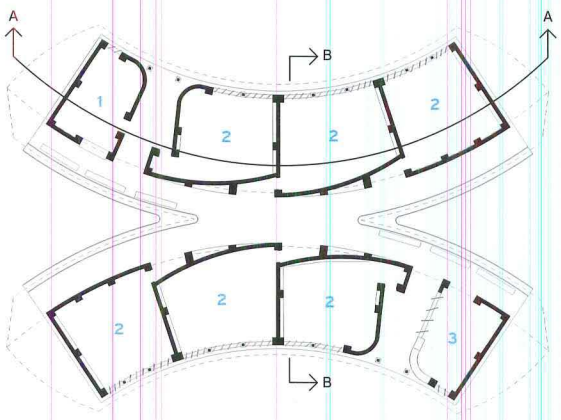
For the design, the architects staked out two circles, one for a demonstration and conservation garden, the other for a play area. The school—two arcs that face away from each other—sits between the two circles and has a laterite and compacted-soil foundation. The southern arc contains three classrooms and a library; the northern arc houses three classrooms and an administration space. A suspended canopy roof made of hardwood shingles connects the two wings. Classroom doors are staggered and face an interior hallway as well as the exterior of the building—a strategy that distributes wear and tear on topsoil. Walls are made of sun-dried adobe brick plastered with two layers of a clay-sand mix, a white clay rendering, and two coats of boiled palm oil, the last ingredient an innovation that makes the

bricks durable. The walls go up about a third of the way, allowing breezes to pass in and out.

Because the "roads" around Ilima are small sand paths that cross multiple rivers and streams, the only way to travel is by bicycle or motorbike; even then, bikes need to be walked across log bridges or travelers have to hire dugout canoes to make crossings. It was necessary, then, for building materials to come from distances that could be traveled on foot. While wood shingles are not common in the Congo, Brose knew they would be easier to replace and maintain than a metal roof from somewhere else. "We were creating a micro-economy for this community," says Brose.

The school opened in March 2015 and serves 300 students. "This was really unique for us and even for the guys we brought from the capital [Kinshasa] of Congo. There was no running water, no power, very limited food choices. It requires time and ability to manage life," says the architect, whose wife documented the project—and made sure he ate and slept. Says Brose, "I've lived in hard, remote areas before, yet this was a major lifestyle change for me." Still, he recommends the process—seeing a project from conception to fabrication testing and design and construction—to every architect. It's not likely, however, that many will experience anything like the building of the Ilima school. ■

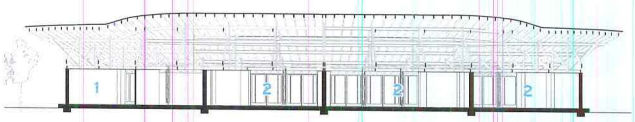
Laura Raskin is a writer and editor based in New York. She was previously the News editor at ARCHITECTURAL RECORD.



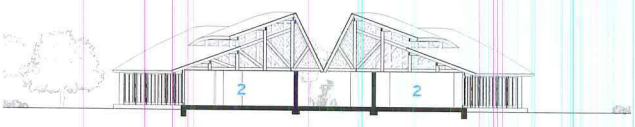
BUILDING PLAN

0 16 FT. 5 M.

1 ADMINISTRATION
2 CLASSROOM
3 LIBRARY



SECTION A - A



SECTION B - B

0 16 FT. 5 M.

The architects decided to clad the roof in wood shingles—almost unheard of in the area—because villagers could learn how to repair and replace them (above). Workers built scaffolding during the construction process (left).

PHOTOGRAPHY: © RACHEL BROSE, MASS DESIGN GROUP

credits

ARCHITECT: MASS Design Group - Michael Murphy, Executive Director; Alan Ricks, COO; Andrew Brose, Project Manager; Patricia Gruits, Sierra Bainbridge, Nicolas Rivard, Christian Uwinkindi, Jeancy Mulela, Jonathan Bongi, Christian Benimana, Kelly Doran, design team

ARCHITECT OF RECORD: Chris Scovel, RA, LEED AP

ENGINEERS: Arup - Jo da Silva, Tim White, Hayely Gryc

CLIENT: African Conservation Schools (program of the African Wildlife Foundation)

OWNER: DRC Ministry of Education

SIZE: 11,850 square feet

COST: $488,000

COMPLETION DATE: March 2015

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Pioneer Village Station, Toronto
SGA / IBI Group Architects in joint venture with Will Alsop
Cast node photograph: Dieter Janssen

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SCHOOLS OF THE 21ST CENTURY

Good design is part of good education, and the architects of the seven K-through-12 schools on the following pages have embraced a movement toward welcoming, flexible, and transparent buildings that is fast becoming the norm rather than the exception. In each case, the design teams have incorporated sustainable technologies and innovative materials to satisfy program needs as well as to please the kids and surrounding communities with functional, friendly spaces. From a small charter school neatly tucked into a new housing development in New York's Harlem to the bold renovation of a modernist campus in London (pictured here), these schools—public and private—have a strong identity of which the students can be proud.

BURNTWOOD SCHOOL, DESIGNED BY ALLFORD HALL MONAGHAN MORRIS

Burntwood School | London | Allford Hall Monaghan Morris

SHADOW BOXING

Unifying old and new buildings on a girls school campus creates a fresh identity—and wins the Stirling Prize.

BY HUGH PEARMAN

PHOTOGRAPHY BY TIMOTHY SOAR

Combining organizational clarity with a facade system that creates expressive patterns of shadow and light, the Burntwood School in southwest London has won over critics, as well as the students who use it. The Stirling Prize recipient in 2015, the multi-building campus serves 2,000 secondary-school girls (ages 11 to 18), who were engaged in workshops with the architects during the design process and now express pleasure with the results. Executed in phases, the project involved tearing down some existing buildings, retaining two, and erecting six new ones.

The original 1950s campus, designed by a highly regarded British modernist, Sir Leslie Martin (1908–2000), needed a lot of work—many of its buildings were outdated, with narrow corridors and precast-concrete cladding panels that, while generally well liked, provided poor sound and thermal insulation. The new project's architect, Paul Monaghan of the large London-based firm Allford Hall Monaghan Morris (AHMM), says he was partly inspired by Martin's buildings but wanted to develop a suite of precast insulated concrete cladding components that could be varied but also replicable, to achieve economies of scale.

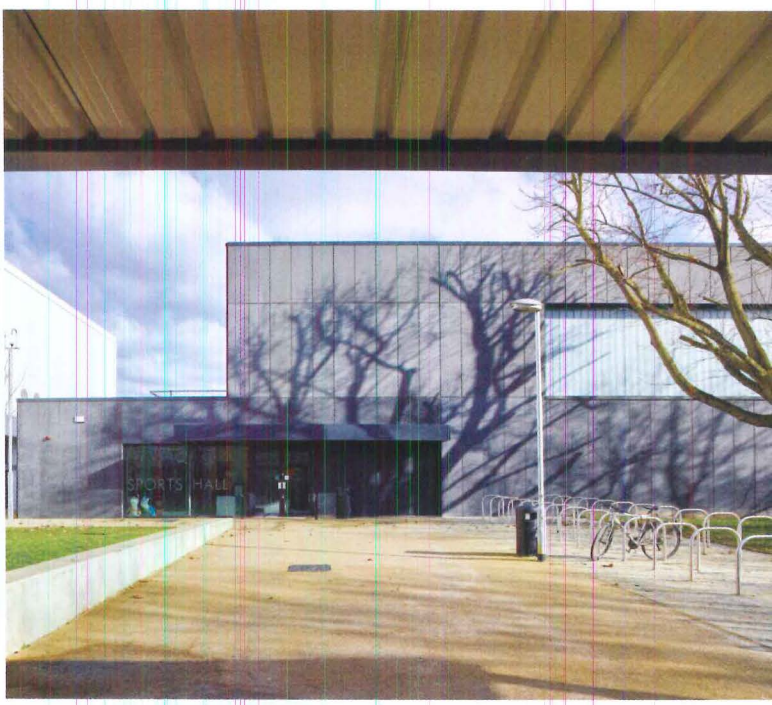
One of the last projects in the British government's Building Schools of the Future program, Burntwood's expansion and rehabilitation began right after the financial crisis of 2008. At a time of economic austerity, it was lucky to get approved at a total project cost of $62 million. It also benefited from a committed head teacher, Helen Dorfman, and pupils of diverse backgrounds who lobbied the government's education minister. Dorfman is a keen admirer of modern architecture. "I told my senior team to go to the David Chipperfield exhibition at the Design Museum," she says. She and Monaghan discussed such greats as Ludwig Mies van der Rohe and Marcel Breuer while the process unfolded, as well as the existing Martin buildings. Monaghan's designs for the school's four teaching blocks recall the old ones, with their precast-concrete panels, but are more visually striking and do a better job of blocking out sound and keeping in heat. Martin's original school assembly hall was saved, though, along with his swimming pool

CAMPUS PLAN A covered walkway made from off-the-shelf steel bus shelters serves as the pedestrian spine of the campus (left). Precast-concrete cladding modules, faceted and 20 inches deep, create striking checkerboard patterns of shadow and light (opposite). Changing the size and orientation of the recessed glazing and rotating the modules provide variation.

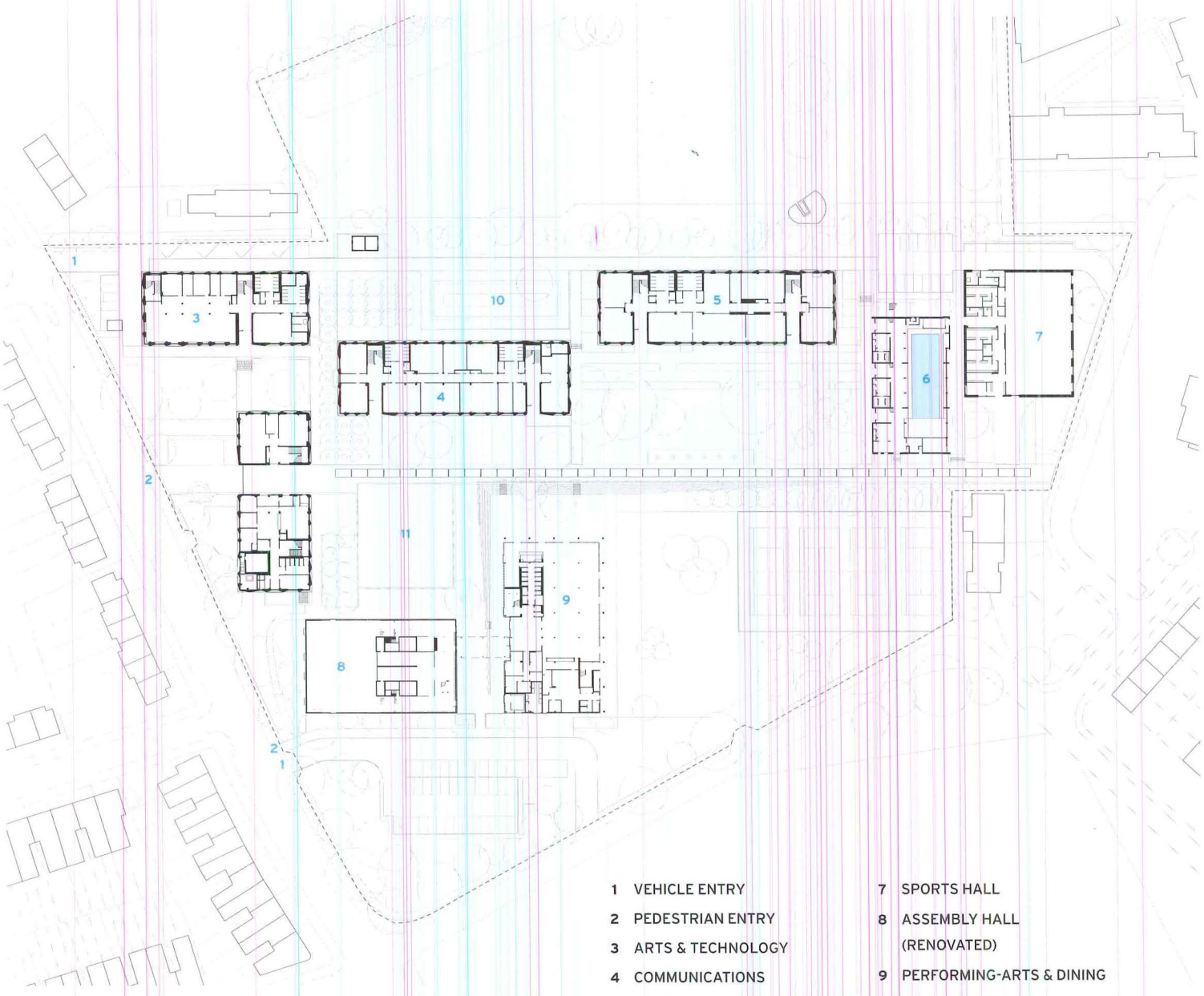
and gym building, which had been reclad by others a decade ago.

The generous 12.6-acre site meant that, with careful phasing, there was room to build the new teaching buildings while the old ones were in use, decanting pupils across campus without the need for temporary classrooms. The program started with a new sports hall clad in black precast-concrete planks, alongside the existing swimming pool building. But the real aesthetic tour de force came with the teaching blocks and their system of deeply articulated concrete panels.

During a visit on a wet winter's day, Monaghan fretted that there might not be enough daylight to see the sparkle of mica in the teaching buildings' dark concrete ground-level panels; off-white panels on the upper floors have a corresponding dark aggregate fleck in them. No need to worry: these smooth precast units—distinctly Breuer-ish in feel—are impressive both from a distance and close up. Their 20-inch depth and faceted components give them a strong character. The concrete's finish is matte but fine-textured, and all the pieces fit together tightly, so the facades aren't blemished by the kind of wide mastic joints common in large-panel buildings from the 1950s and '60s. And by contrasting dark and light concrete and inserting a narrow, vertically ribbed dark band at the base, Monaghan was able to make these buildings appear to float.



PERIOD PIECES The new performing-arts and dining building faces the restored assembly hall from the 1950s (left). The new sports hall (above) stands next to the old swimming pool building. Lawns and courtyards connect the teaching blocks (top), establishing a strong indoor-outdoor relationship.



1 VEHICLE ENTRY
2 PEDESTRIAN ENTRY
3 ARTS & TECHNOLOGY
4 COMMUNICATIONS
5 MATH & SCIENCE
6 POOL BUILDING (RENOVATED)
7 SPORTS HALL
8 ASSEMBLY HALL (RENOVATED)
9 PERFORMING-ARTS & DINING
10 VIEWING LAWN
11 FLAG LAWN

SITE PLAN

The facade panels, which are 12 feet high (floor to floor) come in two widths—10 and 15 feet—to provide variety across the 25-foot-wide classroom (and structural) module. The size and orientation of the window apertures vary according to use—in some cases, achieved by simply rotating the panels. Altogether, 11 molds were used to create nearly all the variations: a few purpose-made "specials" accommodated the rest.

The back-insulated panels—delivered to the site with factory-fitted glazing—were hung on stainless-steel fittings, on building frames of poured-in-place concrete. For sheltered terraces open to the air, the panels have unglazed apertures. Floor slabs were omitted in some areas to create double- or triple-height spaces, such as the tiled entrance portals to the teaching blocks and the informal study spaces found inside. The library in the arts and technology building is double-height, with a consequent double layer of windows. This variety of spaces enlivens what is otherwise a thoroughly conventional plan: rectangular, with a broad central corridor and standard-sized classrooms and lecture halls on either side, many equipped with movable internal walls.

The exception to this construction method is the steel-framed Performing Arts and Dining building. A huge self-service restaurant equipped with long refectory tables occupies the ground floor and spills out to an exterior space protected by the deeply cantilevered floor above. Upstairs, there are drama and dance studios, a lecture theater, and seminar rooms. Monaghan enclosed the building with a curtain wall system of glazed and solid-metal panels, both giving the same strong vertical emphasis found in the restored 1950s Assembly Hall, to which it links at the first-floor level via a concrete ramp.

BOLD ACCENTS
The architects worked with artist Morag Myerscough to add colorful elements such as wall murals and graphics to the library (opposite). A staircase picks up on the use of contrasting colors (this page), while a skylight warms up a science room (right).

The final element is the outdoors. "It was important to us that the buildings and the landscape worked to complement each other," says Dorfman.

Asked how much of a say students had in the design, the student council replied in a statement, "Girls from each year group were randomly selected and gave ideas." These students met with the architects, took part in workshops, and explained what they felt was important. Any quibbles with the result? Yes, they have a few minor complaints, such as the need for more privacy blinds in some places and better locks on the washrooms. But, overall, they seem delighted. How do they describe the architecture? "It's the contrast of the greenery with the concrete," says one student. "Like diamonds reflecting light," says another. When the Stirling Prize victory was announced, the school's students reportedly burst into applause. ■

Hugh Pearman is a London-based architecture critic and the editor of the RIBA Journal.

credits

ARCHITECT: Allford Hall Monaghan Morris – Paul Monaghan, Ben Gibson, Daniel Lewis, Lukas Ochendal, Ben Leach, Alan Worn, Simon Allford, Jonathan Hall, Peter Morris

ENGINEERS: Buro Happold

CONSULTANTS: Kinnear Landscape Architects (landscape)

GENERAL CONTRACTOR: Lend Lease

CLIENT: Wandsworth Council and Burntwood School

SIZE: 230,000 square feet

COST: $62.2 million

COMPLETION DATE: October 2014

SOURCES

PRECAST-CONCRETE CLADDING: Techrete

SKYLIGHTS: Coxdome

CURTAIN WALL: AluK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DREAM MACHINE

A charter school with an ambitious urban mission stands out with stately simplicity.

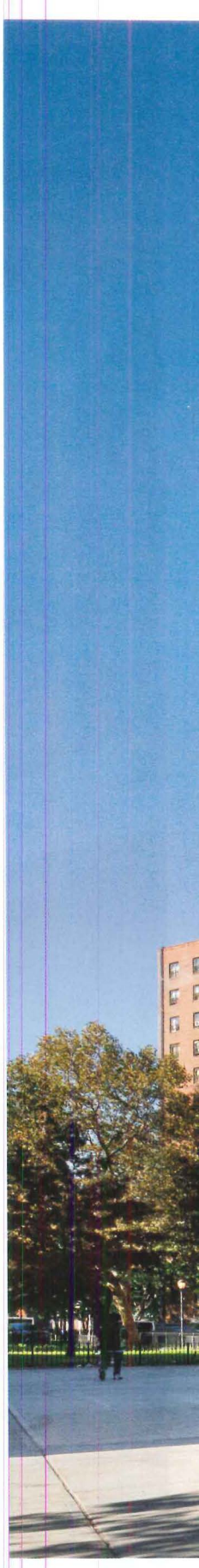
BY SUZANNE STEPHENS

PHOTOGRAPHY BY PAÚL RIVERA

You might say that East Harlem in Manhattan is well-known for the wrong reasons, such as high rates of crime and joblessness. Over a quarter of the low- and moderate-income residents in the area north of 96th Street between Fifth Avenue and the East and Harlem rivers occupy New York City Housing Authority projects. But the neighborhood, traditionally called El Barrio for its largely Latino population, has shown significant signs of change—and not just gentrification as landlords renovate apartments to lure young professionals able to pay higher rents.

Certain substantive initiatives are bolstering the future of the existing community too. One prime example is the DREAM Charter School, which moved into a crisply tailored, light-filled building last August. The K–8, four-story facility for 450 students is part of a new mixed-use complex—the East Harlem Center for Living and Learning, which includes 89 units of affordable housing, along with offices for nonprofit groups.

Its architects, Perkins Eastman, designed a U-shaped block to extend from 103rd to 104th streets on the west side of Second Avenue, most of which is devoted to the 63,000-square-foot school, with the 11-story, 151,000-square-foot residential wing filling out the north edge. While the cladding of the $24 million steel-framed educational structure is a Roman-style brick, richly hued ironspot masonry sheathes the adjoining concrete-



View additional content at architecturalrecord.com.

GOOD NEIGHBOR The DREAM Charter School occupies a four-story block, pulled back behind a small park on Second Avenue in East Harlem (this page). It abuts an 11-story tower for affordable housing clad in ironspot brick, as seen from the third-level outdoor terrace of the school (opposite).

framed residential component (developed by the Jonathan Rose Companies).

Both maintain their own identity but "do not depart radically from the physical context," says Christine Schlendorf, principal in charge of the school for Perkins Eastman. "Putting the two programs together was a challenge," notes Mark McCarthy, design principal for the firm. To make everything fit on the tight 30,000-square-foot site, the architects located school functions and nonprofit offices on the first two floors of the housing arm.

Expansive glass on the exterior walls brings daylight into the core of the building. As you come into the main lobby from a small park running along Second Avenue, you see straight ahead into the 30-foot-high gym and event hall, backed by a rear glass wall. Similarly, ample glazing runs along the dining area to the south of the entrance as well as the community room on the northeast corner, allowing passersby to view the center's activities within.

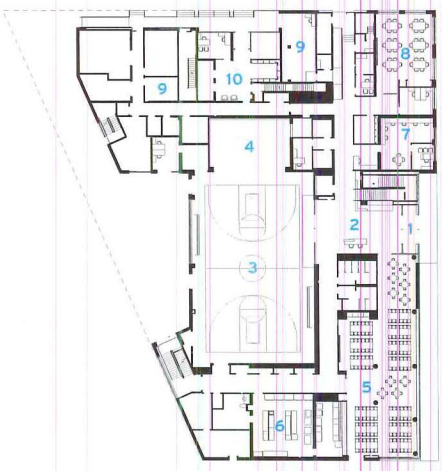
Upstairs, large window walls provide classrooms with views of trees, and abundant daylight, while additional glazing inside fosters the visibility of various activities. Another surprise comes when you discover an outdoor classroom on the third floor, on top of the gym. Here wood benches, decking, and a variety of plantings encourage small groups to come outside from the classrooms when weather permits.

Some 40 or 50 years ago, education experts sought to seal classrooms by claiming that windows caused students to be distracted, encouraged vandalism, and raised energy costs. Clearly, those days are long gone. "I like being able to see outside," says second grader Louis Gomez, who also admires the school's straightforward, L-shaped floor plans: "You know where to go."

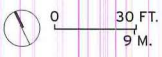
The new home for the DREAM Charter School is the result of an ambitious plan by the Harlem RBI ("Runs Batted In" in baseball parlance), a nonprofit development program for the young. Founded in 1991, the organization seeks to keep neighborhood kids from joining gangs and taking drugs through its sports and education programs. The group's baseball diamond (called the Field of Dreams) at 101st Street and First Avenue has proved to be hugely popular.

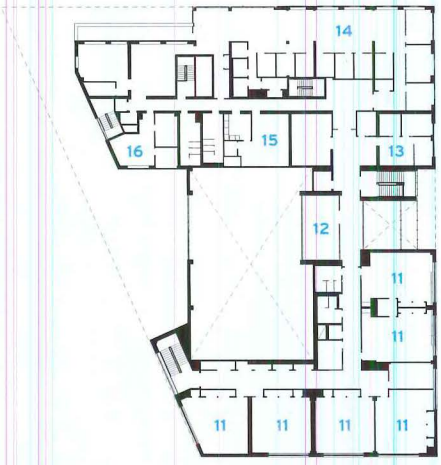
The charter school, founded in 2007, at first had to be located in spaces borrowed from public schools. While a part of New York City's school system, DREAM Charter offers smaller classes and more intensive educational programs than most public schools. Special-needs students form about

CLEAR VIEW The trimly detailed stairwells, such as one at the back of the building (this page) are enlivened by views of trees. The entrance lobby (opposite, bottom) looks straight into the gym, which receives daylight from a rear glass wall. To mitigate noise, walls are acoustical concrete block. The wood-paneled "skybox" (opposite, top), overlooking the gym, provides an additional area for meetings.



MAIN FLOOR

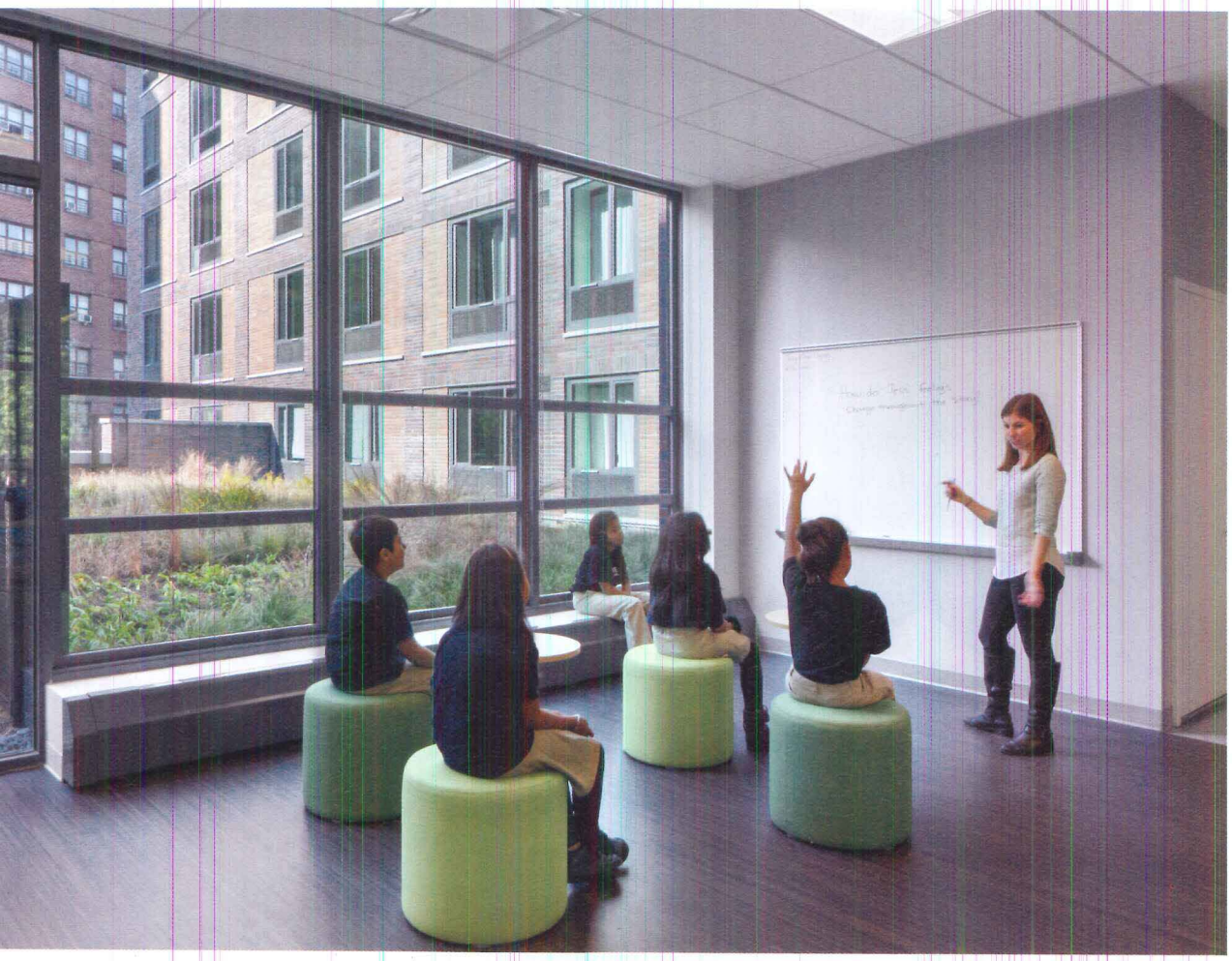




SECOND FLOOR

THIRD FLOOR

1 ENTRANCE
2 LOBBY
3 GYM
4 FITNESS
5 DINING
6 KITCHEN
7 ADMINISTRATION
8 COMMUNITY ROOM
9 MECHANICAL
10 RESIDENTIAL LOBBY
11 CLASSROOM
12 SKYBOX
13 ADMINISTRATION
14 HARLEM RBI OFFICE
15 TEACHER COLLABORATION
16 I.T./SERVER ROOM
17 RESIDENTIAL TOWER
18 ART ROOM
19 SCIENCE LAB
20 OUTDOOR CLASSROOM



THE RIGHT ANSWER
The classrooms (opposite) rely on familiar materials such as acoustical ceilings and resilient flooring, with the key visual element reliably the glimpse of treetops through generous windows. An open collaboration space on the third floor (left) has an entry to a planted terrace on top of the gym.

25 percent of its population. By law, the lottery system determines admission, with preference given to siblings, children of staff members, those living in the neighboring public housing, as well as the East Harlem community.

A visit on a late-fall afternoon corroborated the claims that larger classes of 25 and more would have two instructors and that discrete areas would be devoted to one-on-one tutoring. The energy and passion of the school head, Eve Colavita, and the staff and students were palpable, even among the assemblage of second graders about to tackle Pachelbel's *Canon in D* on the xylophone. One sixth grader, Aniya King, says she has been in the DREAM school since kindergarten. Says this old-timer of the new facility, "The settings are amazing. I get even more help and teacher support." Rich Berlin, the executive director of Harlem RBI, which has its offices here, adds that the architecture reinforces the culture of the school and the opportunities offered inside. From the point of view of its students and its clients, the design has hit the ball out of the park. The Field of Dreams now has a proper educational symbol to complement its courageous agenda. ■

credits

ARCHITECT: Perkins Eastman – Michael Lew, principal in charge; Christine Schlendorf, project manager; Mark McCarthy, principal designer (school); Joe DesRosier, principal designer (residential); Jonathan Thomas, project designer; Shaon Arrindell, project architect (residential); Melissa Babb, project architect (school); Michael Cheng, construction administration (residential); Alex Soto, construction administration (school); Jenny Aleman, interior design (school)

ENGINEERS: GACE Consulting Engineers (structural); MG Engineering (m/e/p); AKRF (civil)

CONSULTANTS: SCAPE (landscape); Steven Winter Associates (sustainability)

CONTRACTOR: Citnalta Construction Corp (school)

CLIENTS: Harlem RBI, Jonathan Rose Companies, Civic Builders

OWNER: Harlem RBI

SIZE: 63,000 square feet (58,000 square feet, school; 5,000 square feet, offices)

COST: $24 million (construction, school)

COMPLETION DATE: September 2015

SOURCES

MASONRY: Belden/Tri State

METAL PANELS: METL SPAN

METAL-FRAME WINDOWS: A.D.S. Design

GLASS, INSULATED PANELS: PPG

INTERIOR GLAZING: Oldcastle BuildingEnvelope

METAL AND FIRE-CONTROL DOORS: L.I.F. Industries

ACOUSTICAL CEILINGS, SUSPENSION GRID, AND WOOD PANELING: Armstrong

INTERIOR BRICK: Trikeenan

PAINTS AND STAINS: Sherwin Williams

RESILIENT FLOORING: Mannington, Azrock, Johnsonite, Forbo

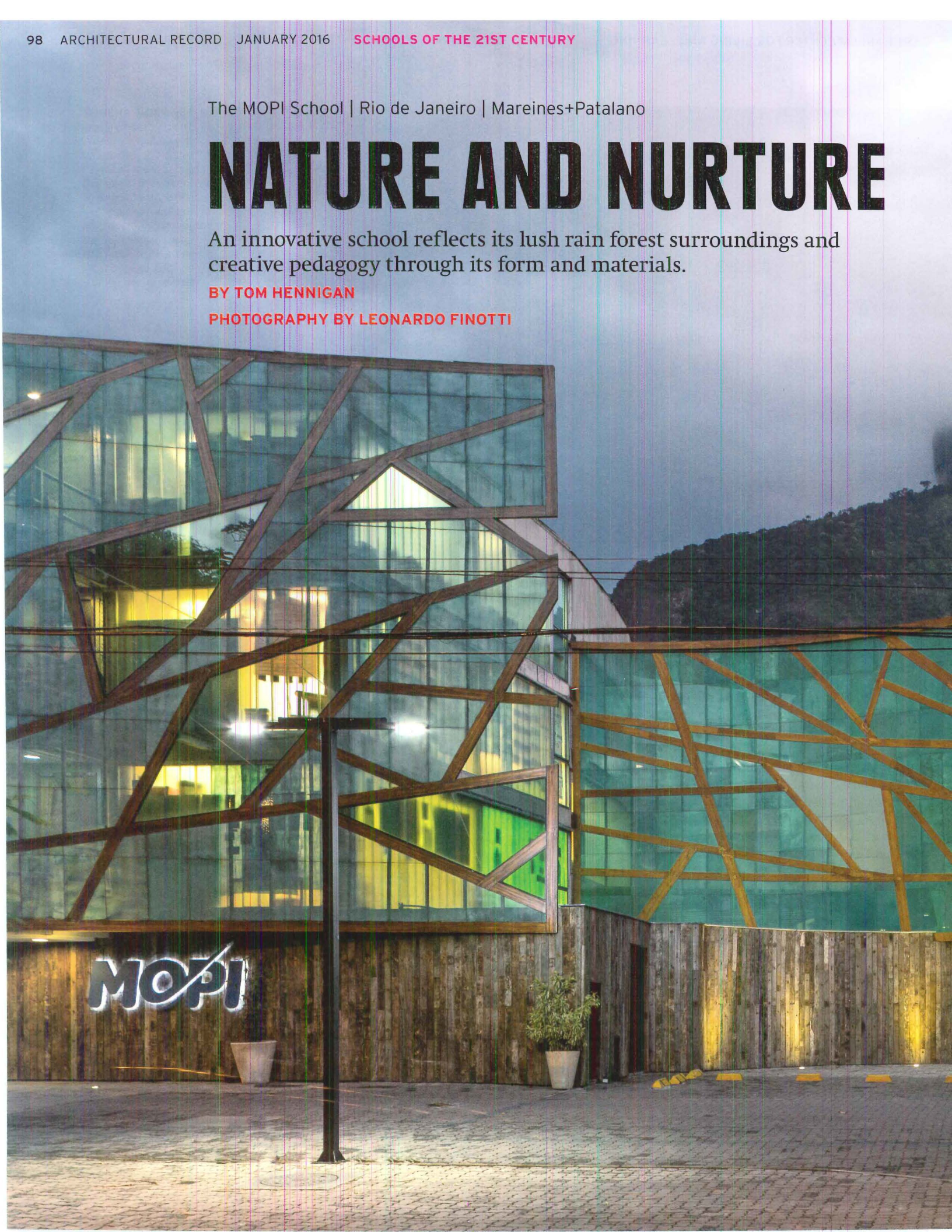
The MOPI School | Rio de Janeiro | Mareines+Patalano

NATURE AND NURTURE

An innovative school reflects its lush rain forest surroundings and creative pedagogy through its form and materials.

BY TOM HENNIGAN

PHOTOGRAPHY BY LEONARDO FINOTTI

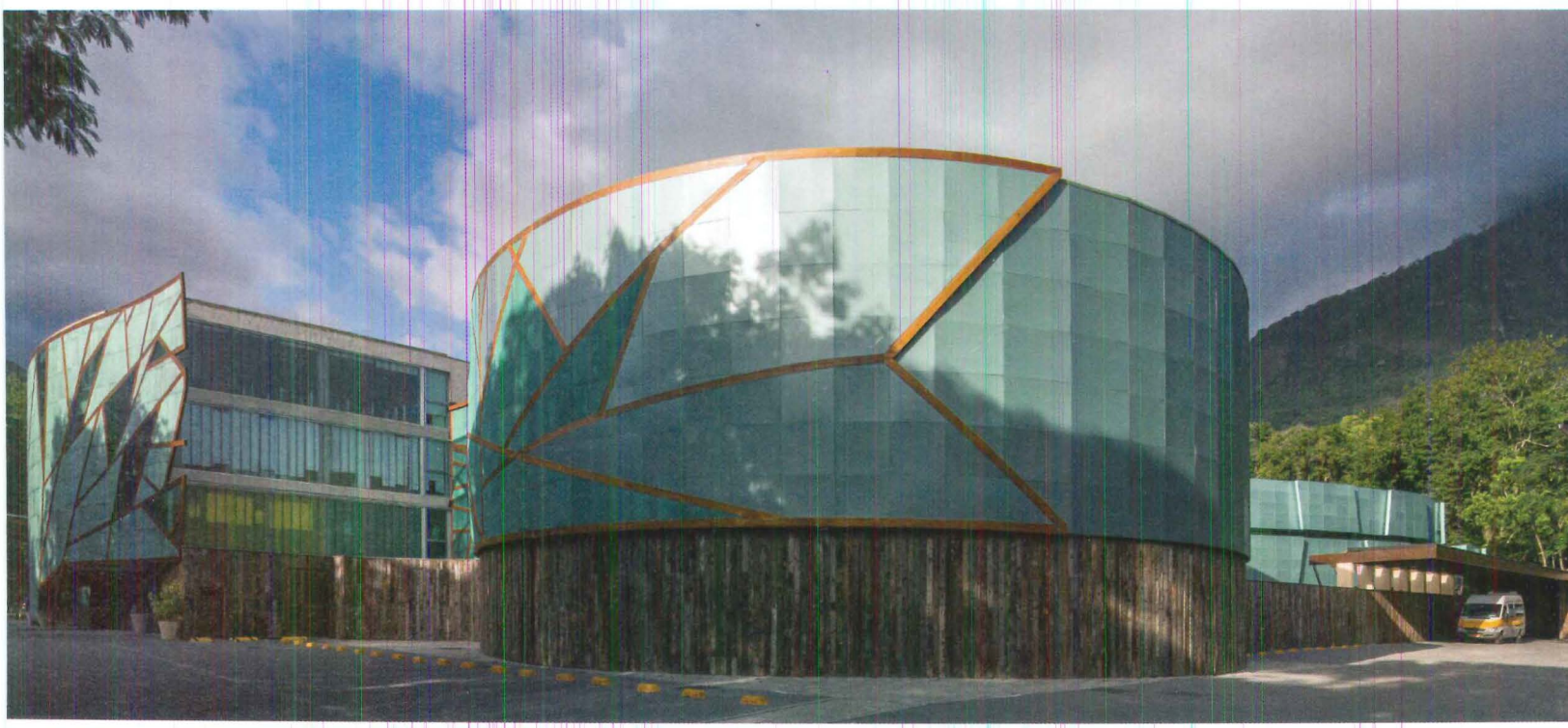


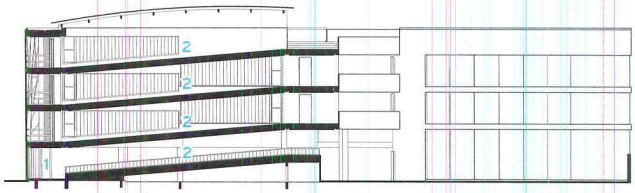
GREEN SCREEN Sitting on top of reused wood from electricity poles, the oxidized copper facade is supported by beams of laminated eucalyptus and evokes the nearby rain forest. The use of copper panels with small perforations allows for airflow yet still provides shelter from sun and rain.

Established in Rio de Janeiro's northern neighborhood of Tijuca in 1973, the MOPI school was planning to open a facility in the rapidly growing Barra region to the west. Its founders wanted a building that would introduce the private school's innovative teaching approach to the area's upwardly mobile population. "So it was fundamental that the building use the same architectural language as our pedagogical philosophy," says Vinicius Canedo, MOPI administrator and son of school founder Regina Canedo. Canedo sought to break with Brazil's traditional teaching by promoting creativity and stimulating social and environmental responsibility. MOPI stands for Moderna Organização Pedagógica Infantil, or Modern Organization of Juvenile Pedagogy.

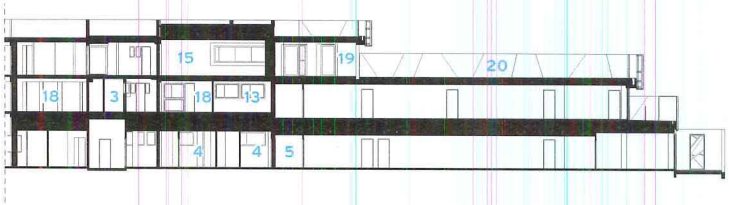
The Canedos turned to the local practice Mareines+Patalano to design the new school for nursery through high school–age children, finding like minds in architects Ivo Mareines and Rafael Patalano. The partners describe themselves as fans but not followers of the neomodernist trend that currently dominates Brazilian architecture, as exemplified by the work of Marcio Kogan. Instead, they draw their inspiration from Brazil's architectural traditions before European colonization. "Brazil is a country of excess, and we are interested in how our indigenous peoples responded to their environment, with its excess of sun, humidity, and rain," says Mareines.

This concern with place is immediately apparent in MOPI's striking street facade. Composed of green pre-oxidized perforated copper panels attached to laminated wood beams, it evokes the rain forest, which rears up behind the school along the slopes of Rio's iconic Gávea mountain. During the day, the panels appear opaque from the outside, while semitransparent from inside. At night, the effect is reversed, and the facade lets the light and movement within the school become visible from the street. The perforated panels allow for the circulation of fresh air throughout the interior, yet also provide shelter from Rio's tropical downpours and shade from its often intense sun. This natural ventilation all through the structure results in an air-conditioning bill far lower than Rio's humid climate would seem to dictate.





SECTION A - A

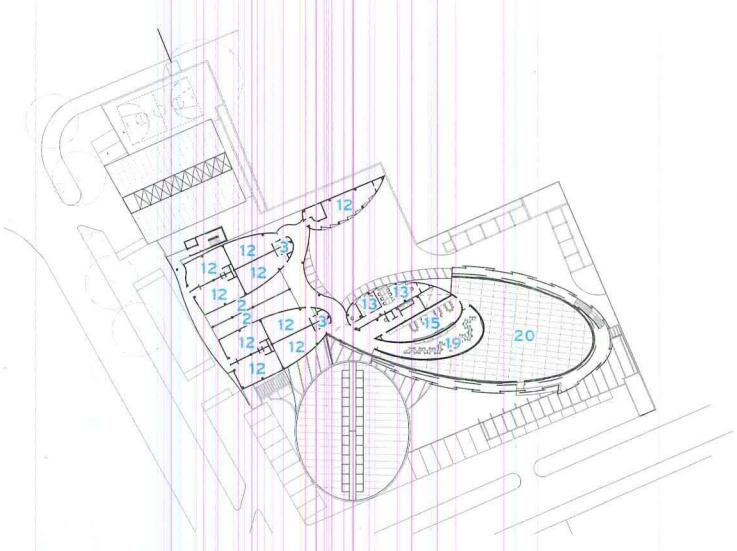


SECTION B - B

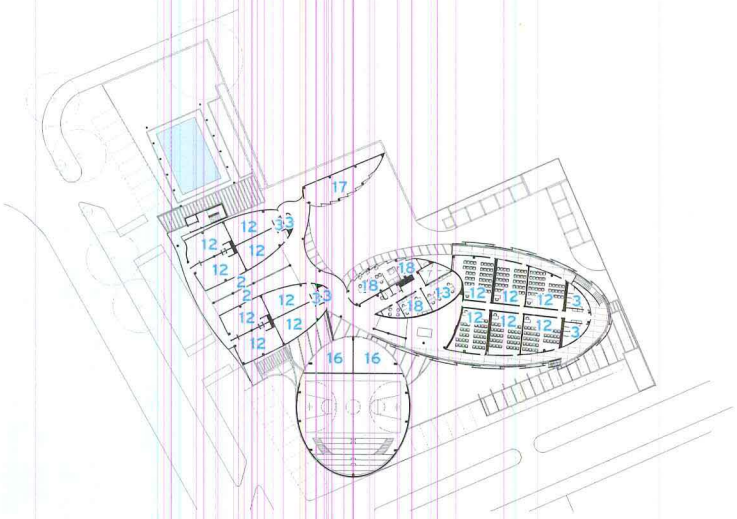
0 16 FT.
5 M.

1 ENTRANCE
2 RAMP
3 RESTROOM
4 KITCHEN
5 CAFETERIA
6 STUDENT KITCHEN
7 COVERED PATIO
8 GYM
9 OUTDOOR COVERED POOL
10 OUTDOOR SPORTS COURT
11 COURTYARD
12 CLASSROOM
13 TEACHERS ROOM
14 LITTLE FARM
15 SCIENCE LAB
16 PHYSICAL EDUCATION ROOM
17 NAP ROOM
18 OFFICE
19 ART ROOM
20 TERRACE

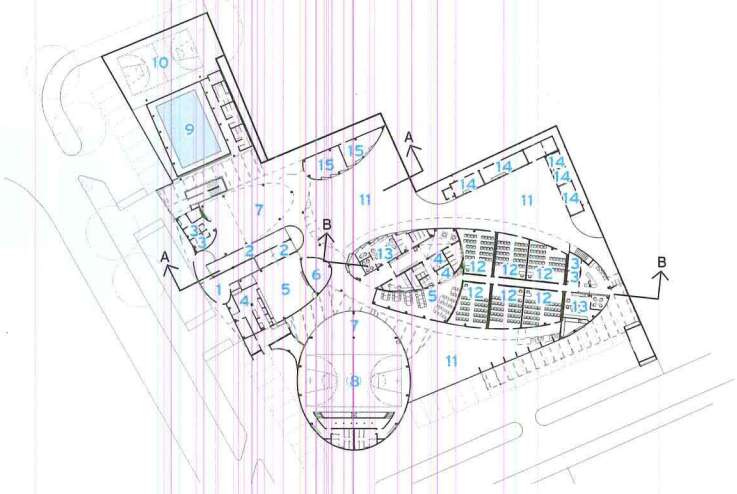
LEARNING ARENA The building comprises four elliptical volumes built in three phases, with an emphasis on maintaining its architectural coherence. The gym (opposite, bottom and above), clad with a perforated aluminum composite that blends with the copper, was part of the third phase. Curving external ramps and balconies reveal stunning mountain views at the back of the building (opposite, top).



THIRD-LEVEL PLAN

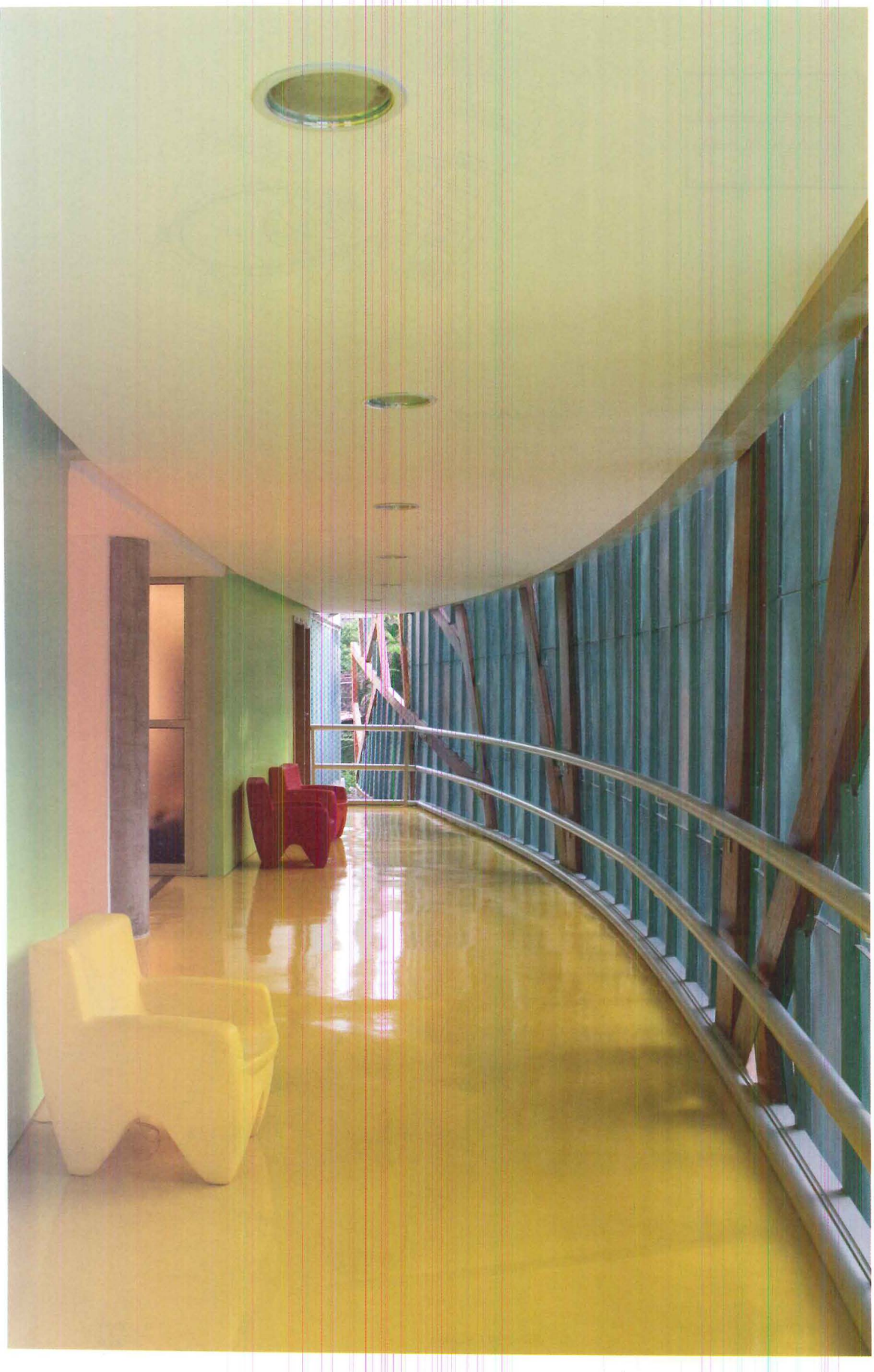


SECOND-LEVEL PLAN



GROUND-LEVEL PLAN

0 30 FT.
10 M.



A fluid interplay between interior and exterior permeates the rest of the poured-in-place concrete structure. The building comprises four separate volumes linked by a series of external color-coded balconies, with the building's rear dramatically opening onto views of the rain forest. This emphasis on harmony with nature is reinforced by the architects' use of materials. The facade sits on top of wood beams once used for electricity poles; sustainable eucalyptus covers the roof of the outdoor swimming pool; recycled rubber and plastics surface flooring in play areas; and much of the water is supplied by captured rain. There is even a vegetable garden and coops for chickens and tropical birds.

Fittingly for an institution that wants to teach children to think outside the box, they are not asked to learn while sitting inside one. "We live in boxes big and small. At MOPI, you are never sitting within four [orthogonal] walls. No two spaces are the same. There is no obvious logic. It is a less harsh, much richer learning experience," says Mareines.

The school is endlessly playful and as sinuous as Rio itself, with classroom walls bending along the elliptical lines of the volumes that make up the structure. This use of curves solves MOPI's requirement that the building be accessible to physically disabled students. The only staircase in the entire structure was mandated by the city's fire

credits

ARCHITECT: Mareines+Patalano Arquitetura – Ivo Mareines, Rafael Patalano, principals

CONSULTANTS: Vistara Paisagismo (landscape); Ana Moraes, Atelier da Luz (lighting); MPNAICE (structural steel and concrete); Edson Cravo (m/e/p); N2 Projetos (facade); Carlos Alberto Szücs (glulam)

GENERAL CONTRACTOR: Kreimer Engenharia

CLIENT: MOPI

SIZE: 60,400 square feet

COST: $8.1 million

COMPLETION DATE: February 2015

SOURCES

METAL PANELS: N. Didini (perforated copper); Reynobond (perforated aluminum)

GLASS: Pilkington Profilit (channel)

WOOD: Esmara (glulam)

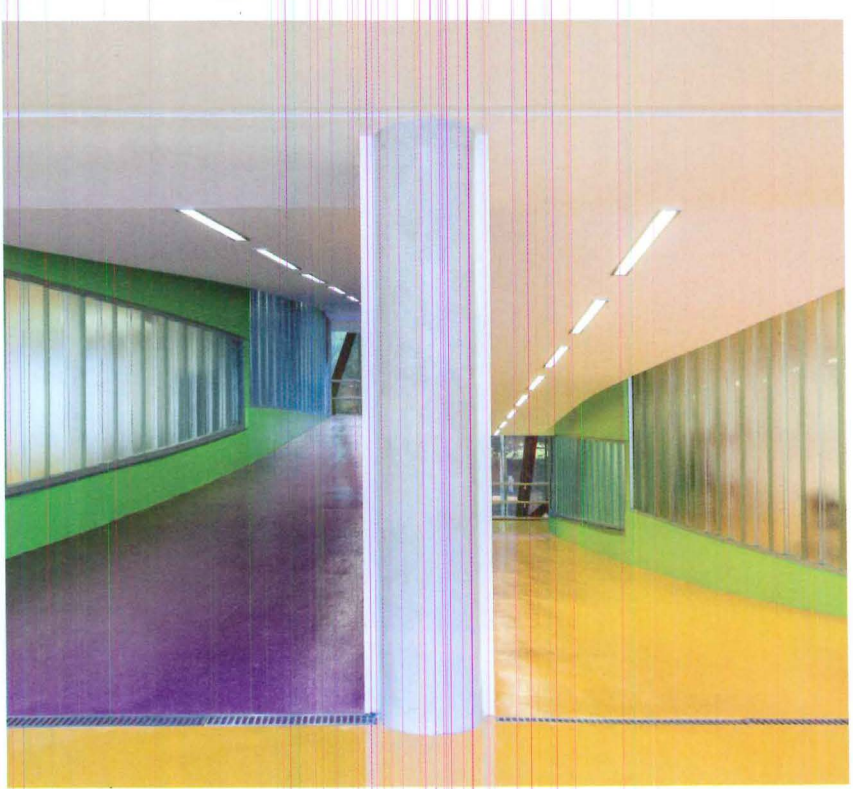
codes. Otherwise, access to upper balconies is by a series of looping ramps that are a manifestation of the school's dedication to inclusion.

Built over three phases as its student body grew and advanced through the upper grades, MOPI today has over 800 children aged 2 to 17. Planning for the project started in 2007, with the first phase delivered in 2009. Phase two was completed in 2010, and the third delivered in 2015. When the decision was first made to expand the school, both client and design team insisted on maintaining the coherence of the original project, seamlessly integrating the distinct phases to create a unified whole. When cost ruled out using the copper panels on the facade of the third phase, Mareines+Patalano turned to less expensive panels made of an aluminum composite, giving the building skin a variegated color scheme utterly in keeping with its rain forest motif.

The investment in such an innovative building has been more than worthwhile, say the school's owners. "Parents want their children to study here, and the numbers back this up," says Canedo. "We see fewer kids taken out before graduating than the average turnover rate in the sector."

It is easy to imagine why parents might be reluctant to move their children elsewhere. MOPI is like the sort of attraction kids get to enjoy on a field trip rather than a regular place of learning. "Here it's like coming to school in an amusement park," says 9-year-old Maia. "It's colorful, and we get to learn while playing. You feel happier here." ■

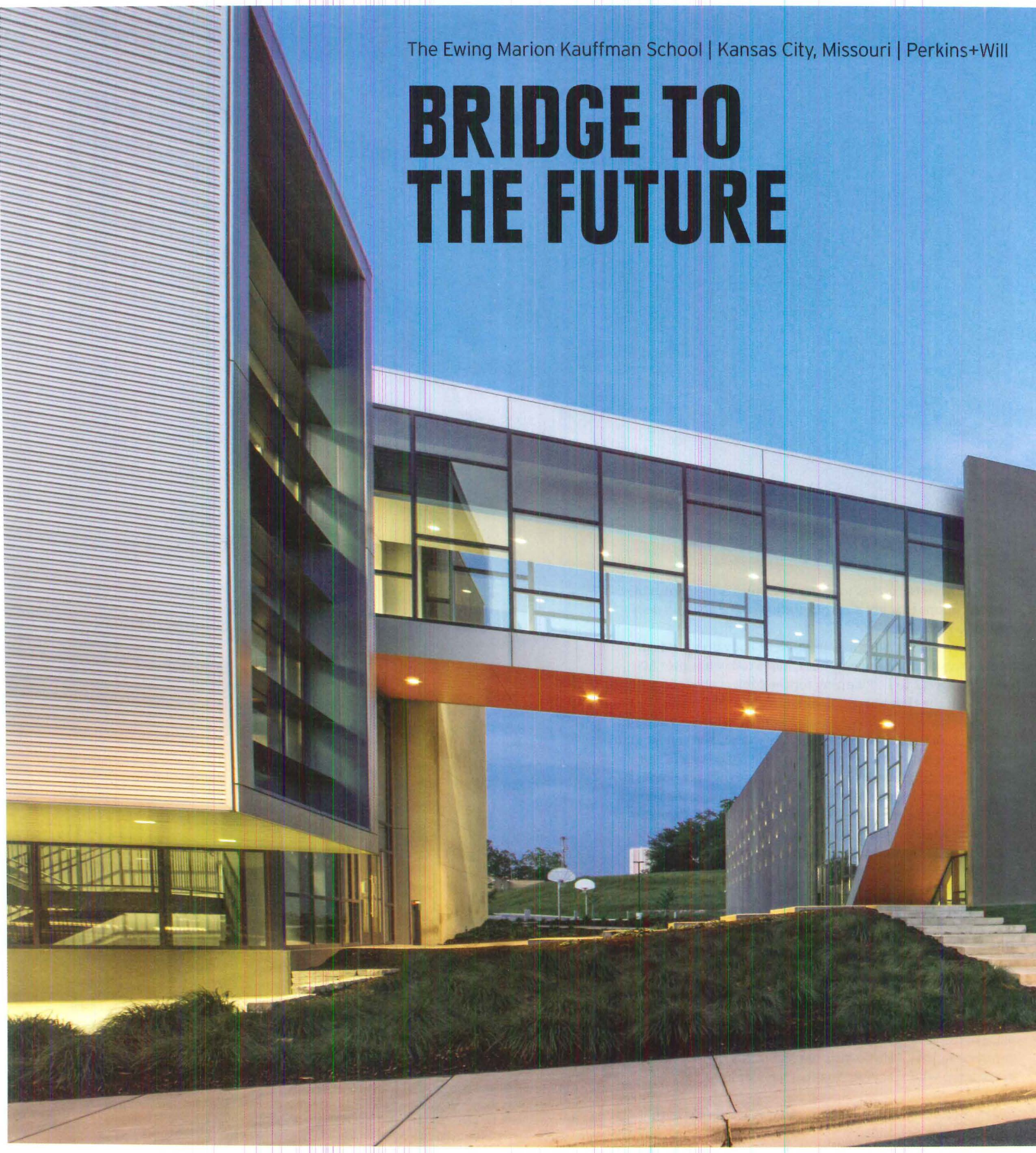
Tom Hennigan is the South America correspondent for the Irish Times, *based in São Paulo.*



PRIMARY SPACES Playful colors serve as a location device throughout the building (opposite), while channel glass is used in most classrooms to maximize daylight inside the building (top). To ensure accessibility for physically disabled students, the architects employed a series of color-coded ramps (above). The building's one staircase was mandated by the city fire codes.

The Ewing Marion Kauffman School | Kansas City, Missouri | Perkins+Will

BRIDGE TO THE FUTURE



A charter school for an underserved community balances rigor with flexibility.

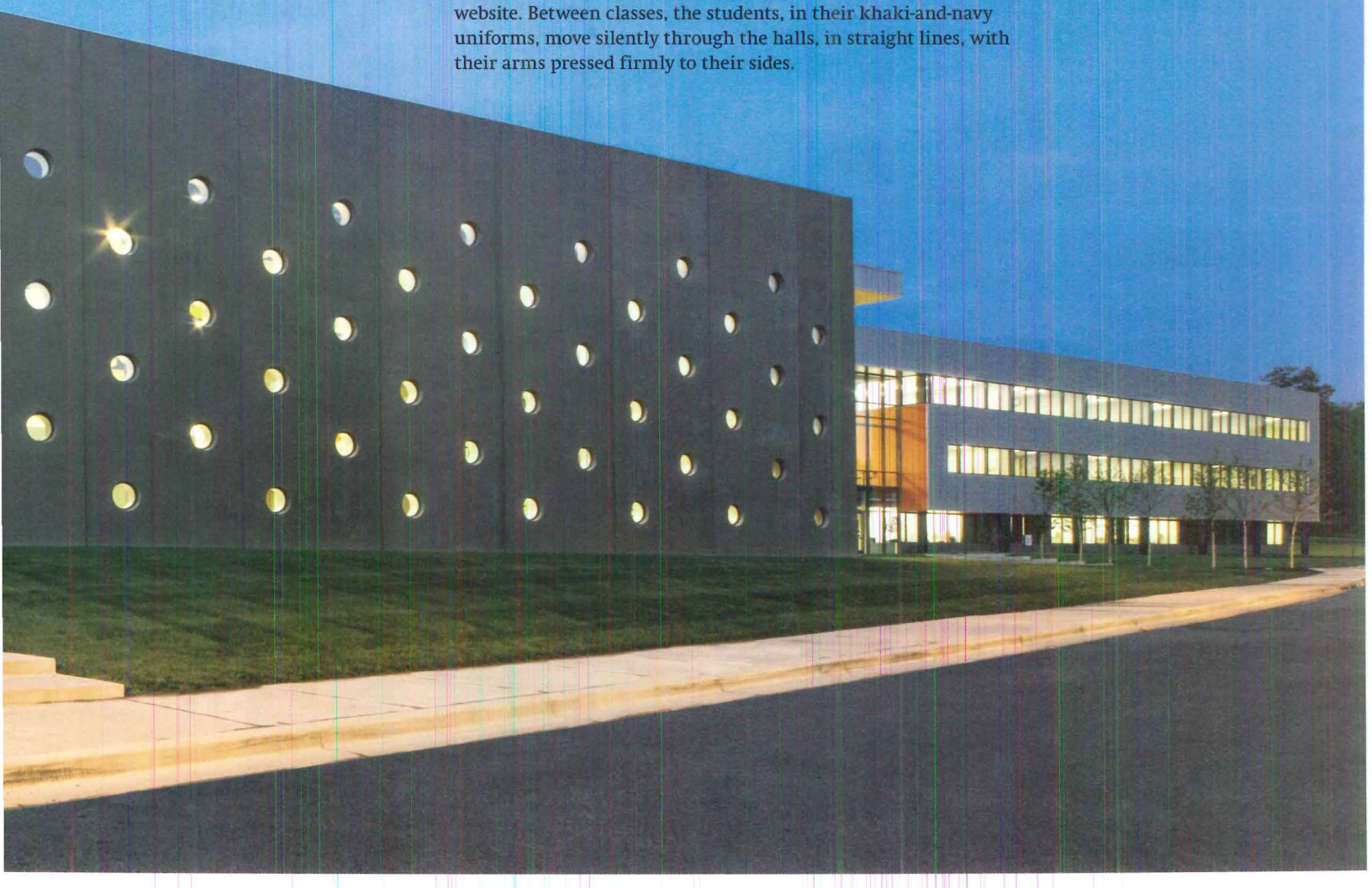
BY BETH BROOME

PHOTOGRAPHY BY JAMES STEINKAMP

On a tidy parcel of land in Kansas City, Missouri, the Ewing Marion Kauffman School demonstrates an elegant sense of order and pragmatism while suggesting a forward-thinking attitude. In so doing, the building, designed by Perkins+Will, reflects the school's vision of both discipline and flexibility—and creates a place of pride for a challenged student body.

The Ewing Marion Kauffman Foundation was established in the 1960s with the mission "to foster a society of economically independent individuals who are engaged citizens in their communities." With a background in supporting education and entrepreneurial programs, the Kansas City–based organization founded its first charter school in 2011, housed in an interim facility for its first two years. Now, with its striking new 206,000-square-foot building, the school has room to grow. Currently, it serves 690 kids in fifth through ninth grade and will eventually run through 12th grade, expanding to 1,100. Students are admitted by a lottery system that gives priority to children living in the city's six "highest need" zip codes.

The school's philosophy has structure at its core. With a rigorous program designed to "create college graduates," it has longer hours and a longer school year than the other local public schools. It also has double class periods and "maintains high academic and behavioral standards," as noted on the school's website. Between classes, the students, in their khaki-and-navy uniforms, move silently through the halls, in straight lines, with their arms pressed firmly to their sides.



MARCHING ORDER
A preexisting limestone office building (at left, back) was expanded with a metal-clad bar affixed to its west side. A bridge traverses an easement and connects to the precast-concrete cafeteria/gym volume, and then to the metal-clad high school (at right).

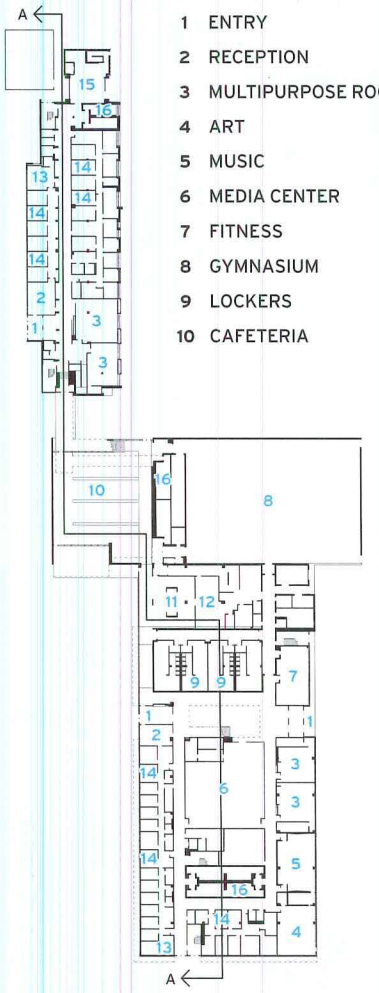
QUIET PAUSE
Tucked alongside the cafeteria, a courtyard (above) affords a tranquil moment. Ample glazing (left) provides views in and out. The mechanical tower of the preexisting limestone building faces busy 63rd Street (opposite, at right). The central volume and high school are visible beyond, with the Church of the Nazarene in the distance.

The 13-acre campus presented the architects with a challenge. A utility easement ran through the plot. And it contained two 1960s buildings that were formerly the headquarters for the Church of the Nazarene, which sits on an adjacent hilltop. Deeming one structure unfit for their needs, the team razed it but retained the second—a three-story limestone office building—for the middle school. "We treated it like a found object," says design principal Bryan Schabel. But the building was too narrow to fit a double-loaded corridor, so the architects expanded it to the west. Distinguishing new from old, they clad the extension with a corrugated metal panel system that brings a spark to the volume's more subdued limestone side. "It started out as a collage of different materials, which we continued on the other buildings," says Schabel.

To traverse the easement, the team created an enclosed bridge, with a storefront window system, that connects the middle school to the core of the campus: a large volume housing the dynamic triple-height cafeteria and gymnasium. With a steel-framed roof and walls made of enormous structural precast-concrete panels dotted with porthole windows—which animate the interiors and soften the surfaces' industrial quality—this building, with its long, broad ramp, helps adjust the floor-to-floor difference between the old and new construction. It also relates to the materiality of the existing structure and connects to the new steel-frame, corrugated-metal-clad high school volume. "Everything is off-the-shelf—it's the whole idea of the building," notes Ralph Johnson, design director for Perkins+Will, emphasizing the attention to the bottom line.

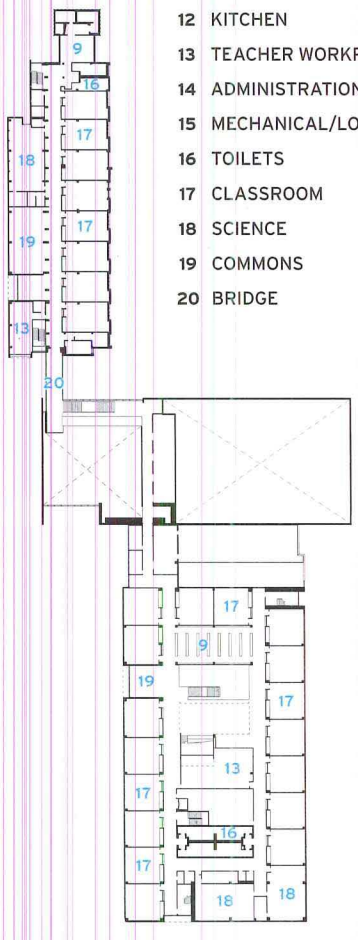
In the initial planning stages, Perkins+Will (with experience in education as far back as 1940, when they collaborated with Eero Saarinen on the Crow Island Elementary School) discussed a range of organizational concepts—for example, flexible classrooms that would open into each other. Of course, the scheme had to accommodate changing pedagogy. "The building was designed to be as adaptable as possible, to ensure it could always be utilized to serve the school's mission, even if approaches to teaching change," says Aaron North, vice president of education for the foundation.

In response to the school's culture, the architects gravitated to a structured, more traditional scheme, "but one where we left some room for the school to create their own learning environments outside the classroom," says principal in charge Steve Turckes. As children move through middle school into high school, the spaces loosen up, with more open, flexible areas—like the daylit cafeteria and a soaring atrium, with its bold yellow stadium seating—



1 ENTRY
2 RECEPTION
3 MULTIPURPOSE ROOM
4 ART
5 MUSIC
6 MEDIA CENTER
7 FITNESS
8 GYMNASIUM
9 LOCKERS
10 CAFETERIA

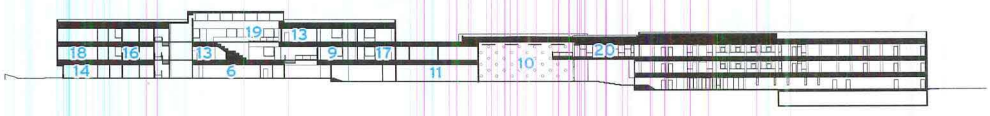
LEVEL-ONE PLAN



11 SERVERY
12 KITCHEN
13 TEACHER WORKROOM
14 ADMINISTRATION
15 MECHANICAL/LOADING
16 TOILETS
17 CLASSROOM
18 SCIENCE
19 COMMONS
20 BRIDGE

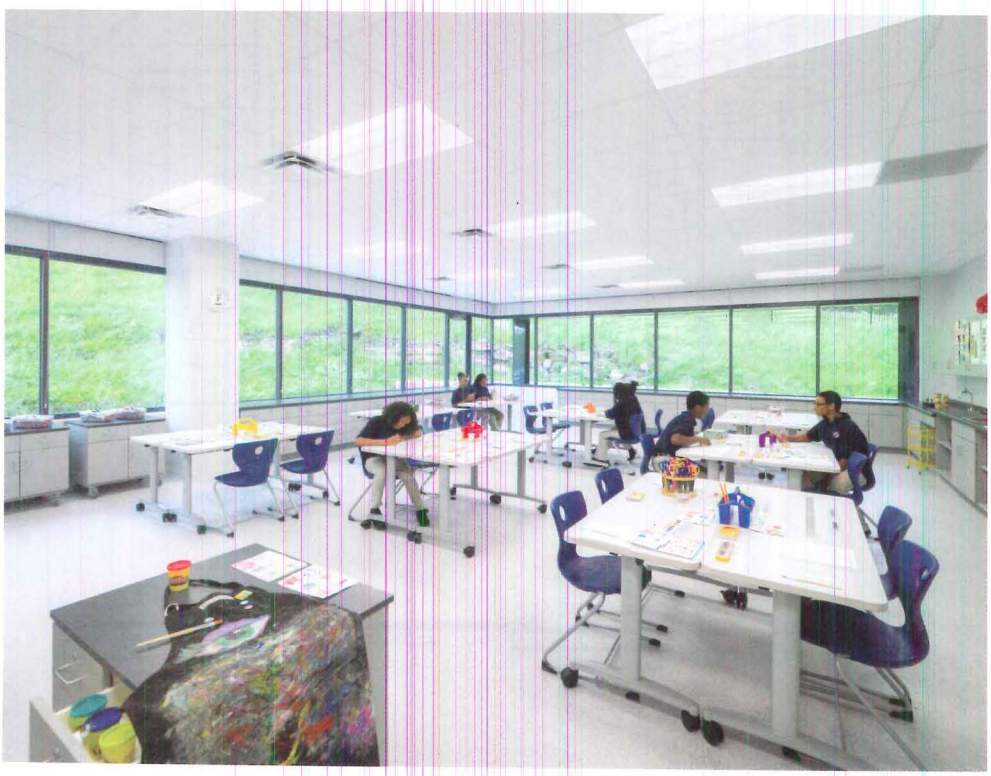
LEVEL-TWO PLAN

0 50 FT.
15 M.



SECTION A - A

0 50 FT.
15 M.



creating a subtle push-pull against the more strictly programmed classrooms. While classrooms and collaboration spaces in the middle school are accessed off the double-loaded corridor, the high school is a donut in plan, with commons rooms and a media center ringed by classrooms. Instructional spaces are devoid of teachers' desks, to discourage "nesting" between periods. Instead, each grade has a dedicated teachers' workroom to promote faculty collaboration.

Daylight floods the interiors, and though the surrounding neighborhood is known as troubled, views from the school frame the parklike setting of the campus, with patios and generous playing fields. Throughout the building are surprising moments, such as lounge-like study areas and quiet niches. At the top of the ramp leading from the cafeteria to the middle school is a pleasant balcony (looking down to the tables below), which has evolved to host morning meetings and end-of-day roundups. "We don't always know specifically how these spaces will be used," says Johnson. "It's interesting to see how they become integrated into the curriculum."

In its short history, Kauffman has achieved impressive boasting rights. The founding class is showing a 50-percentage-point gain on state tests after their first four years, and has surpassed statewide averages for reading and math. The school has an astonishing 97 percent attendance rate. Being in an inspired environment is surely a contributing factor. "The intentionality of this building is so important," says Candace Potter, the school's talent recruiter. "It's wonderful to see how having a beautiful space affects the pride of the students." ■

credits

ARCHITECT: Perkins+Will – Ralph Johnson, design director; Bryan Schabel, design principal; Steve Turckes, principal in charge; Christopher Hale, project manager; Greg Tamborino, senior project architect; Aimee Eckmann, educational planner; Milena Kim, Crister Cantrell, Peter Frisbee, Leila Janssens, project team

ASSOCIATE ARCHITECT: MOMENTA

ENGINEERS: Shafer, Kline & Warren (civil); Walter P Moore (structural); Gibbens Drake Scott (m/e/p/fp)

CLIENT: Ewing Marion Kauffman Foundation

SIZE: 206,000 square feet

COST: withheld

COMPLETION DATE: August 2013 (middle school and shared buildings); June 2014 (high school)

SOURCES

METAL PANELS: CENTRIA

PRECAST CONCRETE: Coreslab Structures

CURTAIN WALL: Kawneer

ROOFING: Firestone

GLASS: PPG

ACOUSTICAL CEILINGS: Certainteed

PAINTS AND STAINS: Sherwin-Williams

RESILIENT FLOORING: Armstrong, Azrock, Johnsonite

CARPET: Interface, Shaw

DINING IN STYLE An orange balcony, ramp, and stair provide a variety of vantage points for experiencing the cafeteria (opposite, top); bright circular baffles further animate the space. Science labs have flexible configurations (opposite, bottom). A seating area (above) encourages students to meet outside. The atrium's Big Yellow Stairs accommodate audiences for a multitude of performances and gatherings.


GEMS World Academy
GEMS World Academy

GEMS World Academy Lower School | Chicago | bKL Architecture

SCHOOLHOUSE ROCK

A private day school in downtown Chicago makes the most of its park-side southern exposure to bring light into the building.

BY JAMES GAUER

PHOTOGRAPHY BY DARRIS LEE HARRIS

How do you give civic scale and stature to a mid-rise school in a high-rise context? This was one of the challenges faced by bKL Architecture in designing the new lower school of GEMS World Academy in Chicago.

Lakeshore East, a 28-acre mixed-use planned community east of the city's downtown Loop and north of the new Maggie Daley Park (RECORD, October 2015, page 78) is the home of two local landmarks: the 82-floor Aqua hotel and apartment tower (Studio Gang, RECORD, May 2010, page 60), with undulating concrete balconies, and Harbor Point (Solomon Cordwell Buenz, 1972), with 54 floors of curved black curtain wall. These will soon be joined by Wanda Vista (Studio Gang again), a sinuous 93-story skyscraper of light, faceted glass shafts for residences and a hotel. The area's centerpiece is the lush 6-acre Park at Lakeshore East designed by James Burnett. Despite topping out at a modest 10 stories, the GEMS School—the new kid on the block—holds its own by enhancing the park's northern edge and giving the neighborhood another kind of eye-catching architecture.

Global Education Management Systems or GEMS, an international network of private K–12 day schools, is making its U.S. debut with the Chicago campus, which opened in September 2014. While tuition is high (about $28,000 to $35,000 annually), the school plans to attract a diverse student body, thanks to a generous financial-aid program. The 83,000-square-foot lower school accommodates 650 students (preK–8) and will share amenities with the institution's upper school, soon due to begin construction on an adjacent property.

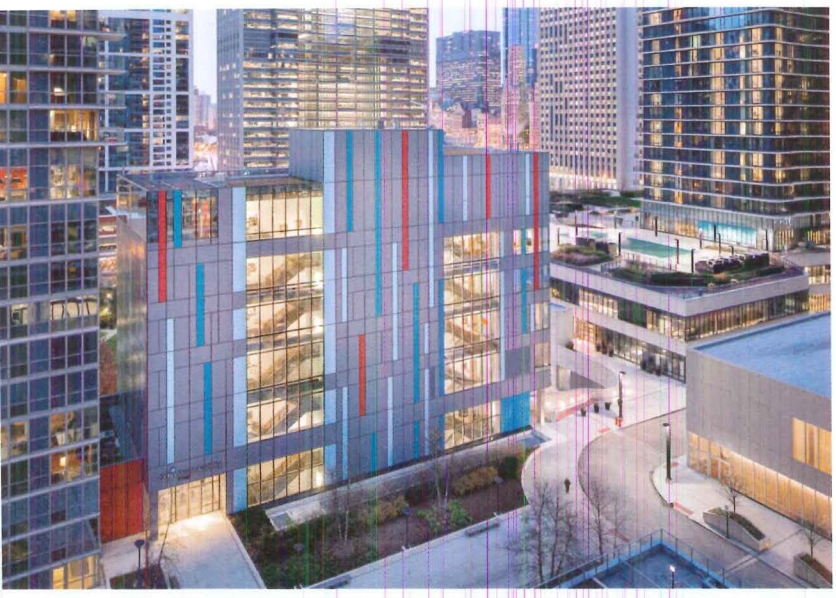
A site of only 9,500 square feet led the architects to stack the program vertically. "The lowest four floors abut existing buildings and have only one exposure," notes bKL principal Tom Kerwin. "Fortunately, the building faces south. We quickly realized the learning spaces must be organized along this face to take advantage of the natural light and views." And so emerged a parti, with circulation placed on the north and classrooms and common areas on the south.

A complex site section—due to multilevel Wacker Drive along the Chicago River—resulted in two entry levels, one off the park to the south and another off an upper pedestrian plaza (corresponding to the fifth floor) to the north, which will also provide an outdoor link to the upper school. The first level of an adjacent parking garage helps provide a secure drop-off and pick-up area, used by a majority of students.

The school's concrete structure, which allows higher ceilings and good acoustical isolation for noisy spaces such as the gym and music room, is enclosed by a vertically syncopated curtain wall of glass and brightly colored metal panels. The antic boldness and linear rhythm prevent the school from appearing dwarfed by the much taller and more sober towers nearby. The result is a handsome backdrop for the park and a civic focal point for the neighborhood.

"We strove to make this building reflect the fact that children are the primary users," explains Kerwin. "Using color in a playful manner seemed natural among the muted residential high-rises. In addition, we modulated openings in the exterior panels so they're

COLORFUL SYNCOPATION
A bold curtain wall of glass and metal panels (opposite) gives this mid-rise building a sense of verticality among high-rises. A setback at the fifth floor breaks up the mass and provides a terrace for the dining hall. The school faces the Lakeshore East Park where one entrance is located; the other occurs on an upper pedestrian plaza to the north.



appropriate for both the functions contained within and the exposure to adjacent buildings."

The generous reliance on glass gives the south-facing classrooms, library, dining room, and gymnasium abundant light and panoramic vistas. Even the stairs—on all but the lowest levels—have oversize windows and views, prompting students to use them rather than the elevators. Landscaped setbacks provide a terrace on the fifth floor—which also breaks up the mass—and a rooftop playground on the tenth floor.

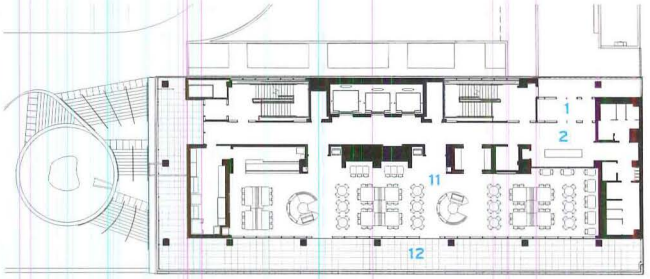
The classrooms are all that tech-savvy students and teachers might want in a thoughtfully designed—and well-funded—new school. Each typically incorporates two LCDs with software applications that allow iPad-wielding students to use Web-based communication such as Skype to connect with other classrooms and with other GEMS schools around the world.

Common areas are generously scaled and nicely detailed. The dining hall on level five, finished in rift-cut white oak and colored tiles, opens to a terrace running the full length of the building and has tables with marker-board tops, so kids are encouraged to take notes and doodle over lunch. The gymnasium

LEVEL-SIX PLAN

LEVEL-SEVEN PLAN

LEVEL-TWO PLAN

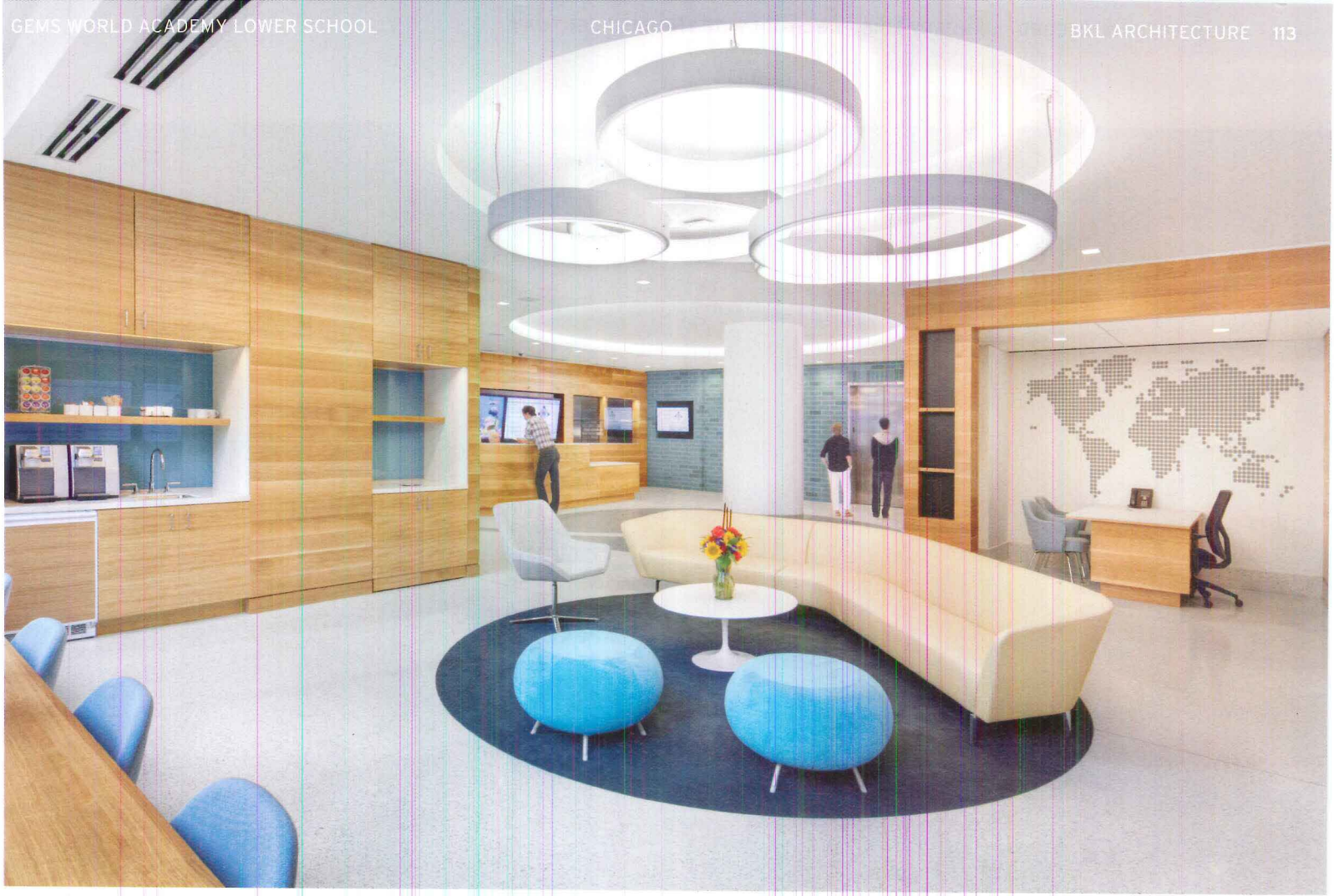


LEVEL-FIVE PLAN

LEVEL-ONE PLAN

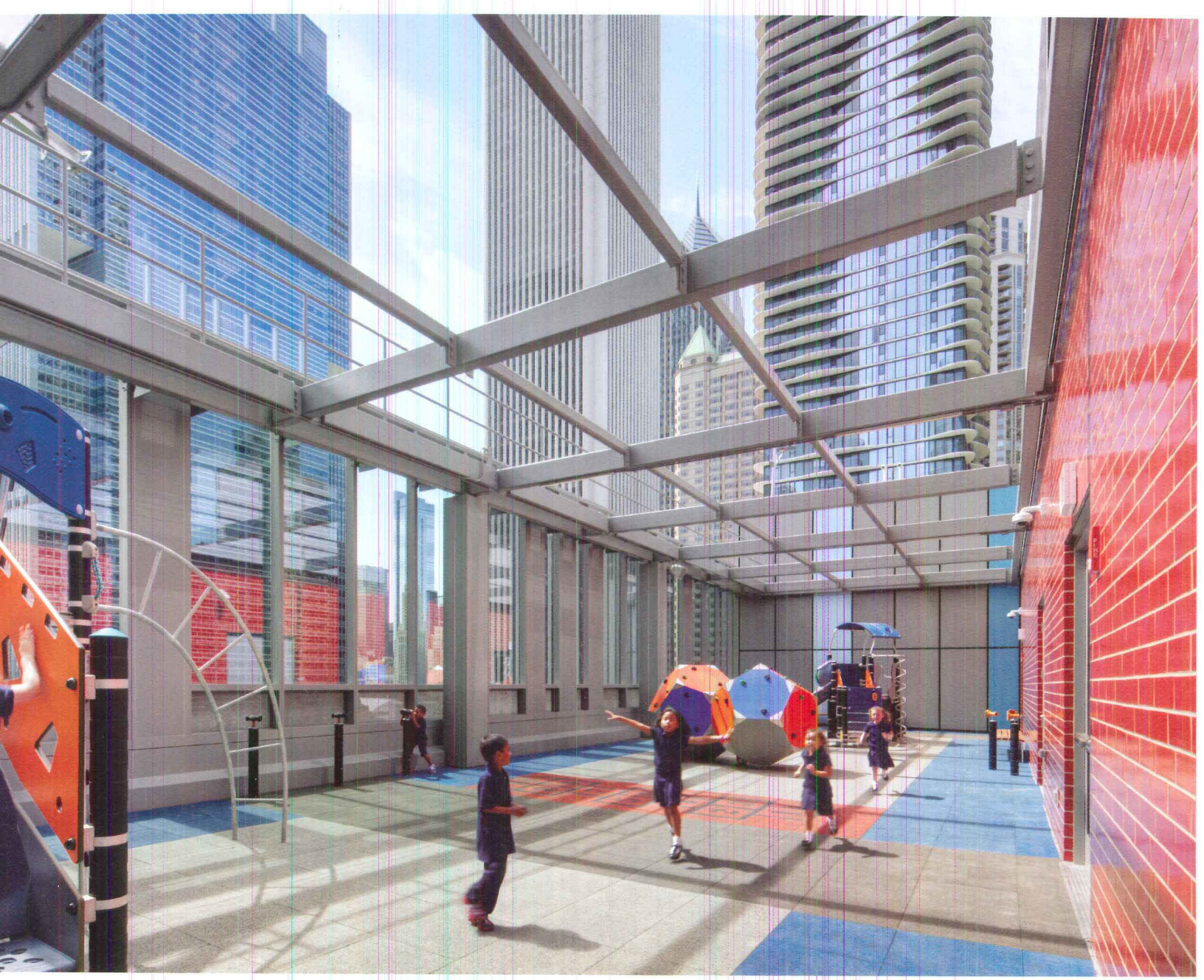
0 20 FT.
6 M.

1 ENTRANCE
2 RECEPTION/LOBBY
3 PARENT LOUNGE
4 OFFICE
5 CONFERENCE ROOM
6 CLASSROOM
7 TECH COMMONS ROOM
8 CORRIDOR WORKSTATION
9 SERVER ROOM
10 IT OFFICE
11 CAFETERIA
12 TERRACE
13 MULTIPURPOSE ROOM
14 NURSES STATION
15 GREEN ROOF
16 LIBRARY
17 MUSIC ROOM
18 ART ROOM
19 SCIENCE CLASSROOM



FUNCTIONAL CLARITY
The generous use of glass on the north wall displays the stairs on this side of the school (opposite). Common areas share a consistent design vocabulary, including walls clad in rift-cut white oak, and the manipulation of the ceiling planes, as in the lobby (above) and the library (right).

DYNAMIC INTERPLAY Brightly colored alcoves with benches and work surfaces (above) turn single-loaded corridors into ad hoc gathering and learning spaces. Classrooms (left) maintain the color palette. On the rooftop playground (opposite) students enjoy sunshine, fresh air, and exercise amid panoramic views of Chicago's skyscrapers.



has windows of fritted glass for light control. The library, imagined as a sky garden, has a palette of bright colors and a ceiling of white hexagonal panels arranged to suggest clouds.

How do the students like their new school? A sampling of fifth graders elicited a unanimous thumbs-up. "At other schools, you can't wait to go home," said one. Her classmate, eager to finish the thought, added, "But we can't wait to go back to school!" Geoff Jones, the head of the school, observes, "Everyone loves the building, especially the light in the classrooms and the spectacular views of the parks and city." However, he adds, "the one universal complaint is that the hard interior surfaces make it noisy. Thankfully, the noise is pretty joyful." ■

James Gauer, based in Victoria, British Columbia, and Chicago, is an architect and the author of The New American Dream: Living Well in Small Homes.

credits

ARCHITECT: bKL Architecture – Thomas Kerwin, principal in charge; Lynne Sorkin, project director; Michael Karlovitz, design director; Carl Moskus, technical director; Srdjan Avram, Jayshree Shah, Angela Spadoni, Lalima Chemjong, Audry Grill, Brad McBride, Danielle Tillman, team

ENGINEERS: Halverson and Partners (structural); WMA Consulting Engineers (m/e/p/fp); Mackie Consultants (civil)

CONSULTANTS: Wolff Landscape Architecture (landscape); Archiluce International (lighting); Shen Milsom Wilke (acoustical)

CLIENT: GEMS Americas

SIZE: 83,000 square feet

COST: $34 million

COMPLETION DATE: September 2014

SOURCES

MASONRY: Elgin Butler

METAL/GLASS CURTAIN WALL AND METAL PANELS: Harmon

GLASS: Viracon; Technical Glass Products

WOOD DOORS: Algoma Hardwoods

ACOUSTICAL CEILINGS AND SUSPENSION GRID: Armstrong

PAINTS AND STAINS: PPG Paints

PLASTIC LAMINATE: Formica

SOLID SURFACING: DuPont (Corian)

SKIN AND BONES Corrugated, perforated, and matte aluminum cladding make up much of the school's exterior. But generous triple-glazed windows allow views to the surroundings and make the wood construction visible, even from the outside, so children can see and understand the building's structure.

European School Frankfurt
Frankfurt | NKBAK

BUILDING BLOCKS

Modular construction yields a surprisingly fresh aesthetic in a school for young children.

BY MARY PEPCHINSKI

PHOTOGRAPHY BY THOMAS MAYER

When city officials approached architects NKBAK in late 2013 to design a temporary building for the campus of the European School Frankfurt (ESF), they were more concerned with speed than "an interesting architectural solution," says firm principal Andreas Krawczyk. A large contingent of European Central Bank employees and their families were poised to move to the German city in the next year, threatening to overcrowd the already at-capacity ESF, which offers pre-K-through-12 instruction for the children of staff at European Union institutions. In such situations, Frankfurt often builds schools out of shipping containers, but Krawczyk and his partner, Nicole Kerstin Berganski, hoped to provide a more innovative alternative, convincing the client to consider other modular systems.

Located on the city's northwestern periphery, the ESF required the new building to house a cafeteria, a gym, and 17 classrooms for 500 students in preschool, kindergarten, and first grade. Because the school offers children daily lessons in their mother tongue, which can be any one of the 24 official EU languages, each classroom needed a generous 870 square feet, to allow several instructors to teach small groups simultaneously.

Due to a tight schedule, with only 15 months for design and construction, the architects elected to create a modular building using wood. Keeping the classroom dimensions in mind, they laid out the three-story structure on a 9-foot 10-inch grid. Then they designed three types of modules, each measuring 9 feet 10 inches by 29 feet 6 inches: a standard shoebox-like unit, with two long plywood walls; a second type with one long wall and one glue-laminated beam; and a third, with only beams. Single modules function as individual rooms or are combined to create larger spaces. For example, a classroom consists of a beam-only module flanked by two more modules, each with one wall and one beam.

The architects clustered modules along an L-shaped corridor, which is enclosed by extensive glazing when single-loaded and widens when double-loaded to become a communication zone. Common spaces take up most of the ground floor, and class-

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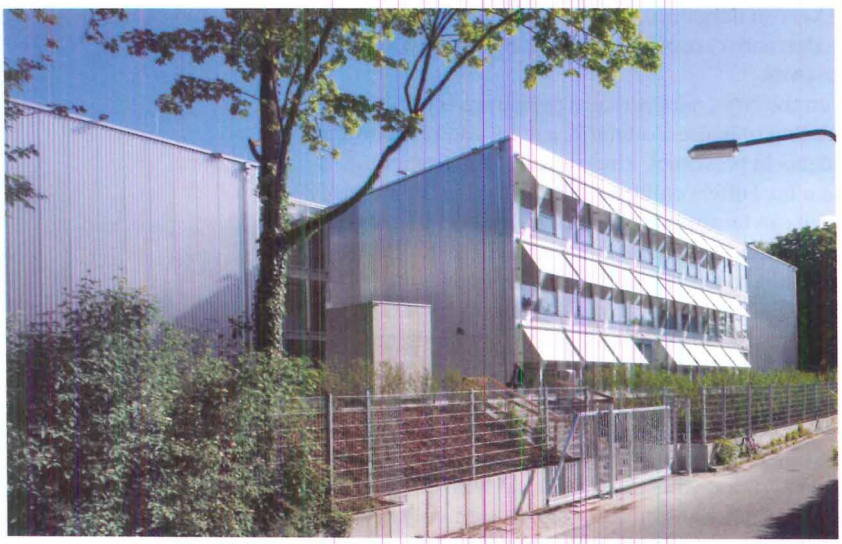


GLASS WITHOUT MASS. Floor-to-ceiling windows (top) flood the corridors (opposite, bottom) and 29-foot-deep classrooms (opposite, top) with daylight. This expansive fenestration required sunshades on the south (above) and east facades to prevent overheating in summer.

rooms occupy the two upper levels. Floor-to-ceiling windows, all triple-glazed, flood the interiors with daylight. Because the city required that the windows be aluminum-framed for maintenance reasons, the architects chose this material for the flat and corrugated panels and the perforated screens that cover much of the exterior. "A wood facade on a wood building is banal," says Krawczyk.

The 100 spruce modules were fabricated in Austria with insulation, electrical cables, plumbing and sanitary fixtures, acoustic panels, glazing, and heating units installed at the factory. The fabricator also produced the non-modular wood components—the corridors and stairwells—as well as metal elements such as the facade panels and screens, and the structural steel used to achieve an almost 40-foot-long span over the gym. Flatbed trucks transported the prefabricated elements 290 miles to the site, arriving every half hour over a three-and-a-half-week period.

The modules were stacked on a slab and fastened to create a three-dimensional frame stiffened by the stairwell walls. To avoid damage, some finishes and fixtures, including the varnish of matte whitewash on the interior walls, the vibrant stairwell colors, the dove-gray linoleum floor, and the ceiling luminaires, were added on-site, at the end of the construction process.

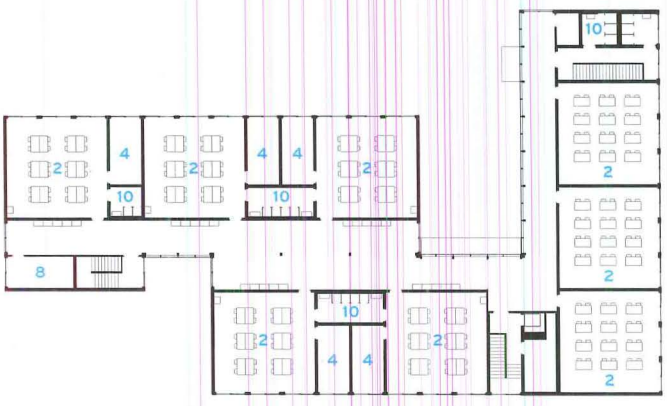
In many respects, the project has exceeded expectations: it met the tight schedule, cost 25 percent less than a school built with traditional methods, and is even a game-changer: the city is now planning permanent modular wood schools. The ESF building was initially given a five-year occupancy permit. When it expires, either an extension will be granted or the school could be dismantled and rebuilt elsewhere.

The building does have some problems. The wood structure's lack of thermal mass and the extensive glazing caused overheating in warm weather, which proved troublesome because the facility houses activities during summer vacation. Additional sunshading and ventilators were recently added to reduce heat gain and improve air circulation.

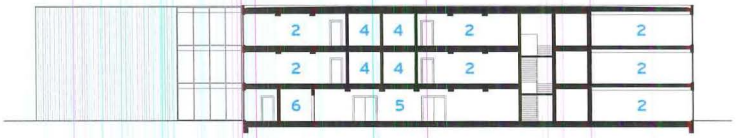
The school may look tough, but the seemingly weightless cladding and generous fenestration provide glimpses of classroom activity and create a surprisingly welcoming impression. The solution feels thoroughly appropriate for young children.

Inside, the wood construction dominates. The air smells lightly of spruce and, as Kalle Endres, a parent, observes, "The building feels cozy and permanent," in contrast to classrooms in shipping containers. Nevertheless, the unembellished corridors look slightly unfinished, as if awaiting the users' touch. Step into the classrooms, however, and the artwork, furnishings, and child-size belongings complete the spaces. "We did not aim to be pedagogical," says Krawczyk. "We wanted to make a light-filled and spacious school so children can feel free and creative." He and Berganski have accomplished this without resorting to the cloyingly sweet aesthetic that is often applied to architecture for children. Instead, their building challenges and satisfies with its poetic clarity. ■

Berlin-based Mary Pepchinski is an author and architect who teaches at the University of Applied Sciences in Dresden, Germany.



THIRD-FLOOR PLAN

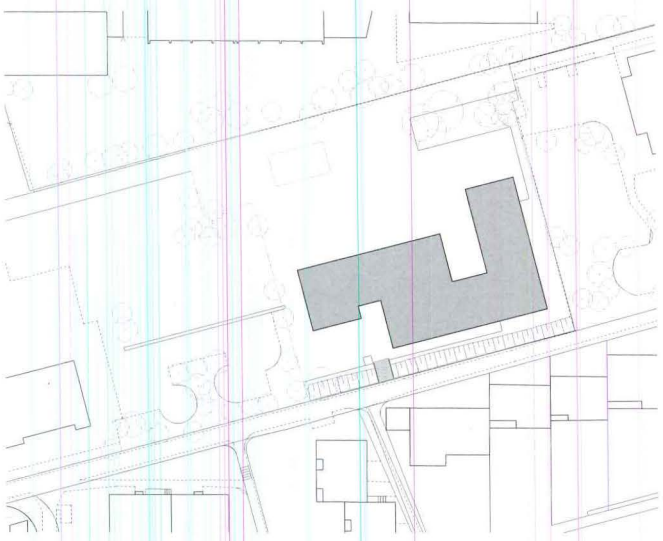


SECTION A - A

1 ENTRY
2 CLASSROOM
3 KITCHENETTE
4 MULTIPURPOSE ROOM
5 CAFETERIA
6 KITCHEN
7 GYM
8 STORAGE
9 LOCKER ROOM
10 TOILETS

GROUND-FLOOR PLAN

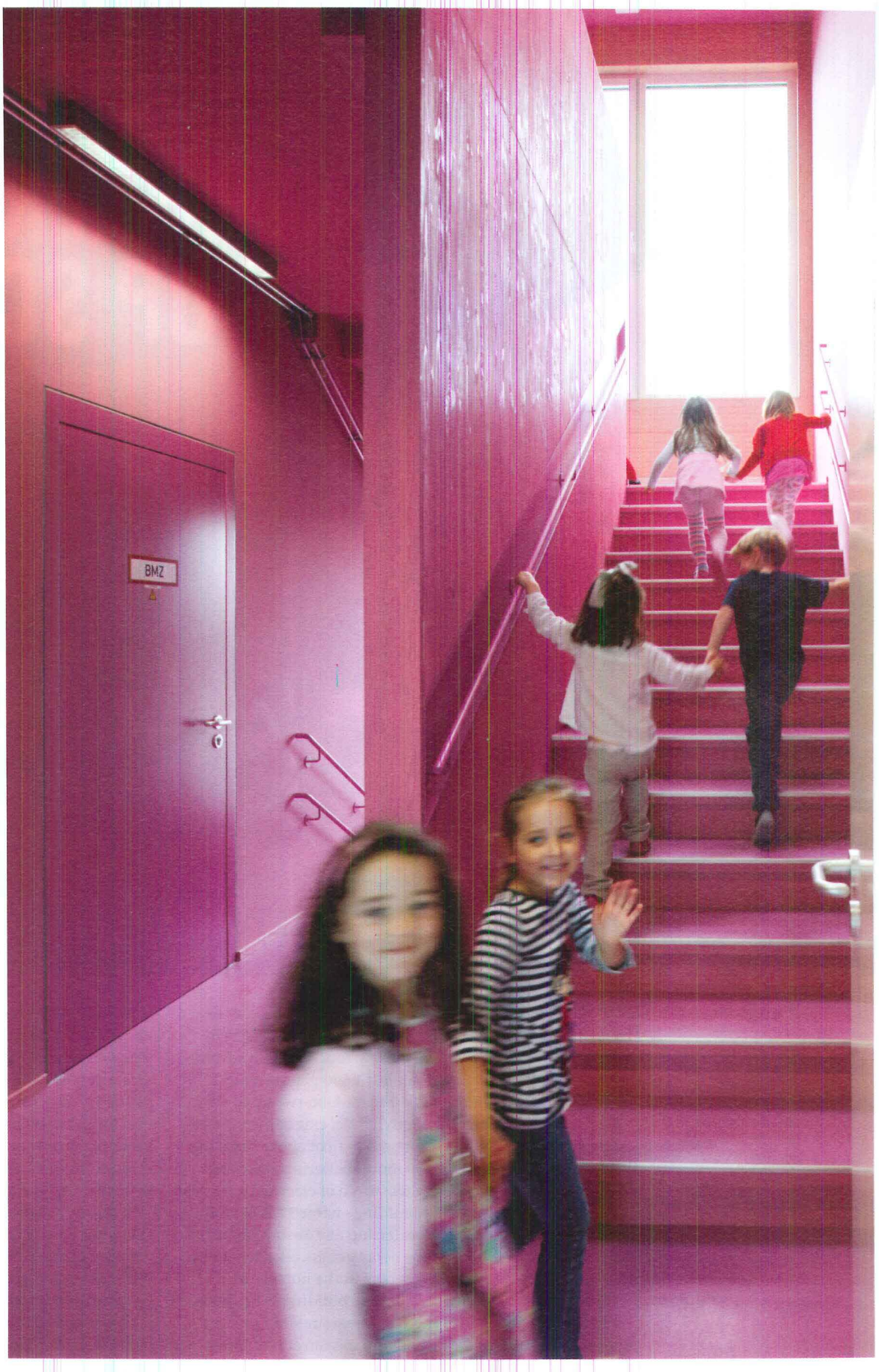
0 20 FT.
6 M.



SITE PLAN

0 150 FT.
50 M.

PRETTY IN PINK In addition to the wood modules (opposite), all other building parts, including the stairwells (right), were factory-produced in Austria. Each stairwell is painted a vibrant color—magenta, lemon yellow, and lime green—providing a contrast to the whitewashed wood surfaces in the classrooms and corridors.



credits

ARCHITECT: NKBAK – Nicole Kerstin Berganski, Andreas Krawczyk

ENGINEERS: Bollinger + Grohmann, Merz Kley & Partner (structural); Hochbauamt Frankfurt (mechanical); Wagner Zeitter Engineers (fire protection)

CONSULTANTS: Michael Gattinger (landscape)

GENERAL CONTRACTOR: Kaufmann Bausysteme

CLIENT: Stadtschulamt Frankfurt

SIZE: 40,000 square feet

COST: $6.1 million

COMPLETION DATE: April 2015

SOURCES

METAL PANELS: Aluform

CURTAIN WALL: RAICO, Becker 360

GLASS: Neutralux

SUN SCREENS: Clauss Markisen

WOOD COMPONENTS: Kaufmann Bausysteme, Ploomeier Massivholz

BUILT-UP ROOFING: Gernor Berner

CLOSERS: Dorma

PULLS: FSB

ACOUSTICAL CEILINGS: Heradesign

ACOUSTIC PANELS: Topakustik

RESILIENT FLOORING: Forbo, Armstrong

CERAMIC TILE: Villeroy & Boch, Pro Architectura

CLASSROOM FURNITURE: Dusyma

INTERIOR AMBIENT LIGHTING: Trilux

ELEVATORS: Vestner

CEILING HEATING: Zehnder Deutschland

P.S. 62, The Kathleen Grimm School for Leadership and Sustainability at Sandy Ground
Staten Island, New York | Skidmore, Owings & Merrill

WHERE ZERO IS THE TOP SCORE

IT'S A WRAP
At P.S. 62, PVs cover the south facade, extend over the roof, and cantilever above the north facade (above) and a playing field. Ribbed precast-concrete panels that are 30 feet tall clad the north, east, and west elevations.

The ambitious environmental agenda of a new elementary school by Skidmore, Owings & Merrill (SOM) on Staten Island, New York, is obvious from the first encounter: almost 1,600 photovoltaic (PV) panels cloak the 68,000-sqare-foot, two-story structure, covering the south facade, extending over its roof, and cantilevering out to float above a playing field. These PVs, plus about 400 more sheltering a parking area, are expected to generate 662 mWh of electricity per year. This energy should make the building—named P.S. 62, the Kathleen Grimm School for Leadership and Sustainability at Sandy Ground, after a longtime deputy chancellor for education—the first net zero energy school in the northeast.

What constitutes a net zero energy building? The industry is still debating this, with the U.S. Department of Energy proposing a standard definition and measurement guidelines only this past fall. But at the most basic level, a net zero energy building (often called a zero net energy building, or simply a zero energy building) is one that over the course of a year produces at least as much energy from renewable sources as it consumes. So far, only 39 nonresidential projects have documented their performance in the U.S., verifying that they are zero energy, according to a tally released in early 2015 by the nonprofit the New Buildings Institute. Eight of those are K–12 school buildings.

If these figures make net zero seem like a high bar, a school in New York presents an especially tough challenge. The city's density makes it difficult to find a site that allows sufficient roof space or unshaded and correctly oriented facade area to mount PV panels—the most viable renewable-energy source for net zero aspiring projects, explains E. Bruce Barrett, vice president for architecture and engineer-

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An ultra-energy-efficient building defines a new paradigm for New York's schools.

BY JOANN GONCHAR, AIA

ing at the city's School Construction Authority (SCA). But in 2010, when the SCA's capital planning and real-estate group presented Barrett with a 3.5-acre site in a residential neighborhood in the city's most low-rise borough, she immediately thought that "if there was ever an opportunity for us to do a net zero school, this is it." Later that year, the SCA won approval from the Department of Education and city officials to move forward with the building and selected SOM's Education Lab as its architects in early 2011.

From the get-go, P.S. 62 was considered a pilot project—one that would help improve and inform SCA design guidelines, explains Chris McCready, a SOM managing director. The potential for positive impact is considerable, since the city's 1,600 public schools represent 37 percent of municipal greenhouse gas emissions, points out Roger Duffy, a design partner.

But Duffy, McCready, and their team had their work cut out for them. They knew that even in its quasi-suburban setting, the school would need a vastly reduced energy appetite in order to meet all its needs with the 34,000 square feet of PV panels that would fit on the school structure and over the parking area. So they aimed for a facility that would use only half the energy of a typical New York City school—a particularly ambitious goal since the city's school buildings must comply with the stringent Local Law 87, which is already 30 percent more efficient than the energy standard ASHRAE 90.1.

The design team tackled this target with extensive energy modeling, developing a set of tightly integrated tactics, both passive and active. One of the most consequential is the daylighting strategy, which in no small part influenced the building's configuration: the roughly square plan is organized around a long and narrow courtyard and a series of skylights that admit sunlight into the school's spacious double-height corridors. The classrooms, which face either north or south, so that the sun coming in through their windows and the associated heat gain are easy to control, also have corridor-facing windows for daylight sharing and ceilings contoured to reflect light. The approach yields classrooms that have as much as 90 percent daylight autonomy—a metric that defines the portion of normal school hours when electric illumination is unnecessary. Building-wide, the average daylight autonomy is 60 to 70 percent.

The architects and their consultants were particularly careful to avoid glare, since they were worried that teachers would pull down the window shades, neglect to raise them, and would then rely on electric illumination, even during daylight hours. To lessen the chances of this happening, in the south-facing classrooms, they split the exterior windows into clerestories and low-level lites set at the right height for children to look out. The lower windows contain vision glass, but the higher ones include an aerogel that helps diffuse the sunlight.

The daylighting isn't all about saving energy, however. In combination with practical materials like vinyl tile flooring, ceramic wall tile, and suspended ceilings, almost all in white or shades of subdued gray, the natural illumination creates a lively and fresh atmosphere. "It changes the whole mood of the building," says Lisa Sarnicola, P.S. 62's principal. "It makes the children happy."

Another critical strategy is the school's super-insulated and tight envelope, with triple-glazed windows, R-20 walls, and an R-30 roof. To avoid compromising their performance, SOM detailed the handsome, 30-foot-tall precast-concrete panels that clad the east, north, and west facades so that they are anchored only at the top and bottom—an approach that avoids unnecessary penetrations of the air and vapor barrier. "Once you've taken care of everything else, infiltration becomes really important," explains McCready. Although these panels are tall, to simplify their attachment to the underlying structure, they are also pleated, giving them a scale and texture that appeals to children as well as adults.

For indoor climate control, the team opted for a dedicated outdoor air system with energy recovery and demand control ventilation. In the

COOL CONNECTIONS
The skylights above the double-story corridors help give the school its lively and fresh atmosphere; the building has no enclosed stairs. Instead, its two floors are connected by four open staircases, amplifying the facility's capacious feel.

FIRST-FLOOR PLAN

SECOND-FLOOR PLAN

1 ENTRY
2 CLASSROOM
3 GYMATORIUM
4 CAFETERIA
5 OFFICE
6 STORAGE
7 SERVICE
8 RESTROOM
9 MECHANICAL
10 LIBRARY
11 COURTYARD
12 GARDEN
13 FACULTY WORKROOM

SECTION A - A: DAYLIGHT AUTONOMY TARGETS

classrooms, perimeter displacement induction units supply conditioned air at a low velocity, which makes the devices both efficient and quiet. The building's heat pumps are tied to a geothermal system consisting of 80 wells drilled under the school's athletic field.

Designers considered combining these active technologies with natural ventilation. However, due to security concerns associated with opening the windows and the added layer of operational complexity, they ultimately decided not to pursue a mixed-mode system, says Robert Diemer, a partner with the project's sustainability consultant, In Posse, a subsidiary of the engineering firm AKF.

To develop the system for wrapping the building in PVs, SOM worked with the Center for Architecture Science and Ecology (CASE), a research effort the firm runs collaboratively with Rensselaer Polytechnic Institute. CASE studied how best to mount the panels, angling them to produce the maximum amount of electricity while making sure they wouldn't shade each other.

To make certain that the school would use less energy than is produced by these PVs, the project team also took a close look at so-called plug and process loads (PPLs)—those loads not related to general lighting, heating, or cooling, or other systems that provide occupant comfort. These PPLs are created by printers, computers, and other devices powered by AC outlets, and by equipment that supports activities such as cooking. The team deployed several strategies for keeping PPLs in check. In the kitchen, for example, the design and consultant team worked with the SCA, and the department of education's food service supplier to swap out the typical gas-fired equipment for much more efficient induction appliances. They even reviewed the menu, suggesting that cold lunches occasionally be substituted for hot meals to further cut back on the energy associated with food preparation. While the kitchen accounts for one third of the energy use in a typical SCA school, it represents only 9 percent of P.S. 62's much lower energy consumption.

Other strategies for reducing P.S. 62's PPLs include the addition of staff workrooms—one per floor—each equipped with a coffee maker, a microwave, and a refrigerator, among other amenities. The hope is that these rooms will provide a place for teachers to work collaboratively, and, at the same time, deter them from bringing their own power-hungry appliances into the classrooms. Additional features of P.S. 62 that should reduce PPLs are printer stations with energy-efficient machines shared among several teachers. This should eliminate the use of individual printers found in most of the city's classrooms.

Students will also have a part in helping the school reach its net zero goal. Interactive dashboards mounted throughout the building offer one opportunity for engagement. Although the screens aren't fully functional yet, kid-friendly graphics designed by Pentagram will eventually display information such as weather conditions, the amount of electricity generated by the PVs, and the amount of energy used in each space. Sarnicola, the principal, plans to hold weekly energy-conservation competitions between classrooms as a "fun and hands-on way" to motivate children and help them gain environmental literacy.

One unusually tricky aspect of the project was the SCA's strict procurement rules, which sometimes made it difficult to take advantage of the latest technology. For instance, the perimeter displacement induction units, considered integral to the design, were a proprietary product, and therefore required special approval by the agency's board of trustees. Other elements, such as the PVs, were rapidly evolving, making it a real possibility that the specified panels would be superseded between completion of the bid set and the time the order was actually placed. To help deal with this problem, the construction contract stated that the owner would provide final direction regarding the PVs before the shop-drawing phase.

As the school neared completion, new and improved panels did become available. But, in an ironic turn of events, the entire manufacturing run was snapped up before they could be purchased for P.S. 62. In the end, the earlier generation of panels clads the building. Nevertheless, the project team says that the installed PVs should be

credits

ARCHITECT: Skidmore, Owings & Merrill – Roger Duffy, design partner; Anthony Vacchione, Christopher McCready, managing partners; Austin Harris, project manager; Jon Cicconi, senior design architect; Carrie Moore, senior technical coordinator

ENGINEERS: AKF Group (m/e/p); Desimone Consulting Engineers (structure); Langan Engineering and Environmental (geotechnical)

CONSULTANTS: Mark K. Morrison Landscape Architecture (landscape); Brandston Partnership (lighting); In Posse (sustainability)

GENERAL CONTRACTOR: Leon D. DeMatteis Construction

CLIENT: New York City School Construction Authority

SIZE: 68,000 square feet

COST: $70 million

COMPLETION DATE: September 2015

SOURCES

PRECAST CONCRETE: BPDL

GLAZING: Viracon, Solera, Oldcastle BuildingEnvelope

SKYLIGHTS: Acurlite

ACOUSTICAL CEILINGS: Armstrong, Chicago Metallic

CUSTOM WOODWORK: Elli

RESILIENT FLOORING: Armstrong, Pawling

CERAMIC TILE: Daltile

CARPET: Mohawk

INTERIOR LIGHTING: Peerless, Neo-Ray, Fail-Safe, Edison Price, Metalux

EXTERIOR LIGHTING: McGraw Edison

LIGHTING CONTROLS: Cooper

DISPLACEMENT INDUCTION UNIT: Trox

PV SYSTEM: SunPower, Panasonic, Advanced Energy Industries, Power-One, Ecolibrium Solar, Unirac

ENERGY MANAGEMENT SYSTEM: Schneider, Square D

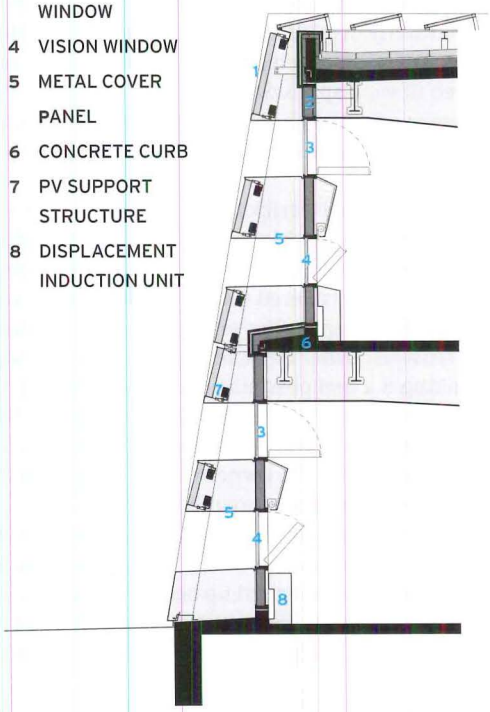
SUNNY DISPOSITION To avoid glare, the south-facing classrooms have two levels of windows: lower-level lites containing vision glass, and clerestories with glazing that includes an aerogel for diffusing sunlight. The sloped suspended ceilings help with even distribution.

THE RIGHT ANGLE
The project team carefully studied the angles of the PVs that clad the south facade (above) and the building's roof to find the optimum orientation for electricity generation without allowing the panels to shade each other.

more than sufficient to meet the net zero goal since the energy model includes a comfortable cushion.

Even though the architects are confident that the building will operate at net zero, they say it could take as long as three years to fully commission and fine-tune its systems so that it performs as designed. But the project is already having a positive influence—in both large and small ways—on the city's school design and construction program. Just a few examples of this impact: printer stations instead of individual classroom machines are now standard for new schools, as are teacher workrooms that include pantries. The induction units that required special approval have been made an option for all design teams. But one of the more profound shifts for which P.S. 62 may be responsible is a new emphasis on natural illumination in SCA projects. Barrett says that her team is now on the lookout for opportunities to insert sidelights and transoms in their projects. Echoing the sentiments of the school's principal, Barrett says, "We were just totally awestruck by the daylighting." ■

1 PV PANEL
2 SPANDREL PANEL
3 CLERESTORY WINDOW
4 VISION WINDOW
5 METAL COVER PANEL
6 CONCRETE CURB
7 PV SUPPORT STRUCTURE
8 DISPLACEMENT INDUCTION UNIT



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Learning Objectives

1 Define net zero energy.

2 Define terms relevant to net zero buildings such as "daylight autonomy" and "plug and process loads."

3 Discuss some of the strategies that SOM used to make P.S. 62 ultra-energy-efficient.

4 Describe some of the challenges the P.S. 62 project team faced in procuring the latest energy-efficient technology for the building.

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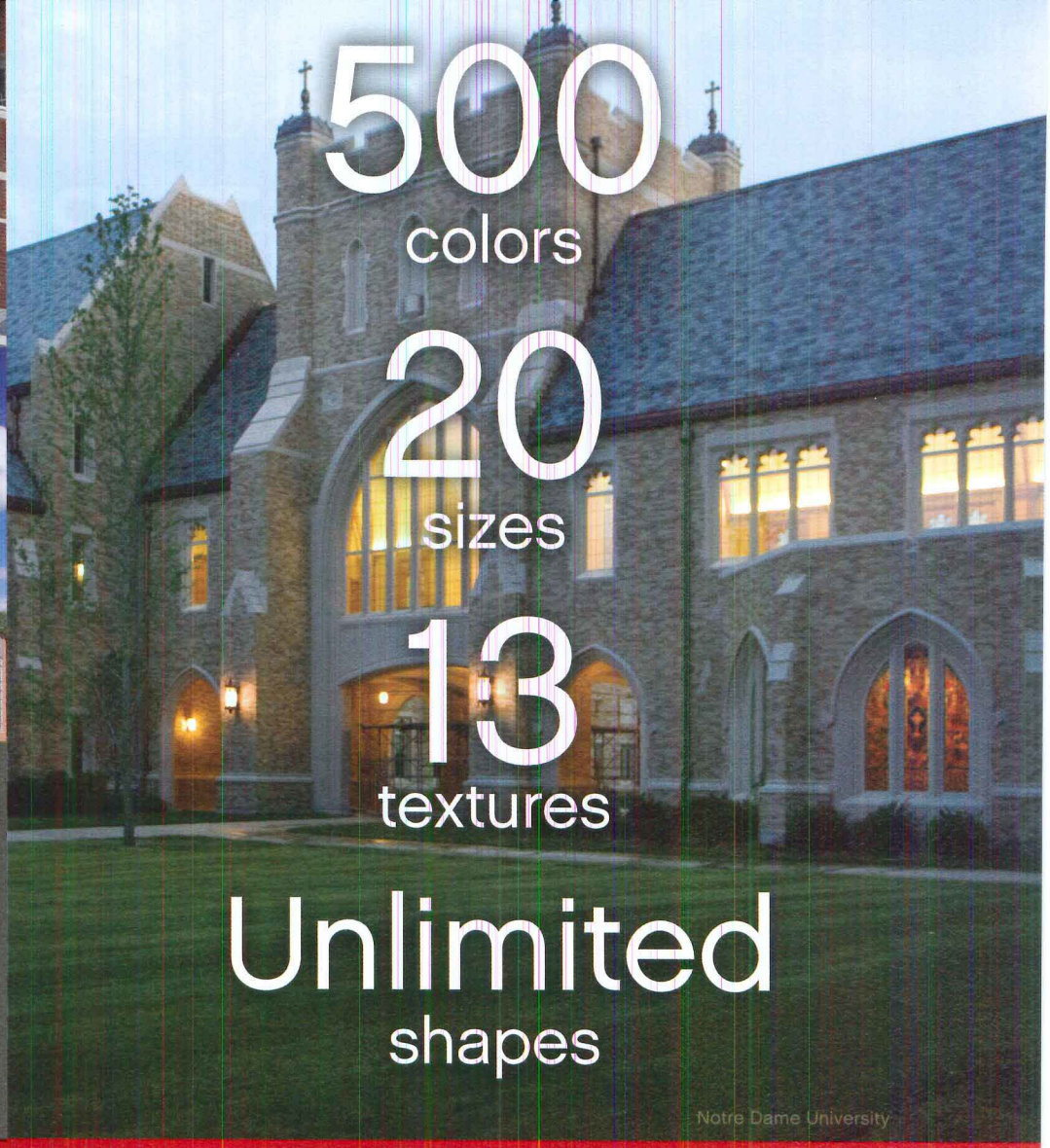

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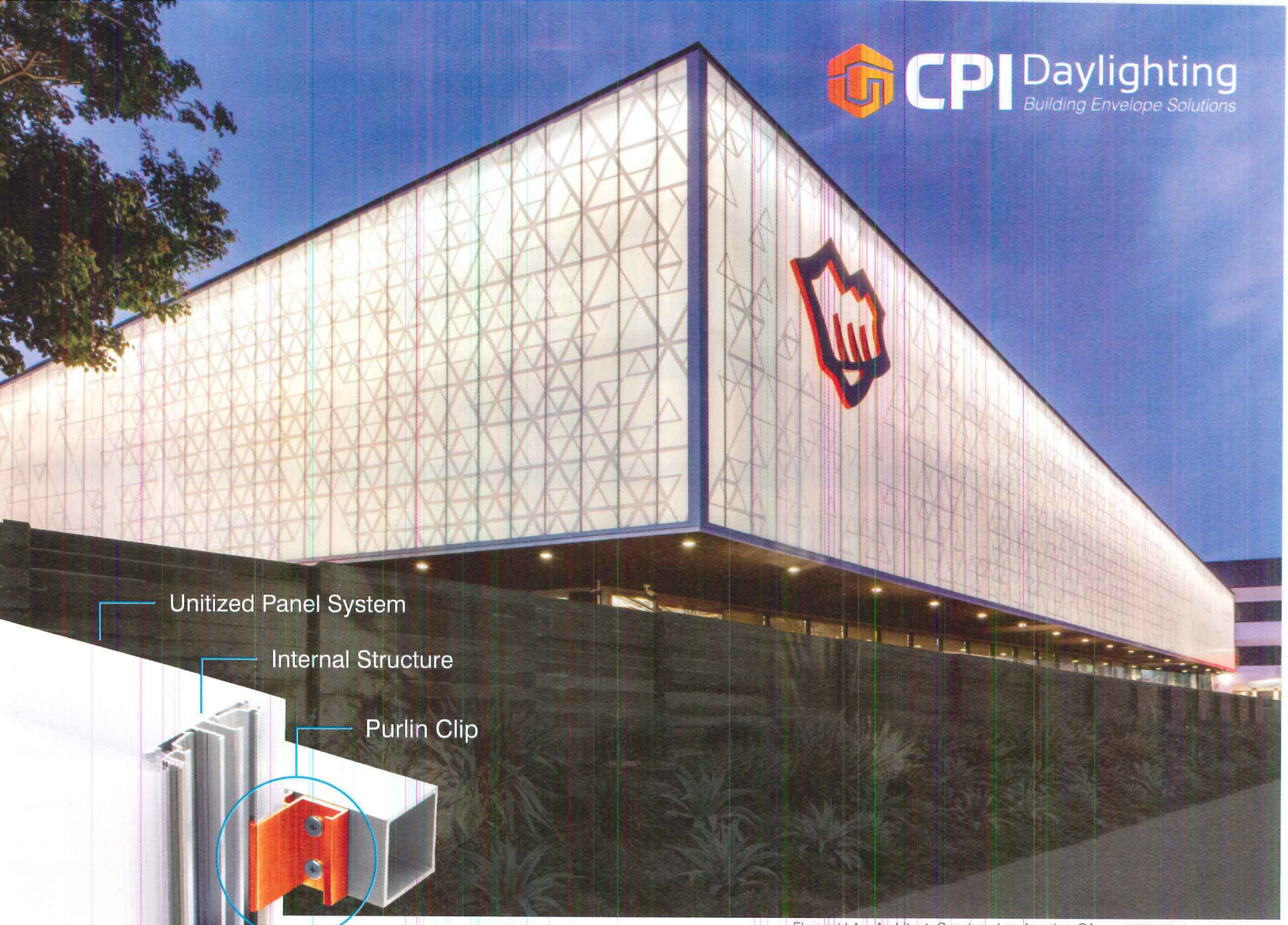

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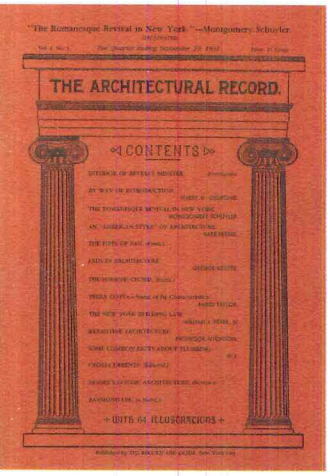

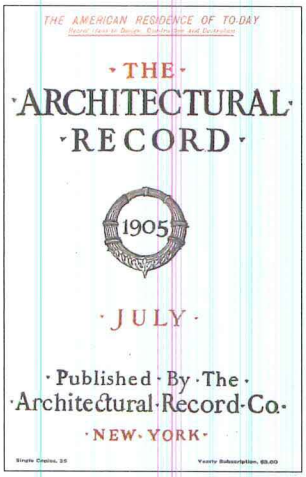

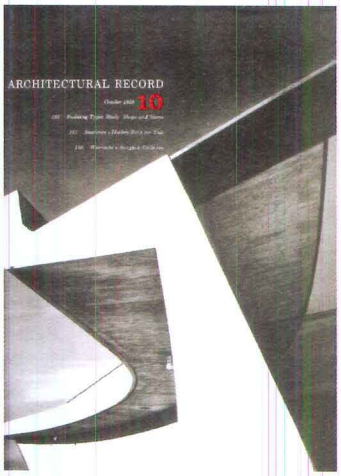

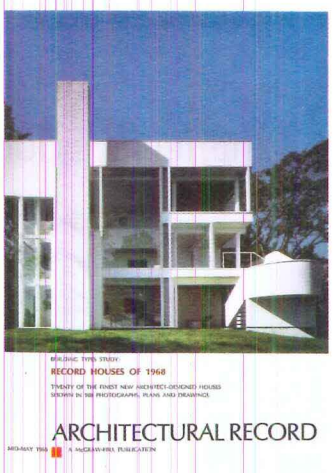

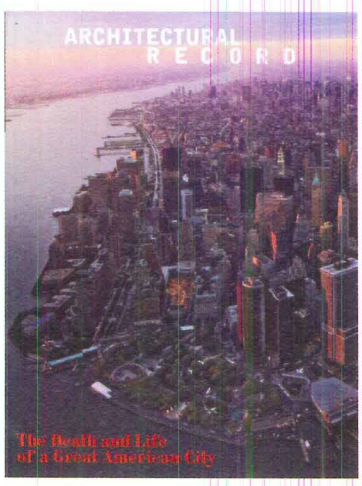

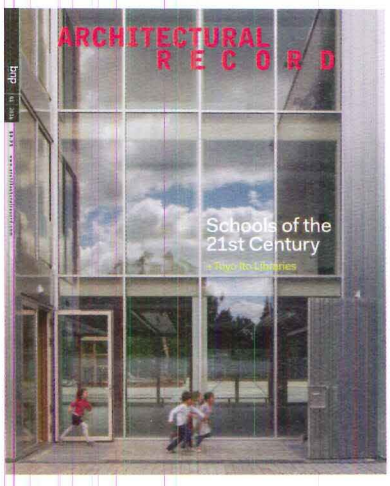

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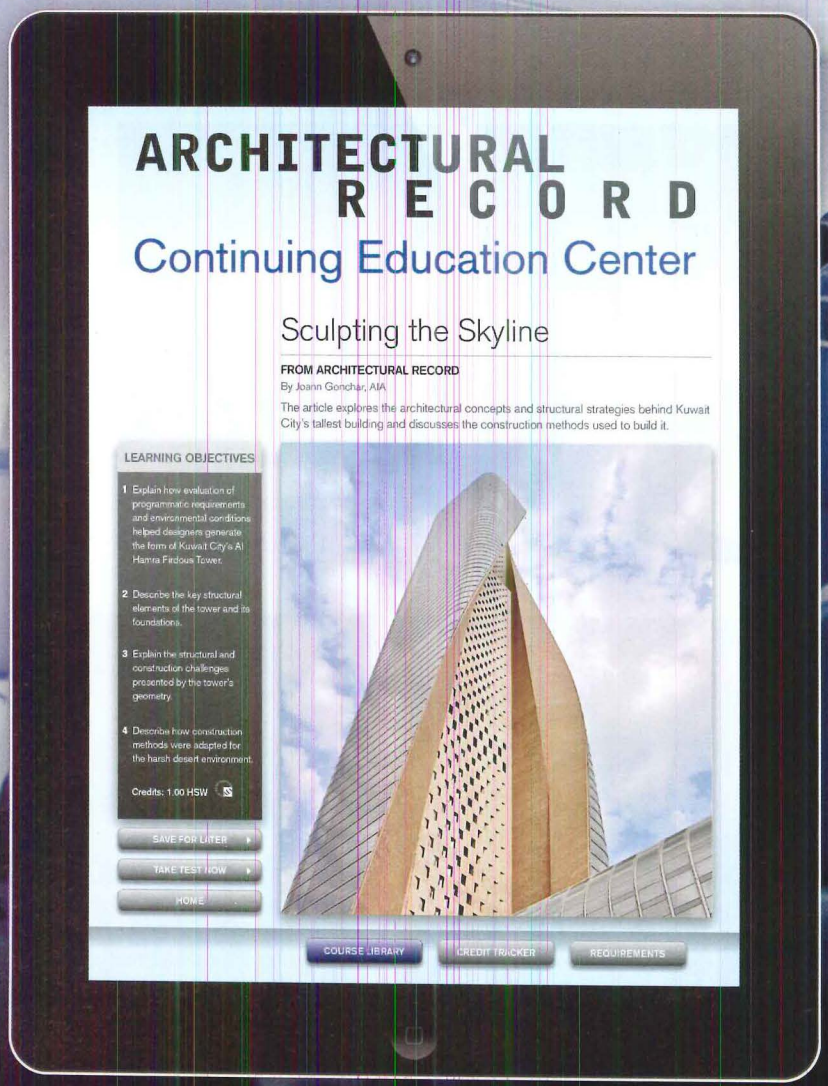

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p137

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Twenty-First Century Schools Are Green

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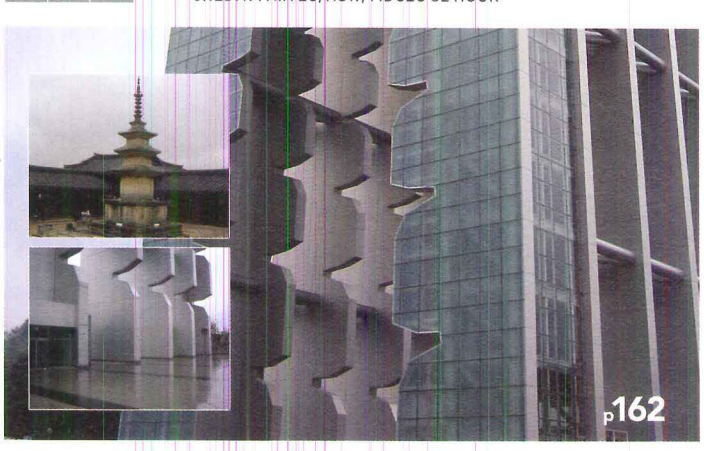
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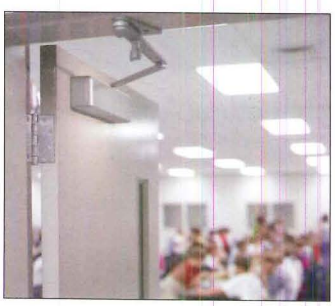

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CIRCLE 207

Lady Bird Johnson Middle School in Irving, Texas, is the first net-zero school in the state, and at 150,250 square feet, the campus is the largest net-zero educational facility in the country. A net-zero building produces as much energy as it consumes, so its overall energy consumption is net zero over the course of a year.

Photo courtesy of Mondo/Corgan Associates, Inc.

Twenty-First Century Schools Are Green

Positively impacting student education through green and sustainable design

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According to multiple sources, there are more than 130,000 existing K-12 schools operating in the United States. New schools are also in design and construction either to accommodate growing needs or to replace outdated facilities. The significance of this sheer quantity of facilities certainly reflects the importance of education in this country, but the buildings have become more than that. In most places, schools are centers of communities providing a full range of events and programs for children, parents, and the general public. With all of this exposure, it is a bit surprising that many American citizens and public officials have a poor understanding of the scale of their presence and worse, of their typical physical condition. The Center for Green Schools at the U.S. Green Building Council has published the "2013 State of Our Schools" report, which estimates that it will take approximately $271 billion to bring public K-12 school buildings in the United States up to working order and in full compliance with current codes and standards. If we add to that the cost of modernization to ensure that our schools meet today's education, safety, and health standards, it estimates twice that at a $542 billion required investment. An updated State of Our Schools report is due to be released in early 2016. While these figures present a sizable challenge to public school districts around the country, they also represent a huge opportunity for those involved in the design, construction, and operation of schools. It also presents the best opportunity to bring these existing schools into the 21st century using what has become the most defining characteristic of our time—green school design.

GREEN SCHOOLS

The Center for Green Schools at the U.S. Green Building Council was founded in 2010 with an "ambitious yet achievable mission to put every student in a green school within this generation." As such, the center works directly with teachers, students, administrators, elected officials, and communities to create programs, resources, and partnerships to transform schools into healthy learning environments. Their work intersects buildings, curriculum, and community, and building design professionals can use them as a great resource. For more information, visit www.centerforgreenschools.org.

Green schools that follow a fundamental design and operational approach have been shown to reduce the environmental impact of buildings and grounds, have a positive

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Learning Objectives

After reading this article, you should be able to:

1. Explore the condition of schools in the United States and the range of issues related to green school design.
2. Define the fundamental criteria that contribute to a green school based on the LEED for Schools building certification program.
3. Discuss different strategies that can be used successfully to contribute to the design, construction, and operation of green K-12 schools.
4. Identify programs and resources to assist in healthier, more productive, and more efficient green learning environments.

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Images courtesy of the Center for Green Schools at the U.S. Green Building Council

The Center for Green Schools provides a full range of information and resources for architects and other design professionals engaged in the creation of green and sustainable schools.

effect on student and teacher health, and increase environmental literacy among students and graduates. This is because the green schools community, both in the United States and around the world, is aligned toward three aspirational goals for schools: zero environmental footprint (including energy, water, and waste), a positive impact on occupant health and performance, and 100 percent of graduates demonstrating environmental literacy. In 2011, the U.S. Department of Education launched its Green Ribbon Schools award program and has invited schools, as well as colleges and universities, to participate and demonstrate their success in meeting these goals.

The U.S. Green Building Council is also well known for the LEED Rating System, which is often used as the basis for determining green school design and construction, and also for green operations and maintenance in existing buildings. The rating systems are generally organized into six credit categories, including Sustainable Sites (SS), Water Efficiency (WE), Energy and Atmosphere (EA), Materials and Resources (MR), Indoor Environmental Quality (EQ), and Innovation (IN) in either design or operations. Other credit is possible for things like Integrative Process, Location and Transportation, and Regional Priority depending on the specific rating system used. In the following portions of this article, we will look at 11 selected approaches and examples that can contribute to achieving credit in most of these categories based on currently available systems, technology, and products.

SUSTAINABLE SITES (SS)

Approaches under this category promote responsible, innovative, and practical site design and maintenance strategies that are sensitive to plants, wildlife, and water and air quality. Such environmentally sensitive site design practices reduce site operations and maintenance costs while creating outdoor spaces that are attractive and healthy for both building occupants and local flora and fauna.

Pavement Alternatives

Hard surface paving is a common part of most new or existing school facilities. Typically that has meant a non-pervious material, such as asphalt or concrete, is used ,which can sometimes cause water runoff, flooding, and water pollution issues. However, there is an alternative solution in the form of flexible, permeable paving systems. Some very attractive and appropriate systems use concrete pavers with open portions that can be filled with planted material, such as grass or ground covers or other material such as artificial turf or decomposed material. Either way, the intent is to allow water to readily drain into the ground to be naturally absorbed and filtered before making its way to other water resources, such as aquifers, lakes, streams, or rivers. The materials and systems available are fully capable of carrying pedestrian, bicycle, or vehicular traffic. At schools, that makes them ideal for fire lanes, parking lots, walking paths, swales, bicycle lanes, and other common hard surfaces on a school campus. As such, they function as durable, permeable hard surfaces providing versatility for a variety of locations.

Outdoor Rooftop Spaces

Outdoor spaces don't always need to be on the ground, rather, they can be located on borrowed spaces on rooftops, terraces, etc. Recognizing this, architects can create safe and secure areas for learning on rooftop decks. Such innovative spaces can be utilized for learning labs, gardening, science experiments, reading areas, and exercise. They can also help to maximize the useable space of the building footprint, particularly in urban areas where schools tend to be built up vertically rather than out horizontally. They can also provide some mitigation to the heat island effect by using plantings and other light-reflecting materials and surfaces.

The technical issue with creating such rooftop spaces is two-fold. First, the primary purpose of a roof is to maintain a waterproof barrier to weather, meaning that any roof deck system needs to avoid penetrations or damage to the roof. Ideally, it would actually help protect the roofing membrane and add to its longevity, while still allowing water to properly drain from the deck, onto the roof, and into the drainage system. The second issue is that even low-slope roofs are still sloped, and decks want to be level. Hence, an adjustable support system that can accommodate varying heights and create a level deck surface is needed.

Photo courtesy of Soil Retention Products, Inc.

Laguna Blanca School in Santa Barbara, California, used permeable concrete pavers to provide environmentally friendly parking around this K-12 school that addresses water runoff on-site.

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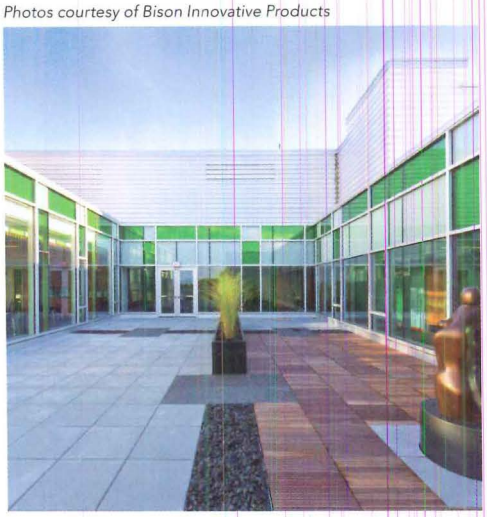

Rooftop spaces can be used for outdoor learning environments when a system is selected that is specifically designed to work with the roof membrane, create a level surface, and meet all functional requirements for design and drainage.

The building industry has responded with complete systems for creating rooftop environments that are functional, environmentally appealing, and suitable for outdoor learning. Available products include adjustable pedestals that sit on top of the roof membrane and compensate for the roof slope and height change at the same time. The pedestals typically support a variety of different surface materials, including wood tiles that can be certified by the Forest Stewardship Council (FSC) for sustainability. Such tiles sit on the pedestals and provide a stable and natural surface for pedestrians to walk on and for other things, such as planters, benches, or gardens, to be placed upon.

ENERGY AND ATMOSPHERE (EA)

The Energy and Atmosphere aspects of LEED are probably the best known, and rightly so since they are typically weighted to carry the most points in the rating system. The prerequisites and credits of this category address the reduction of energy consumption through a performance-based approach allowing designers and facility managers to tailor energy reduction measures to their specific buildings. Improving the energy performance of facilities is well known to lower operating costs, reduce pollution, and enhance occupant comfort, which can lead to healthier, happier students, teachers, and staff.

Building Envelope

The most cost effective and highest potential for controlling energy use in a building starts with the design of the building envelope—the place that architects typically have the most direct control over. For schools, that usually means a reliable, high-performance system is needed to prevent heat loss, eliminate thermal bridging, and provide safety and comfort over the operating lifetime of the facility. This is particularly true in the exterior wall system selected for a school building.

An alternative high-performance option instead of common steel framed, block, or brick walls is catching on through the use of insulated concrete forms (ICFs). Such systems start with pre-formed rigid insulation in the shape of large, hollow "blocks" that can be straight, cornered, or custom configured. The inner and outer layers of insulation are held apart by connectors with low thermal conductance spaced appropriately. The hollow area is then filled with concrete once the ICF blocks are in place with the connectors serving as form ties and providing support to locate reinforcing steel. Once the concrete is set, the system provides a solid, durable concrete wall that is covered inside and out with continuous insulation, creating a very efficient thermal wall envelope. The interior and exterior can then be finished in conventional manners of choice.

By designing and building with ICFs, buildings can achieve high-performance values by vastly reducing air infiltration due to the continuous nature of the walls. The system also offers superior performance when it comes to eliminating thermal bridging, resulting in even temperatures throughout the building with reduced drafts and cold spots to optimize energy performance. An added benefit is that insulated concrete forms act as an effective sound barrier by dampening sound vibrations from unwanted outside noise, such as traffic, trains, and neighbors. Since the main structural element in an ICF building is reinforced concrete, it offers substantially better durability and requires less maintenance and repair over its lifetime compared to some other systems.

Heating and Cooling Systems

Conventional HVAC systems have served the needs of most buildings for many decades. However, achieving high levels of performance often requires going beyond the conventional. Considerable success has been found in the use of variable refrigerant flow (VRF) systems, which operate in a zoned manner as an energy-efficient method of providing precise comfort control to indoor environments. Zones are defined as single or multiple room spaces that are conditioned to a set temperature and are operated independently from other rooms within the same structure.

VRF systems move conditioned refrigerant directly to the zone to be cooled or heated, allowing the temperature of that area to be more precisely controlled. They can simultaneously cool some zones while heating others or just provide comfort control to zones that are in use. In addition, VRF systems do not require ductwork for cooling and heating, thus providing more building design flexibility, which can result in more usable space. Ducted systems allow multiple rooms or a large open area to be combined into a single zone. Either

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Insulated concrete forms (ICFs) achieve high energy efficiency and provide other attributes, such as sound deadening and durability in green schools.

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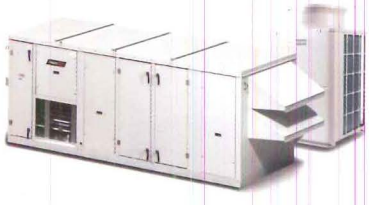

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A VRF system is an energy-efficient alternative to conventional HVAC systems using high-performance compressors, ductless or ducted indoor units, and individual zone controls.

way, VRF systems are often simpler in design and more energy efficient than conventional HVAC systems due in part to inverter-driven compressor technology, which is highly responsive and efficient. The systems overall allow for compact, quiet units, flexibility of placement, and give architects and owners more design freedom with individualized controls.

VRF systems tend to differ from conventional HVAC systems in three ways: low noise levels, design flexibility, and long-term reliability and efficiency of the systems. The very quiet indoor unit operation (as low as 19 decibels) leads to uninterrupted learning within classroom environments. The design flexibility and potential space savings means more attention can be placed on school design while indoor air quality is enhanced through the elimination of ductwork, providing a higher indoor air quality to the classroom. The efficiency and long-term reliability speak to the green school design requirements for energy performance and sustainability with personalized comfort control.

MATERIALS AND RESOURCES (MR)

The Materials and Resources credit category of LEED focuses on two main issues: the environmental impact of materials brought into the facility, and the minimization of landfill and incinerator disposal for materials taken out of the facility. The latest version places particular emphasis on the life-cycle impact of the materials.

Resilient Flooring Surfaces

Schools are, by virtue of their daily student use, a very high foot traffic building type. As such, the choice of flooring materials for common areas, such as hallways, large group rooms, and even individual classrooms, is important in terms of long-term wear and cleanliness. Resilient flooring is available in many forms with differing degrees of environmental impact. One that is being looked at more is rubber-based floor coverings. These durable flooring surfaces have been installed in schools and universities worldwide in gymnasiums, weight rooms, indoor and outdoor tracks, multipurpose rooms, classrooms, lobby areas, and locker rooms.

From an environmental standpoint, this type of flooring is available completely free of many of the things that designers are trying to keep out of green schools, such as PVC, chlorine, and heavy metals. That means this material doesn't rely on those materials during its manufacture nor detract from a healthy indoor environment once it is in place. During its useful life, rubber flooring products are well known for reducing significantly the need for chemical cleaners for maintenance, further protecting the health of school occupants. At the end of its service life, it is also 100 percent recyclable, allowing it to become a new product and start a new service life. Because of its long life expectancy and lower maintenance costs, including the elimination of the need for waxing, rubber flooring is often shown to have a very low total life-cycle cost.

Beyond the attributes already mentioned, rubber flooring contributes in other ways to a positive school environment. It is a non-porous, durable material with outstanding wear and abrasion resistance, as well as stain and chemical resistance. It is dimensionally stable without the need to weld seams and can carry high static or rolling loads. From a human perspective, it provides a comfortable walking surface, some sound-deadening properties, and can even be specified with antibacterial/antimicrobial qualities. For safety, it has been shown to meet ADA slip-resistance requirements and is commonly Class 1 fire rated.

Photo courtesy of Mondo

Rubber flooring surfaces are resilient, highly durable, easy to maintain, and environmentally friendly, making them ideal for many school applications.

Wall Surfaces

Adding visual interest or educational information to walls in schools has been a long-standing design objective. However, if school walls could talk, they would describe constant contact with students' backpacks, computer bags, and feet, as well as tough blows from mobile classroom carts. These occurrences can cause scrapes and dents on wall surfaces and corners. Because of the abuse they receive, walls in classrooms, hallways, gyms, and cafeterias must be durable and easy to clean, requiring little to no maintenance. They must also be manufactured from material that is environmentally sound and maintains safe indoor air quality.

Until now, designers and architects have struggled to incorporate patterns and high-resolution graphics onto walls in busy school environments. In many cases, design and durability have been compromised with the use of limited-offering, Type-II (i.e. medium duty) vinyl wall coverings with graphic patterns or solid color or wood-grain materials that

don't withstand the extensive abuse. That has changed since new product offerings deliver all the functional elements required of walls in schools without compromising style. In fact, custom photos, wayfinding, mascots, logos, and other art can now be preserved on walls behind impact-resistant, environmentally preferable, rigid PETG (polyethylene terephthlate glycol-modified) plastic material that is PVC-free and contains no PBTs (persistent bioaccumulative toxic) and no halogenated or brominated fire retardants. Such a protective material acts as a shield that safeguards against damage, while making cleaning easy so walls look great during use.

The high-performance capabilities of a PETG protective wall covering means that the art has staying power in schools. "The hallways of our school get an A+ for design, function, and durability," said Steven Fleming, principal of Pasadena Independent School District's new Dr. Kirk Lewis Career & Technical High School in Texas. "Students are motivated and energized before they even enter the classroom. We rest easy knowing that custom walls can stand the test of time and of school wear and tear."

Access Control

Schools require a lot of doors. They also require security at many or even all of those doors in the interest of safety, which is regularly on the mind of all school administrators and green school advocates. Further, exterior doors need to be able to seal tightly shut for energy conservation purposes but be easy to open and exit in all circumstances. Controlling the operation of doors then, is to control the flow of people coming into or exiting the building, while still meeting other needs. The means for achieving that often comes down to selecting both electronic and mechanical access control products that meet or exceed the requirements needed for K-12 schools.

Manufacturers of door control devices recognize both the common and unique demands of schools and offer a wide range of products accordingly. Electronic stand alone and wireless cylindrical and mortise locks are hot items with many school designers and managers since they can help secure doors remotely. Manual systems are still predominant, requiring key access with sophisticated systems in place to establish master keys, sub-master keys, etc. The trick to using both electronic and manual systems in the same building is the coordination between them, which means finding one manufacturer that does both should make everyone's lives easier. Exit devices using concealed or surface-mounted hardware are usually paired with door closers all with a particular eye toward a consistent look and performance level throughout the facility. Door lever designs that are compliant with handicapped accessibility requirements and good security are often consistent between different series of products, from mortise to cylindrical, and finishes can be consistent for all category of products. But often it is the hardware performance over time that is of most interest with warranties and serviceability playing large roles in decision-making selections.

Photo courtesy of Construction Specialties, Inc./Shau Lin Hon, Slyworks Photography

PETG protective coverings allow for art, information, wayfinding, and other custom or standard graphic information to contribute to the learning environment, while staying protected from damage.

INDOOR ENVIRONMENTAL QUALITY (IEQ)

Indoor Environmental Quality address concerns relating to indoor air quality, occupant's health, safety, and comfort, air change effectiveness, and air contaminant management. The IEQ credit category seeks improvements to ventilation, indoor CO_2 levels, daylighting, lighting quality, and thermal comfort—all of which have the potential to impact occupant health and performance.

Adhesives and Air Quality

While it is easy to think about the things we see in a building and how they affect air quality, there are also many products or materials that we don't readily see in a finished space that are important, too. LEED certification seeks that all materials, including those not seen, address their chemical make-up and their potential impact on human health by limiting or eliminating such things as volatile organic compounds (VOCs). One such unseen but prevalent product is adhesives, which can be used throughout a school building to secure many products in place.

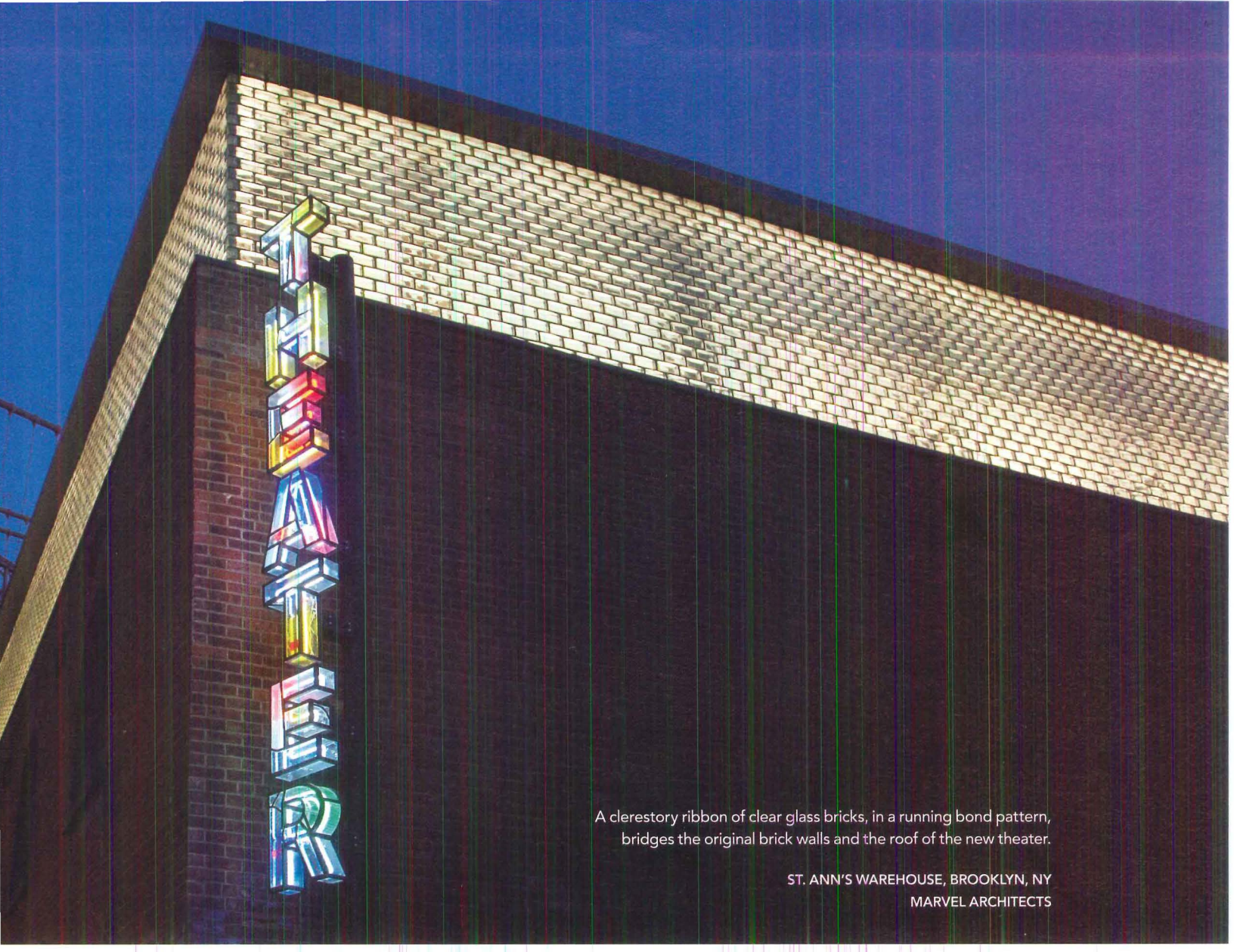
By way of example, let's look at wood flooring that may be used in a gymnasium or perhaps be existing in a school. If the wood is placed over concrete, then an appropriate underlayment and adhesive may be the best way to install it. The selection process for the adhesive must address not only a long-lasting, durable bond, but also the ability to stand up to heavy foot traffic. There may be other considerations, too, such as moisture protection from the concrete and sound mitigation from footsteps on the floor.

At least one manufacturer has recognized the variety of needs and combines high-strength adhesive, moisture barrier, and sound abatement underlayment all in one low-VOC product. The goal is to provide a safe installation so parents, teachers, and students don't have to worry about a school's gymnasium flooring de-bonding from its substrate, possibly causing safety hazards to students walking, running, or exercising on top of it. A concurrent goal is to maintain good indoor air quality in the space through low-VOC content. Going further, the adhesive not only firmly grips wood flooring to the substrate, it protects the floor from damaging moisture vapor, which could cause deterioration, leveling problems, fissures, and even mold, which could be harmful to those using it day-to-day.

According to Ron Winterton, sales manager of Intermountain Wood Flooring, a major supplier to the architectural and design community in the Pacific Northwestern states, "Not only do all-in-one products like these offer excellent moisture protection, they provide sound abatement properties equivalent to ¼-inch cork underlayment." He also recognizes the importance of manufacturer's systems that help ensure the required thickness of

Photo courtesy of DORMA

School security is an important consideration that usually involves coordination of electronic and mechanical hardware in 21st century school design.



A clerestory ribbon of clear glass bricks, in a running bond pattern, bridges the original brick walls and the roof of the new theater.

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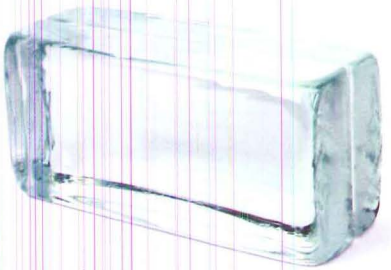

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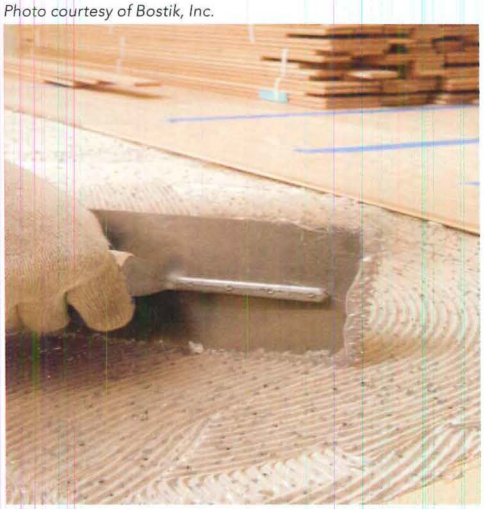
the adhesive membrane is maintained, even if installers walk on the flooring before the adhesive has cured.

Daylight

The use of natural daylight in school buildings is not only desirable from a general indoor environment point of view, it has also been shown to positively improve the comfort, health, and learning abilities of students. Building designers often think first of glass to achieve daylighting goals, which is often appropriate, but glass block is another time-proven, durable option. Glass block can be used in both interior and exterior applications; it is inert, low maintenance, and highly durable. Glass block's myriad of performance characteristics make it a superior choice for school construction by providing daylighting, security, sound control, and controllable levels of privacy. Plus, new glass block systems also can be a part of the building envelope to protect against outside forces all without giving up daylighting. New energy-efficient glass block can also provide improved insulation and solar heat gain values, which can meet or exceed energy conservation from other glazing options.

While glass blocks are traditionally specified in Division 4 masonry applications, there are new glass block systems that are engineered and prefabricated for use in Division 8 applications. These prefabricated high-performance systems have been tested to meet enhanced performance requirements and are resistant to hurricanes, tornadoes, blasts of force, and ballistic attacks. All of these systems also provide daylighting, privacy, and security, and contribute to LEED and sustainability. For interior applications, custom decorated glass blocks can complement the design of the school by providing subject specific décor to enhance the learning experience of students. Plus, they are easy to install, which improves efficiency by reducing labor at the job site.

Photo courtesy of Bostik, Inc.



All-in-one wood floor adhesives are available in low-VOC formulations that also provide moisture protection, sound deadening, and mold protection.

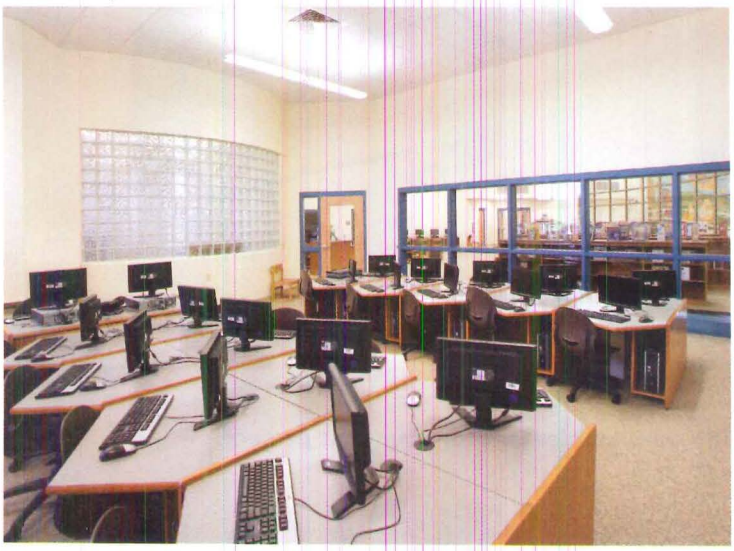
Enhanced Acoustics

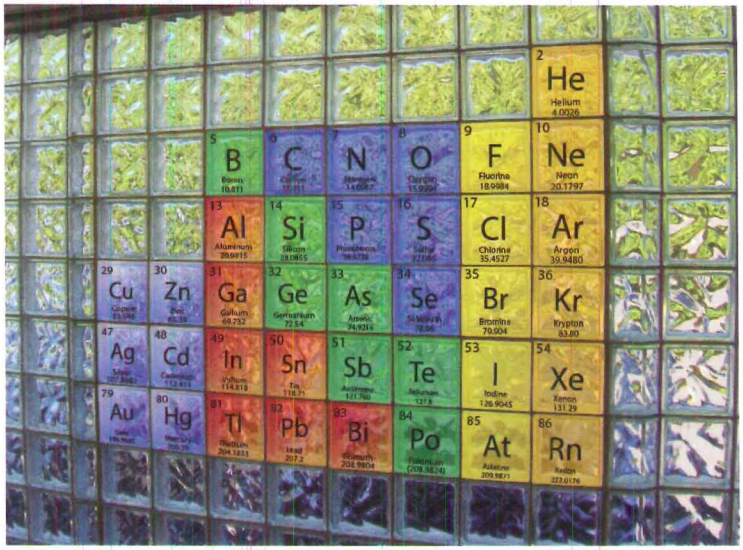
We have touched on the fact that LEED for Schools has both prerequisites and credit options for acoustical control in schools. The goal is: "To provide workspaces and classrooms that promote occupants' well-being, productivity, and communications through effective acoustic design." When looking to achieve that goal, architects often look at walls and floor/ceiling assemblies for things such as sound transmission class (STC) ratings. The means to achieve those ratings are fairly well known although some innovations continue to occur.

When looking at classroom walls designed for acoustics in schools, it is important to address the doors leading into those classrooms. Sound from a corridor may be thwarted by a wall assembly properly designed to mitigate sound transfer, but if the door is not also addressed, the end result will be poor. Since sound is energy and behaves the same way as other energy, this would be the equivalent of building a very energy-efficient exterior wall and then putting a very leaky window in it which would undo most of the effort put into the wall.

Fortunately, it is possible to specify doors and frame assemblies with high STC ratings. However, that is not where things end. The door, frame, and related door components all need to be looked at and addressed in order to achieve satisfactory results. To do so using individual products and components is theoretically possible, but functionally nearly impossible. The more direct solution is to specify complete door and window frame systems that are coordinated and independently tested for sound control. In this way, STC ratings are dependent on doors and frames being supplied as complete assemblies from a single manufacturer rather than separate doors, frames, seal systems, glazing, and hardware being supplied from different manufacturers. Typically, manufacturers of such complete systems can demonstrate acoustic performance as tested in accordance with ASTM E-330: Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights, and Curtain Walls by Uniform Static Air Pressure Difference, and ASTM E-413: Classification for Rating Sound Insulation.

Photos courtesy of PITTSBURGH CORNING





Glass block can be customized with messaging or artistic designs to enhance or complement the design of the building and classrooms. For example, a chemistry lab can have a glass block wall with the periodic table of elements on it. Clear or patterned glass block can also provide daylighting, while enhancing the learning atmosphere of the classroom.

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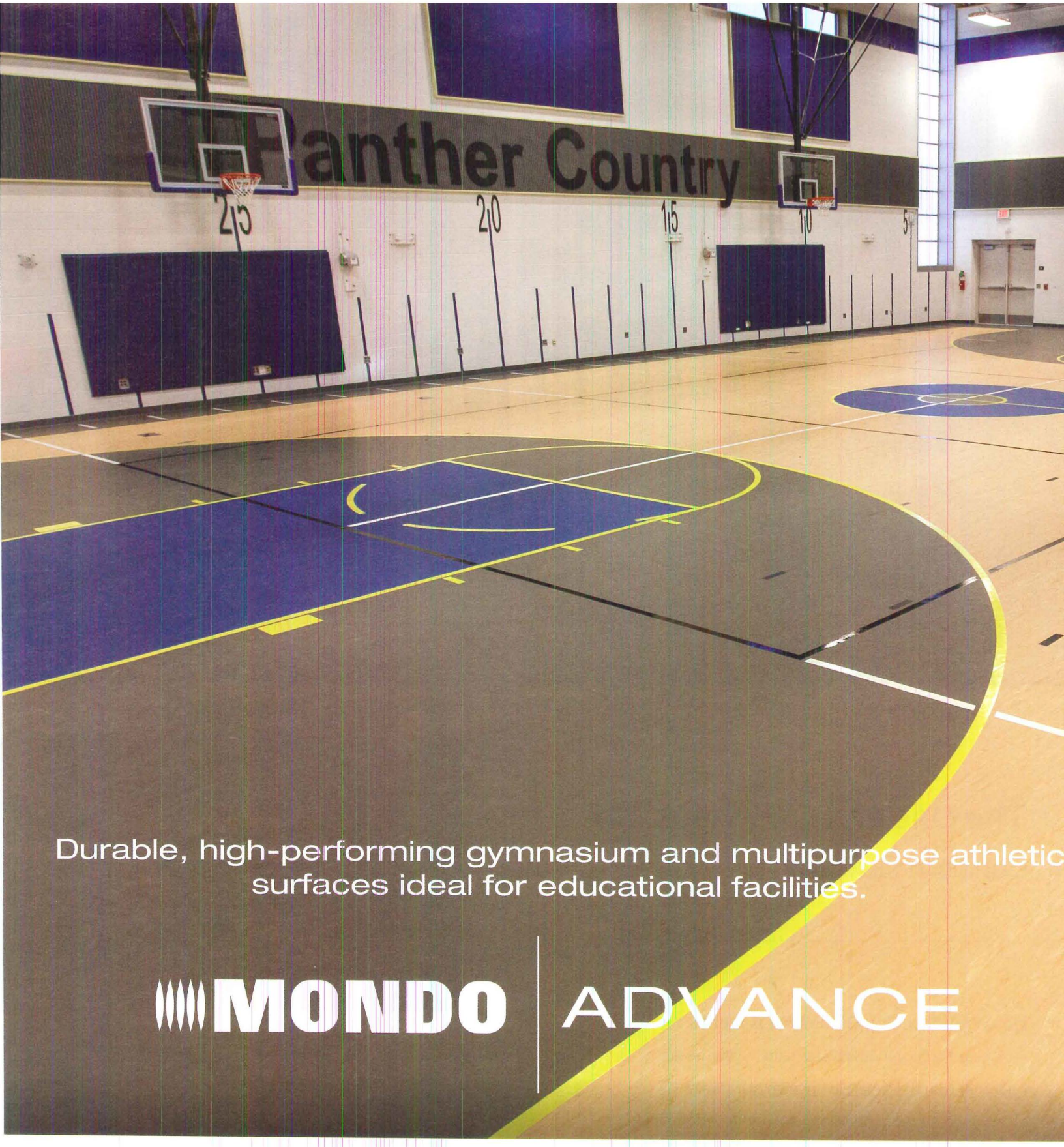

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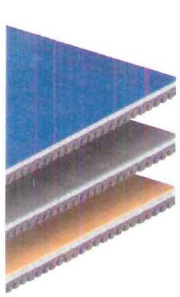

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Photo courtesy of AMBICO Limited

Specialized door, frame, and window systems can be specified to meet performance standards and still feature aesthetic qualities, such as this acoustic wood door and steel frame system achieving an STC rating of 51.

An additional consideration when looking at door and window frames is safety in regard to extreme weather. Many schools in certain areas of the country experience the threat of tornados giving rise to the need for tornado safe rooms. Frame door and hardware assemblies along with window frame and glazing assemblies on perimeter shelter walls need to be capable of resisting the forces imposed on it and protecting the critical life safety of the inhabitants. Such door and window assemblies are available and can be specified as tornado-resistant openings shown to be tested in accordance with FEMA 361 & 320 and ICC-500 standards.

Photo courtesy of NanaWall Systems

Flexible classroom configurations are an innovative way to maximize programming space, while minimizing square footage and the associated costs of construction and operations.

INNOVATION IN DESIGN OR OPERATIONS (IN)

All LEED rating systems have always left room for innovation and creativity in meeting the objectives and intent of the program. As such, credits are sometimes earned by recognizing projects for innovative and exemplary technologies, methods, project planning, and project execution.

Flexible Space

A popular topic in 21st century school design is the creation and use of flexible space—space that can be used for multiple purposes or modified to suit variable needs. This approach is generally regarded as an innovative way to carry out education while staying nimble in the use of space in a school. But it can also be a very green design approach if it allows building square footage to be reduced by combining and consolidating activities that might otherwise need totally separate rooms. Less square footage means less space to heat and cool, less material to incorporate, and less environmental impact overall. It doesn't mean having to do with less program space, however, it just means being smarter about how it is created and used.

One successful approach toward creating such flexible space is the use of movable wall panels, often with glass or glazing to enhance visibility and daylighting. By incorporating such movable walls, some fixed walls of a traditional classroom can be eliminated either by creating a shared space between two classrooms or by opening up to a common area that is shared by multiple classrooms or grades. It is also possible to create areas for project-based learning or common areas where students can work together on a range of activities, utilizing shared resources, such as technology centers and presentation areas.

Creating a flexible classroom configurations optimizes the floor space within the building envelope, which translates into reduced construction costs. In addition, the multi-use spaces also can contribute to reduced operating costs, as teachers can share resources and cross-collaborate, creating a more efficiently run school environment.

CONCLUSION

There are certainly countless ways to achieve the design, construction, and operation of schools in a manner that is consistent with the three-fold goals of green schools: zero environmental footprint, a positive impact on occupant health and performance, and environmental literacy. Understanding the options and some of the materials and systems currently available, including those discussed in this article, can help design professionals, construction teams, facility managers, educators, and administrators achieve these goals successfully.

▶ Continues at ce.architecturalrecord.com

Peter J. Arsenault**, FAIA, NCARB, LEED AP, is an architect and green building consultant who has authored more than 120 continuing education and technical publications as part of a nationwide practice. **www.linkedin.com/in/pjaarch

PRODUCT REVIEW

Twenty-First Century Schools Are Green

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Education facilities demand quiet environments for both students and teachers. AMBICO manufactures industry leading, acoustic swing and slide door assemblies. Doors are available in steel or wood veneer. For all classroom, industrial shop, gymnasium, music room, auditorium, studio, or stage applications; make AMBICO part of your sound barrier solution.

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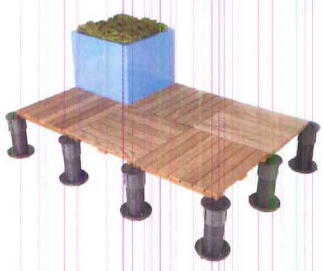
Bison Innovative Products

Image courtesy of Bison Innovative Products



Bison Innovative Products Rooftop Deck System

From multi-family, mixed-use, government facilities, healthcare, and more—Bison Innovative Products offer the design flexibility to create versatile, unique outdoor spaces. Since 1994, Bison has led the industry in the design and manufacture of adjustable pedestals and hardwood deck tiles that create beautiful rooftop environments.

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Bostik's Ultra-Set® Singlestep2™

Ultra-Set® SingleStep2® utilizing Bostik's AXIOS® Tri-Linking™ polymer technology, is the ultimate in high-performance wood flooring adhesives. It combines high strength adhesive, industry-leading moisture barrier, and sound abatement underlayment technologies all-in-one dynamic, space-age formulation. It also contains Bostik's patent-pending Thickness Control™ Spacer Technology, ensuring ideal membrane thickness between substrate and hardwood flooring.

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Construction Specialties, Inc.

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DORMA

Photo courtesy of DORMA

M9000 Grade 1 Locksets

The M9000 Series Grade 1 heavy-duty mortise locksets provide exceptional security, refined aesthetics, and rugged dependability. These premium locks are designed for extreme reliability and durability, exceeding 13 million cycles in independently witnessed laboratory testing.

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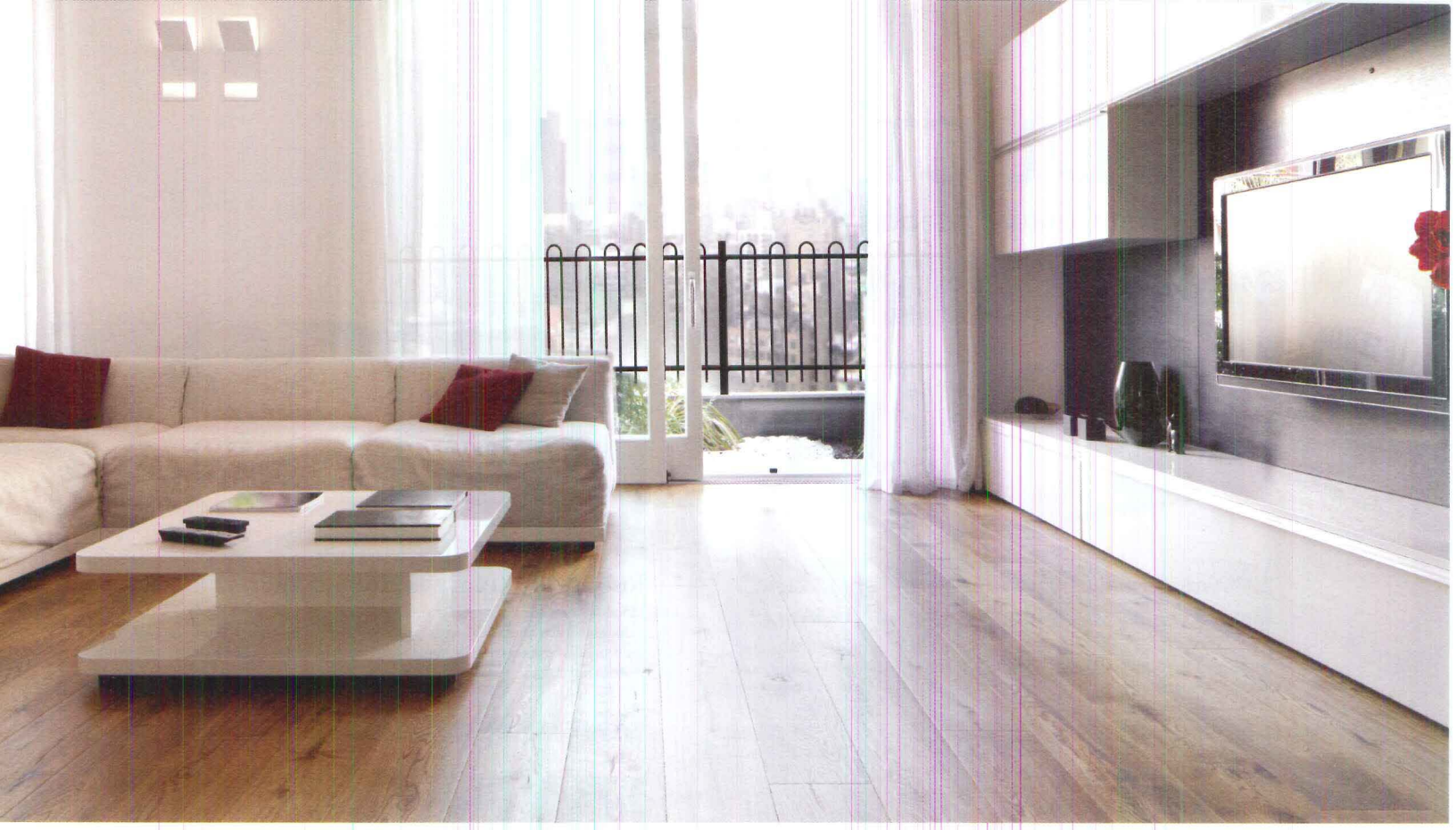

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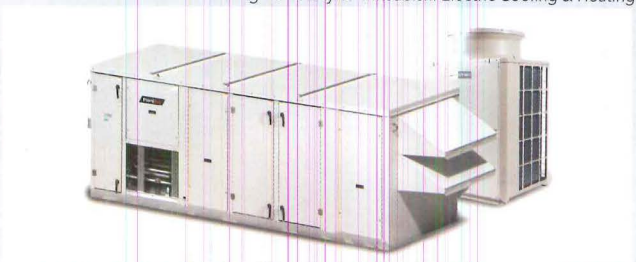
PRODUCT REVIEW

Twenty-First Century Schools Are Green

Mitsubishi Electric Cooling & Heating

Image courtesy of Mitsubishi Electric Cooling & Heating



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PremiSys® Fusion DOAS systems deliver 100% outdoor air with over 20% greater efficiency than traditional DOAS systems. These systems maintain the quality and value of standardized products while earning valuable LEED® points. Learn more at MitsubishiPro.com/Ready.

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Mondo

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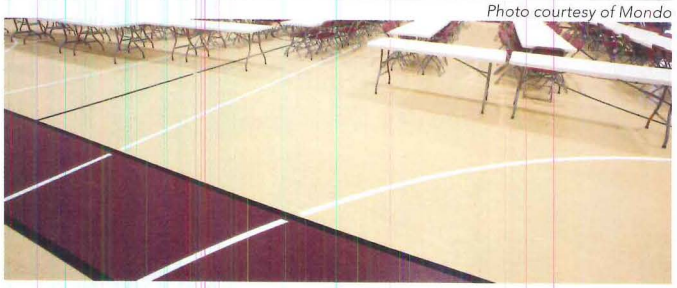

Rubber Multipurpose Indoor Sports Flooring

Mondo's Advance rubber multipurpose indoor sports flooring is ideal for a wide array of indoor sport activities. Advance is highly durable and low maintenance, it provides outstanding sound absorption properties, and is slip resistant. It is GREENGUARD Gold certified and is 100% recyclable.

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NanaWall Systems

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The NanaWall FoldFlat®-Panels Fold Completely Flat Against the Wall

NanaWall FlexSpace Opening Glass Walls eliminate fixed walls and create flexible shared spaces between multiple classrooms. Shown above in the NanaWall FoldFlat configuration.

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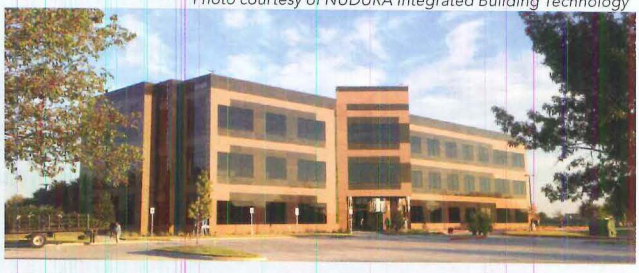
NUDURA Integrated Building Technology

Photo courtesy of NUDURA Integrated Building Technology



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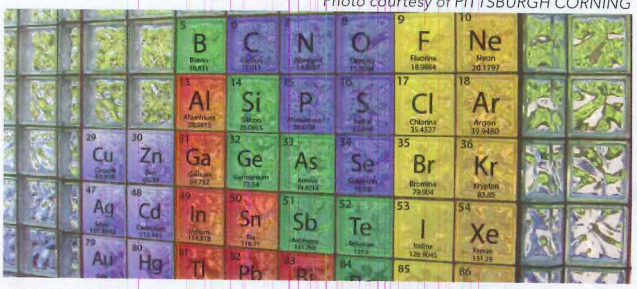

PITTSBURGH CORNING Expressions Collection Glass Block

Glass block can be customized with messaging or artistic designs to enhance or complement the design of the building and classrooms. For example, a chemistry lab can have a glass block wall with the Periodic Table of Elements on it. Glass block can provide daylighting while enhancing the learning atmosphere of the classroom.

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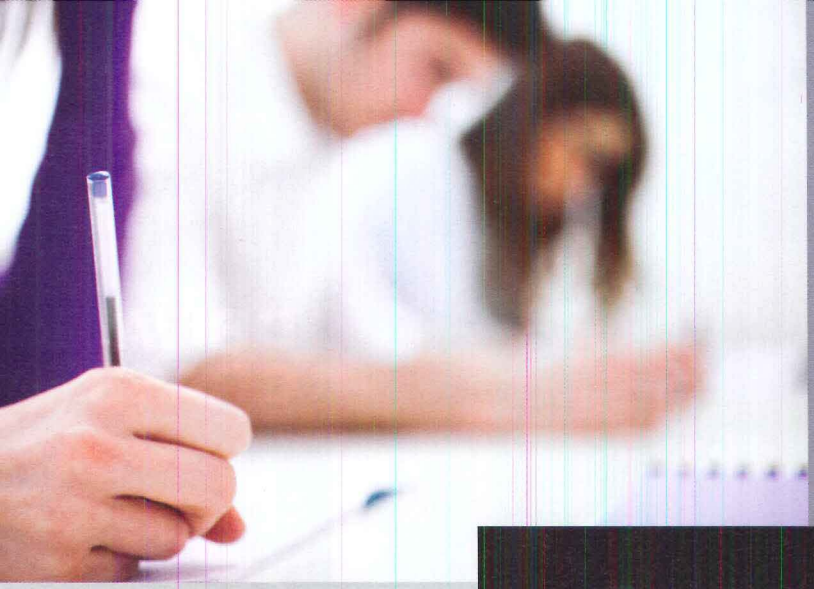

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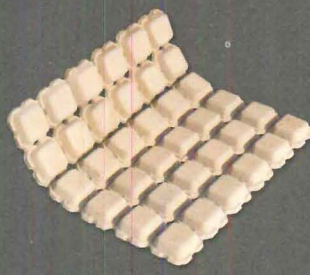

ARCHITECT: Cannon Design
LANDSCAPE ARCHITECT: Whitin Design Works
GENERAL CONTRACTOR: Hensel Phelps
INSTALLER: Valley Crest
CUSTOMER: Kaiser Permanente
PLANTING: Hydroseeded Fescue

Fire Lane/ Healing Garden

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Sliding glass door systems enable designers to divide the interior space as needed, without obstructing access to daylight and views.

Innovate with Sliding Door and Wall Systems

Reclaim valuable square footage, and help bring daylight and access to views deeper into the floorplan

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Sliding door and wall systems are more space efficient and offer greater space flexibility than conventional pivot doors and stationary walls. These sliding hardware systems are designed to provide an effective barrier, when necessary, in a fraction of the footprint required by traditional solutions, and then enable occupants to slide the door or wall out of the way when the space division is no longer needed. This approach to doors and walls also offers advantages in satisfying accessibility requirements mandated by the Americans with Disabilities Act (ADA) and green building initiatives. Sliding systems are considered easier to manipulate and maneuver around than swinging doors, and subsequently require less maneuvering clearance than their pivoting counterparts. Sliding glass panels can be used to create a space barrier without blocking daylight from traveling deeper into a space or obstructing views to the outdoors. This is particularly useful when trying to maximize the presence of daylight and views in the interior.

INTRODUCING SLIDING DOOR AND WALL SYSTEMS

There are many types of sliding door and wall systems now available that offer innovative solutions for designers looking to do more with less space and increase the overall flexibility of any interior.

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Learning Objectives

After reading this article, you should be able to:

1. Explain the different ADA accessibility guidelines as they apply to sliding doors.
2. Select the right combination of system components to create a safe sliding hardware system.
3. Describe how the use of glass sliding doors and walls enables access to daylight and views deeper into the space, improving occupant well-being and creating energy savings opportunities.
4. Apply best practices to specify the most common sliding hardware systems: single-panel door systems, telescoping door systems, folding wall systems, and stacking wall systems.

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Telescoping door systems smoothly retract and extend multiple door panels moving in the same direction, providing an elegant barrier solution for large openings.

Straight Sliding Door Systems

Sliding doors can be used in place of hinged or pivot doors, providing the same space division and functionality with a much smaller operational footprint and a large range of available door widths.

The Single Sliding Door

The most basic sliding door system is a single straight-sliding door on a single track. When opened, these doors can be recessed inside the wall to be concealed from view or slide out of the way along the outside wall, remaining visible in both open and closed positions. These space-efficient barriers are an excellent and innovative solution in office and hospitality applications.

Bi-Parting Doors

Bi-parting door systems consist of two door panels on a single track. These systems are opened from the center by pushing the door panels in opposing directions, one to the right and the other to the left. These systems can be operated individually or interconnected for simultaneous operation with a belt and pulley mechanism, which provides a smooth and elegant experience.

Bi-Passing Doors

Bi-passing door systems employ multiple tracks and multiple bi-directional panels. These multifaceted systems are often used to conceal wide storage areas that benefit from multiple access points, such as the libraries found in architectural firms, hotel closets, residential closets, and AV areas in large conference rooms and classrooms.

Telescoping Door Systems

Telescoping door systems are designed to smoothly retract and extend multiple door panels moving in the same direction. Panels in a telescoping door system can be interconnected with a belt and pulley mechanism or with entrainment strips. While the operation of the belt and pulley system creates a very smooth and elegant experience for the operator, there are limits on the quantity, weight, and width of the doors that can be operated this way. The use of entrainment strips can offer similar telescoping panel configurations with fewer limitations on door size and weight, but may result in maintenance issues without proper operation.

Folding Wall Systems

Folding wall systems offer a dynamic alternative to standard stationary walls. They live on a single track with panels that are connected to one another with hinges and fold accordian-style into and out of the space. Each folding wall system may be comprised of up to nine panels. These systems are a good solution for the simple and straightforward task of subdividing one large space into two smaller spaces with one straight wall.

When subdividing a space, there is often a need to go back and forth between the two smaller spaces. A pivot door can be incorporated into a folding wall system, offering easy access to both spaces when the wall is deployed. When not in use, the pivot door can fold up with the rest of the folding system or, depending upon the configuration of the system, it can pivot and park against the wall opposite to the larger stack.

Stacking walls give restaurants the flexibility to maintain a large and open general dining area and morph to accommodate special private events, when booked.

Stacking Wall Systems

Stacking wall systems provide unparalleled flexibility for moveable walls. The panels move independently, into and out of the space, and then stack like dominos at the end of the track when not in use. The tracks can incorporate curves and corners to best fit any desired application. Panels in stacking wall systems can be larger and heavier than the panels in folding wall systems, reaching up to 4 or 5 feet wide, 10 feet tall, and more than 300 pounds in weight. They may also be used for smaller countertop-height systems, which may be handy for security or concealment. Panels within a stacking system can even be different sizes to create a special aesthetic or accommodate a unique design element. These systems can effectively create unique and custom environments within a larger common space, such as a hotel lobby that houses a variety of stores and services, or a restaurant that morphs to accommodate a private event.

SYSTEM COMPONENTS

These sliding systems may not be high-tech, but good design and high-quality materials make all the difference in delivering silent, smooth, and easy operation that will last for a very long time.

Panels

The panels are the physical material that create the door or are combined to create the wall that divides the space. Panels can be made of a variety of materials, such as wood, glass, and metal, and some composite materials, including acrylics.

Track

The track used for sliding hardware systems is often either steel or aluminum. These tracks are available in a variety of grades, thicknesses, and finishes. While the type of finish is often mostly aesthetic, the type of the material and the thickness can affect the performance of the track. Thinner tracks can warp over time, while thicker tracks tend to hold their shape more reliably. An anodized aluminum track is one of the most durable types of track available.

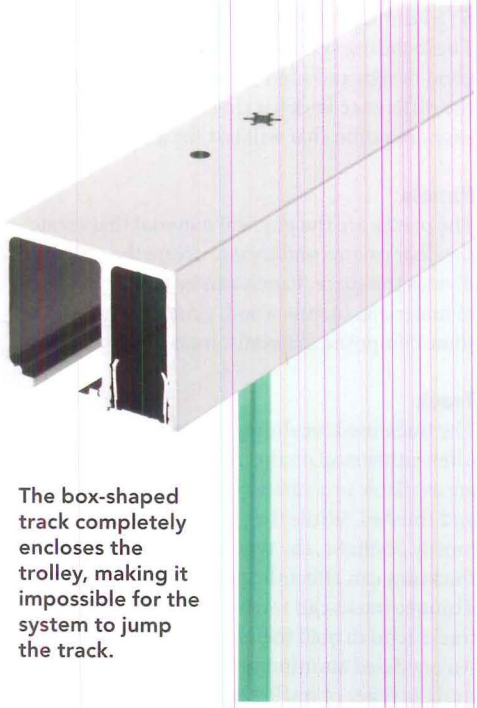
Track for sliding hardware systems is also available in several shapes. Three of the most common track shapes are the box shape, the C shape, and the E shape. Advancements in the manufacturing process of the box shape have made this style of track less prone to contamination and have also made it possible to prevent the sliding hardware system from jumping the track. C-shaped track can be bent, allowing panels to traverse along a curved path. E-shaped track also accommodates curved applications and is equipped to handle lateral loads.

Trolley

The trolley is a wheeled carriage that travels along the track and carries the weight of the panel. Today, trolleys often have plastic or plastic-coated wheels for quiet rolling.

It should be noted that there are a variety of trolley styles and shapes, including, but not limited to: two-wheel, four-wheel, and multi-plane (where wheels are placed on both the vertical and horizontal planes) configurations. When selecting the right trolley for a project, it is important to identify whether or not the system will need to travel along a radius or accommodate any lateral movement or sway. Multi-plane trolleys are designed to travel around curves and help control lateral motion, whereas trolleys designed to travel in a straight line may be damaged by lateral movement. It is also important to note that the size of the trolley will change based on the size or weight of the panel it is carrying.

Advancements in both the design of the track and the quality of the trolley wheels have resulted in sliding systems that are smoother, more silent, more durable, and easier to operate than their predecessors. For example, in the past, the trolley would often become misaligned or disengage from the track, causing the sliding door to fall off of the track. Today, the box-shaped track completely encloses the trolley, making misalignment and disengagement impossible, and delivering a reliably smooth sliding experience year after year.



The box-shaped track completely encloses the trolley, making it impossible for the system to jump the track.

Sliding systems with large or heavy panels should include a door guide to prevent panel sway and protect the integrity of the system.

When specifying a sliding system, an important consideration is the length of the top track. Top tracks are available in standard lengths up to about 19 feet. For systems that require longer top tracks, special care should be taken to ensure a precisely connected track. Small gaps in the joints of the track can, and often do, damage the wheel surface of the trolley. Over time, this causes the system to be noisy and, more importantly, can increase the rolling resistance, making the panels harder to open and close. In some cases, the increase in rolling resistance can be substantial enough to cause the system to fail to meet operational force guidelines mandated by the ADA. The ADA requires that hinged doors and sliding doors be able to be operated with a maximum 5-pound force (lbf). Some manufacturers offer top tracks that employ locator pins to provide precise connections. These enhanced tracks will allow trolleys to travel over connections with minimal or no damage.

Suspension

The suspension connects the individual hardware panels to the trolley and can be visible or concealed. Usually, the suspension includes a hanger bolt, which explains why this component is also commonly referred to as the hanger. It is important to ensure that the suspension mount selected is appropriate for the type of panel that is being mounted. Glass panels require different considerations than wood panels and metal panels.

Floor-Mounted or Panel-Mounted Guides

A guide prevents lateral movement, or sway, of the panel. This means that it keeps the panels from swinging back and forth or rattling in response to vibration in the space or airflow. While there are many reasons and many application types that warrant the use of these devices, safety is the most important benefit that these components provide. Guides may be mounted to the floor, an adjacent wall or sliding panel, or directly to the bottom of a sliding panel. Panel-mounted guides are often used to control the motion of very wide and very heavy panels, which can generate larger amounts of lateral movement as they slide. As a general rule, panels sliding further than their own width or larger than 5 feet wide should be controlled by a panel-mounted guide. These guides should also be considered if the height-to-width ratio of the panel is too large to avoid panel sway. The control that guides provide is important, because uncontrolled panel motion can cause damage to the wall, trolley, suspension, or hanger bolt. Damaged components could cause the panel to fall and result in injury.

A panel-mounted guide is comprised of the physical guide mechanism, which is mounted to the bottom of a panel, and a floor-mounted guide channel into which the guide fits.

A floor-mounted guide provides a barrier-free threshold because the guide channel lives

in the bottom of the panel and is concealed from view, rather than being mounted to the floor. The physical guide mechanism is either mounted to the floor or an adjacent wall and is concealed by the door or panel.

Doorstop

Doorstops keep the sliding door panels from sliding too far. Door stops may be placed inside the track and mounted on the floor or wall. Whenever possible, it is advisable to place the doorstop as close to the vertical center of the panel as possible or at the top and bottom to stop the panel simultaneously. Inertia will cause the door to rack, or rotate vertically, if the stop is located only at the top. Over time, the racking motion may cause some additional wear and tear on the sliding system.

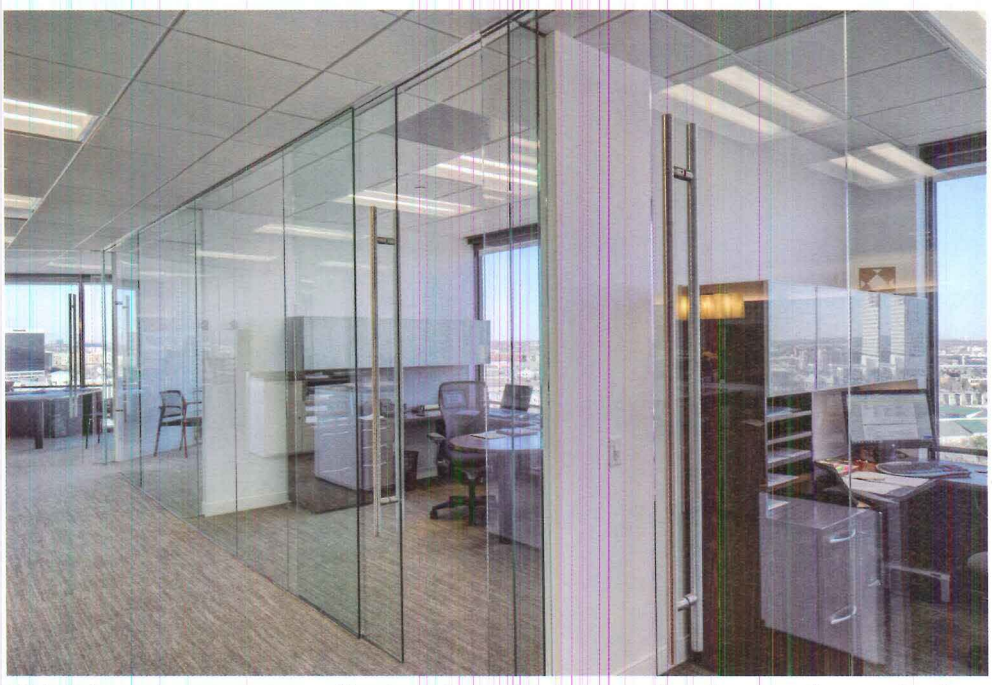
BENEFITS OF SLIDING HARDWARE SYSTEMS

It turns out that the motion of an opening door makes a lot of difference. Whether wood, metal, or glass, opening doors by sliding them along an existing wall or into an existing pocket instead of swinging them open saves a lot of space. Sliding doors require a fraction of the functional footprint required by a hinged door, and this can generate real cost savings as well.

Sliding Doors Save Square Footage

Sliding doors are a more space-effective solution than swinging doors for providing a barrier at a room entrance. The traditional hinge-and-pivot door requires a clear operational footprint that is large enough to accommodate the swing of the door as it moves from open to close. The average size of an interior commercial door in the United States is 36 inches wide by 84 inches tall. In a typical application, where the average-sized door makes a full 180-degree swing, more than 14 square feet (2,016 square inches) must remain clear and unobstructed for the door to work properly. Proper operation of a sliding door requires much less clear space, and that space often falls either along a wall or inside a wall, if the sliding door is recessed. If the average sliding door is 36 inches wide by 84 inches tall by 1.75 inches thick, it requires a space only that size be extended along the track.

Consider the layout of an average 10 foot by 15 foot private office with a pivot door. The first 3 feet of the office space are used, almost exclusively, to allow the door to open and shut, leaving a 10 foot by 12 foot space to fill with office furniture and dedicate to office work. If the pivot door is replaced with a sliding door, the exact same office furniture and functionality can be provided in an office that is actually 10 feet by 12 feet. Designers can provide clients with essentially the same office in a space that is 20 percent smaller.



Sliding doors are a more space-effective solution than swinging doors because they require that less space be kept clear and unobstructed for the door to work properly.

Associated Cost Savings

Space is one of the most valuable assets in the built environment. Eliminating a swinging door from the floorplan can return a lot of square footage back into active duty and enable designers to do more with a smaller amount of space. This flexibility offers a real value. LoopNet™, a website that tracks commercial real estate trends in Chicago, identifies the current median price for office space as $139 per square foot. At that price, the 20 percent smaller office footprint enables a designer to save $4,170 per office.

Reduced Maneuvering Clearance Required by ADA

Sliding doors also save space because the ADA requires a smaller clearance for maneuvering in front of a sliding door when compared with the clearance required in front of a swinging door. Section 404.2.4 of the ADAAG defines the acceptable maneuvering clearances for different types of doors. Clearances for swinging doors and gates are defined in terms of the approach, whether it is parallel or perpendicular to the door, and whether a person is maneuvering around the pull or push side of the door. The maneuvering clearances required by the ADA in front of sliding doors is nearly the same as the maneuvering clearance required when there is no door on an opening.

Access Daylight and Views Deeper in a Space with Glass Panels and Moveable Walls

Incorporating soft, glare-free daylight and outdoor views into the built environment has been proven to have a powerful effect on the people and energy use in the space. When people have access to daylight and outdoor views from inside a building, studies have shown an increase in productivity and an improvement in mood. They also learn and heal faster. With regard to systems efficiency, dimming electric lights or turning them off when sufficient daylight is available has been credited with reducing the energy used by the lighting system by 20 to 80 percent.

The potential upsides to occupant well-being and energy efficiency have motivated many designers and building owners to demand more daylight and access to views deeper into the floorplate.

Continues at ce.architecturalrecord.com

Jeanette Fitzgerald Pitts has written dozens of continuing education articles for Architectural Record *covering a wide range of building products and practices.*

All photos courtesy of Space Plus, a division of The Sliding Door Company

The Best of Both Worlds

Interior glass partitions: solving the open versus private workstation dilemma

Sponsored by Space Plus, a division of The Sliding Door Company
By Barbara Horwitz-Bennett

An ideal way to bring in more natural daylighting, enhance productivity and well-being, and drive down vacancy rates, interior glass partitions are gaining traction. But perhaps the product's most newsworthy appeal is its ability to simultaneously offer both open, transparent spaces and private rooms.

By simply sliding the glass door shut, occupants have access to a quiet room for heads-down work or private conferences. Meanwhile, the floor-to-ceiling glass still preserves a sense of connectivity.

"We have found that some of our most successful spaces are those that balance an open work environment with shared heads-down spaces and informal relaxation space," confirms Susan Foong, senior interior designer, HGA, San Jose, California. "A properly designed glass partition system can simultaneously address privacy and openness, allowing natural light to filter into private zones while averting the stray gaze and noise of passersby."

THE SWINGING PENDULUM

Offering some historical perspective, researchers at Steelcase point out in an October 2014 Harvard Business Review article titled, "Balancing the 'We' and 'Me': The Best Collaborative Spaces Also Support Solitude,"

CONTINUING EDUCATION

EARN ONE AIA/CES HSW LEARNING UNIT (LU)

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

1. Explain how interior glass enclosures and partitions positively impact employee morale and productivity.
2. Identify how flexible workspaces enhance health and well-being.
3. Classify interior glass systems as a solution to balancing open, collaborative floorplates with private, quiet spaces.
4. Demonstrate how interior glass partitions promote daylighting and views, control acoustics, and are ADA accessible.

To receive AIA/CES 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/CES COURSE #K1601B

that back in the 1980s, the trend was to build high cubicles to support a large percentage of employees seeking to concentrate on their work without distractions.

By the 1990s, the tide began to turn, as Steelcase research found only 23 percent of employees wanted privacy, 50 percent desired to access others, and 40 percent wanted more interaction. Backed by other industry research, the real estate and design community responded by opening up the floor plates, bringing down the walls, and decreasing the square footage of private zones.

However, within the past few years, many experts are suggesting that the pendulum has swung too far. Steelcase reports a 16 percent increase since 2008 in folks having trouble concentrating at their desks and a 13 percent decrease amongst people feeling like they have access to quiet areas where they can perform focus work.

Furthermore, research coming from the University of California, Berkeley's Center for the Built Environment points to more than half of office workers feeling dissatisfied with the level of speech privacy in their offices.

Simultaneously delivering an open floor plan, along with privacy, office fronts with sliders that lock and clear glass sliding panels can all stack to one side to optimize the opening.

"It has been my experience that many workplaces put too much emphasis on the need for open, informal collaboration and not enough emphasis on the need for quiet space to perform individual work as well as the need to meet virtually," states Leigh Stringer, LEED AP, workplace strategy and research specialist, EYP Architecture & Engineering, Washington, D.C. "In a recent study of 30,000 work points across the globe for knowledge workers, my team found that on average, face-to-face collaboration made up only 9 percent of the workday. Using glass door partitions/walls is a really good way to create space with needed acoustical privacy while making it feel more open."

Meanwhile, some of the more progressive organizations are moving toward an "activity-based" workplace that Bernice Boucher—managing director, head of workplace strategy, Americas, Jones Lang LaSalle, New York—calls a mix of task-based and social spaces, such as reservation-based conference rooms, ad-hoc huddle spaces, informal conversation zones, and private, quiet workspaces. In fact, a large organization that JLL recently worked with found 13 percent of its employees to be more engaged with the organization given this autonomy to choose their workplaces in such an activity-based environment.

Continues at ce.architecturalrecord.com

Barbara Horwitz-Bennett *is a trade press journalist who has covered the design and building industry for the past 17 years. She contributes regularly to a number of leading architectural publications.*

Offering some additional privacy, frosted glass fronts are a nice option for designers.

CONTINUING EDUCATION

Anodized Aluminum for Architectural Applications

Durable, strong, versatile, and cost effective with extensive color and finish choices, anodized aluminum provides a multitude of applications

Sponsored by Lorin Industries | *By Karin Tetlow*

Nearly a century ago, aluminum revolutionized the world of metals. Since then, coil anodizing technology has allowed remarkable architectural possibilities of designs, textures, and finishes that are functional, versatile, and environmentally responsible. Anodized aluminum can be roll-formed, stamped, laser engraved, laminated, perforated, welded, embossed, and silk-screened. Moreover, recent breakthroughs in coloring techniques provide a range of colors rivaling those of paint. Among the many applications of anodized aluminum are architectural exteriors, interiors, paneling, roofing, windows, doors, ceilings, and lighting.

Continues at ce.architecturalrecord.com

Anodized aluminum cut-out honeycomb panels in the Gyeongju Tower in Gyeongju, South Korea, echo the legendary Hwangnyongsa Temple's wooden pagoda (see case study online).

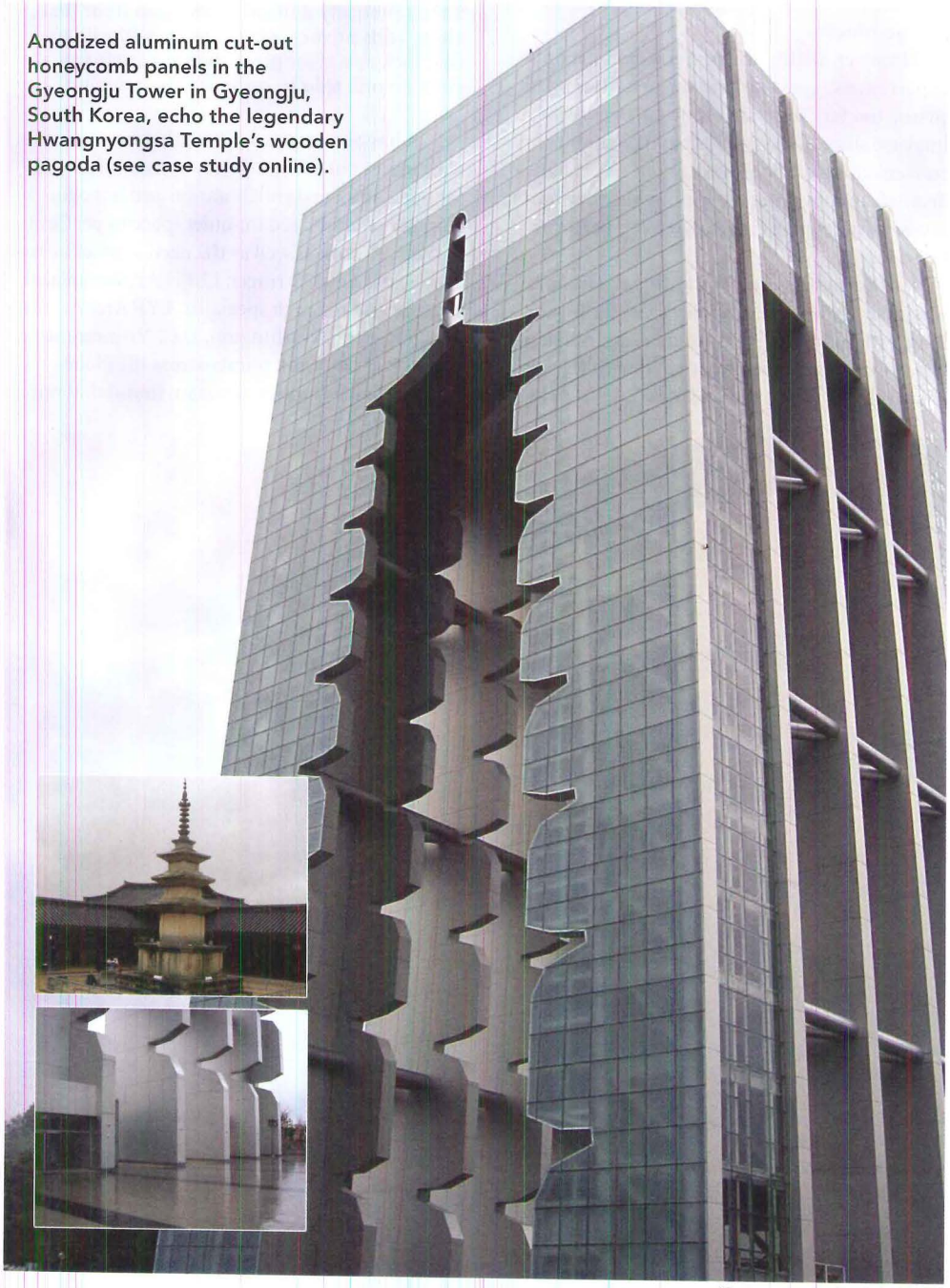


Photo courtesy of Lorin Industries

CONTINUING EDUCATION

EARN ONE AIA/CES HSW LEARNING UNIT (LU)

Learning Objectives

After reading this article, you should be able to:

1. Describe aluminum anodizing and explain the differences between types of anodizing processes.
2. List the advantages and disadvantages of coil and batch anodized aluminum.
3. Summarize the advantages of coil anodized aluminum compared with other metals and coatings.
4. Identify applications that use coil anodized aluminum products for architectural interior and exterior uses.
5. Discuss the sustainable and environmental characteristics of anodized aluminum.

To receive AIA/CES 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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Originally published in the November 2013 issue of Architectural Record

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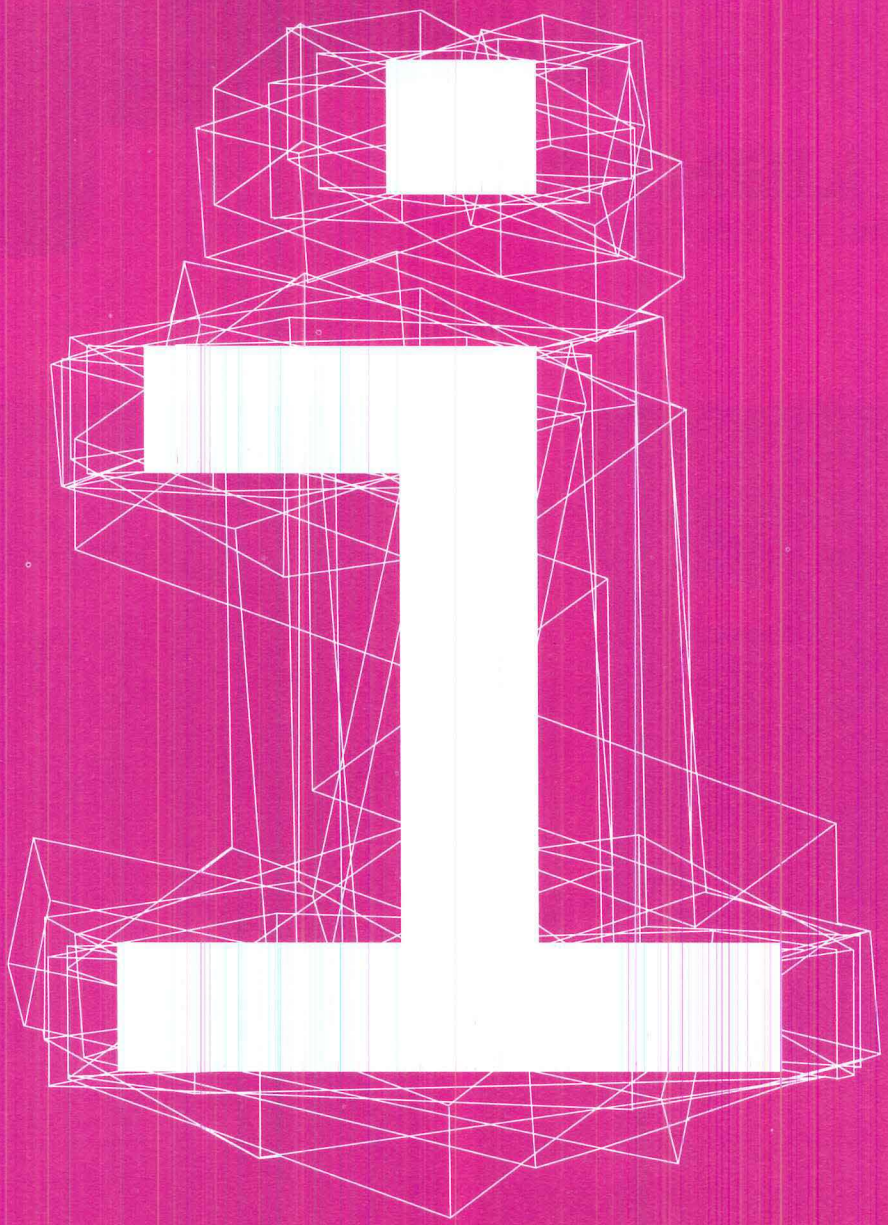

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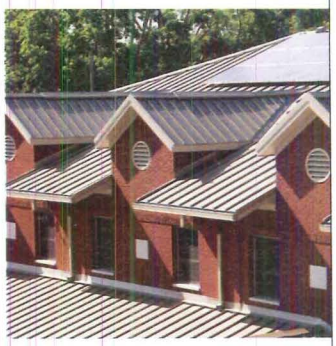

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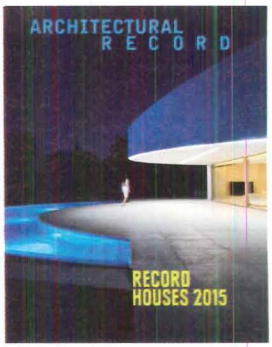


2016 Record Houses

CALL FOR ENTRIES

The editors of **ARCHITECTURAL RECORD** announce the **2016 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.

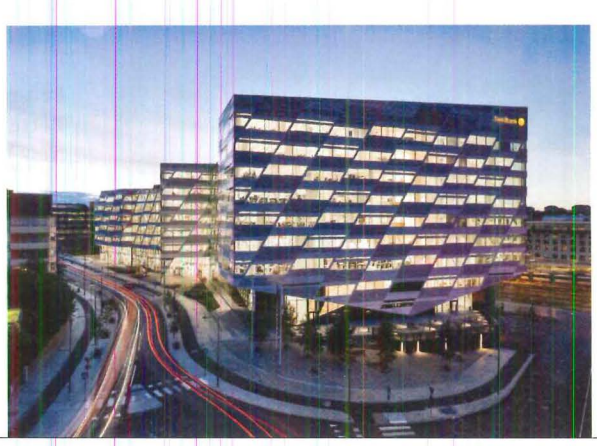
The fee is US$75 per submission. Download the official entry form at architecturalrecord.com/call4entries. E-mail questions to arcallforentries@bnpmedia.com. Please indicate **Record Houses** as the subject of your e-mail.
SUBMISSION DEADLINE: **JANUARY 8, 2016**

Good Design Is Good Business

CALL FOR ENTRIES

The editors of **ARCHITECTURAL RECORD** are currently accepting submissions for the **2016 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 2016 issue.

The fee is US$150 per entry and $50 for each additional project. Download the official entry form at architectural record.com/call4entries. E-mail questions to arcallforentries@bnpmedia.com. Please indicate **GDGB** as the subject of your e-mail. **SUBMISSION DEADLINE: FEBRUARY 1, 2016**



New and Upcoming Exhibitions

Bauhaus twenty-21: An Ongoing Legacy
Palm Springs, California
January 24–May 1, 2016
This exhibition will showcase 12 of the most iconic achievements of Bauhaus architecture built before 1933, bringing the buildings into conversation with contemporary architectural visions. Each building, photographed by Gordon Watkinson, will be featured in conjunction with a project built in this century. For more information, visit psmuseum.org.

Peter Fischli David Weiss: How to Work Better
New York City
February 5–April 20, 2016
For more than three decades, Peter Fischli (b. 1952) and David Weiss (1946–2012) collaborated to exploit humor, banality, and a keen rethinking of the readymade to realign our view of the world. This exhibit, at the Guggenheim, will offer a thorough investigation of the artists' joint production, revealing the ways they juxtaposed the spectacular and the ordinary to celebrate the sheer triviality of everyday life. For more information, visit guggenheim.org.

Beauty
New York City
February 12–August 21, 2016
The fifth installment of the Cooper Hewitt's contemporary design exhibition series, Beauty, will celebrate design as a creative endeavor that engages the mind, body, and senses. With a focus on aesthetic innovation, the exhibition will feature more than 250 works by 62 designers from around the globe and is organized around seven themes: extravagant, intricate, ethereal, transgressive, emergent, elemental, and transformative beauty. For more information, visit cooperhewitt.org.

Ongoing Exhibitions

Making Music Modern: Design for Ear and Eye
New York City
Through January 17, 2016
Music and design—art forms that share aesthetics of rhythm, tonality, harmony, interaction, and improvisation—have long had a close affinity, perhaps never more so than during the 20th century. *Making Music Modern* gathers designs for auditoriums, instruments, and equipment for listening to music, along with posters, record sleeves, sheet music, and animation. For more information, visit moma.org.

Turner Prize 2015
Glasgow, Scotland
Through January 17, 2016
The Turner Prize is awarded annually to a British artist under 50 for an outstanding exhibition or other presentation of their work in the preceding year. Every other year, the prize leaves the Tate Britain and is presented at a venue outside London. This year, that venue is Tramway in Glasgow, an international art space renowned for commissioning, producing, and presenting contemporary arts projects. For more information, visit tate.org.uk.

Chinese Style: Rediscovering the Architecture of Poy Gum Lee, 1923–1968
New York City
Through January 31, 2016
In this survey exhibition at the Museum of Chinese in America, architectural historian Kerri Culhane documents and explores Poy Gum Lee's (1900–68) nearly 50-year-long career in both China and New York and examines Lee's modernist influence in New York's Chinatown. This project has resulted in the first-ever comprehensive list of Lee's projects in New York. Lee's hand is visible in the major civic architecture of Chinatown post-1945, which blends Chinese stylistic details with modern technologies and materials. For more information, visit mocanyc.org.

St. Louis Modern
St. Louis
Through January 31, 2016
This exhibit explores a dynamic period (1935–65) when St. Louis–based architects, artists, and designers made innovative contributions to Midcentury Modern design. Commemorating the 50th anniversary of Eero Saarinen's modernist masterpiece, the Gateway Arch, this exhibition features more than 150 modern design objects and artworks drawn from the St. Louis Art Museum's own collection as well as more than 30 museums and private lenders around the country. Many works in the exhibition are being shown for the first time. For more information, visit slam.org.

David Adjaye Selects: Works from the Permanent Collection
New York City
Through February 14, 2016
David Adjaye presents 14 West African and Central African textiles from the Cooper Hewitt Museum's permanent collection in the latest installment of the museum's Selects series. On view in the renovated Marks Gallery, the exhibition is the 12th in an ongoing series in which prominent designers, artists, and

architects are invited to mine and interpret the museum's collection. For more information, visit cooperhewitt.org.

Wendell Castle Remastered
New York City
Through February 28, 2016
This exhibition examines the digitally crafted works of Wendell Castle, an acclaimed figure of the American art-furniture movement. In this solo exhibition at the Museum of Arts and Design, Castle casts a critical eye at the first decade of his own artistic production by creating a new body of work that revisits his achievements of the 1960s through a contemporary lens. For more information, visit madmuseum.org.

Frank Gehry
Los Angeles
Through March 20, 2016
Frank Gehry's buildings have altered architecture's relationship to the city, and his pioneering in digital technologies set in motion the practices employed by the construction industry today. This Los Angeles County Museum of Art exhibition is a comprehensive overview of Gehry's body of work. The show begins in the early 1960s—Gehry established his firm in Los Angeles in 1962—and runs to the present. Many of the 200 drawings have never been seen publicly, and 65 models illuminate the evolution of Gehry's thinking. For more information, visit lacma.org.

Lectures, Conferences, and Symposia

Interior Design Show
Toronto
January 21–24, 2016
The 18th edition of Canada's design fair will celebrate leading brands, innovative speakers, and rising local talents. Spotlighting Canadian-made products and small-batch designers, the show will also feature international speakers, including Lee Broom, Ora-ïto, and International Guest of Honor Tom Dixon. At the Metro Toronto Convention Centre. For more information, visit interiordesignshow.com.

Facades+
Los Angeles
January 28–29, 2016
Centered on high-performance and high-design building skins, this conference promises a robust dialogue on innovations in resilient buildings, systems integration, and sustainability. Enrique Norten, founder and director of TEN Arquitectos, will kick off the conference with a keynote speech. For more information, visit facadeplus.com.

SAH 2016 Annual International Conference
Los Angeles
April 6–10, 2016
The SAH 2016 Annual International Conference will engage participants from around the world with the rich, evolving legacy of the Pasadena/Los Angeles region's built environment. With the scheduled completion of the Metro Expo Light-Rail Line west to Santa Monica in early 2016, Pasadena will be connected to downtown L.A. and the rest of Los Angeles County. This infrastructure, building on historic rights-of-way, will provide new methods to see the broad range of the region's architecture and urbanism. At the Pasadena Convention Center. For more information, visit sah.org.

Competitions

A Museum in the Making: Beirut, Lebanon
Submission deadline: January 4, 2016
The Association for the Promotion and Exhibition of the Arts in Lebanon (APEAL) is

launching a design competition for a new modern art museum in the heart of Beirut. The yet-to-be-named museum, set to open in 2020, is envisioned as a multidisciplinary hub of art and design dedicated to showcasing modern and contemporary Lebanese culture. For more information, visit amuseuminthemaking.com.

AIA New Practices New York 2016
Registration deadline: January 8, 2016
This biennial competition recognizes and promotes new and innovative architecture and design firms. For this year's theme, AIA is seeking practices operating in New York City that have been able to embrace unknowns, cultivate new opportunities, challenge assumptions, and find new ways to leverage architectural thinking to shape the city. For more information, visit aiany.org.

Taking Buildings Down
Registration deadline: January 12, 2016
In a design culture focused on the superlative (the tallest, the newest, the priciest), in which destruction is often perceived as being or produced by an act of violence, the processes of removal appear as secondary concerns or collateral damage. Taking Buildings Down invites proposals for the production of voids; the demolition of buildings, structures, and infrastructures; or the subtraction of objects and/or matter as a creative act. Removal is all that is allowed. For more information, visit storefrontnews.org.

Ceramics of Italy Tile Competition 2016
Submission deadline: January 15, 2016
For 22 years, this competition has showcased the work of North American architects and designers who utilize the high technical and aesthetic qualities of Italian tile. Each year, an international jury of design experts selects three winning projects as well as honorable mentions in the residential, institutional, and commercial/hospitality sectors. Projects displaying the highest level of functionality, creativity, sustainability, and aesthetic appeal in each category will be rewarded a grand prize of $4,000 as well as a five-day trip to Bologna to attend Cersaie 2016. For more information, visit tilecompetition.com.

Daniel Urban Kiley Teaching Fellowship
Application deadline: January 15, 2016
This fellowship is awarded annually to an emerging designer whose work articulates the potential for landscape as a medium of design in the public realm. The Kiley Fellow will be appointed Lecturer in Landscape Architecture at the Harvard Graduate School of Design for the 2016–17 academic year. Landscape architects and designers from a range of allied professions who can demonstrate a significant engagement with public landscape design are invited to apply. For more information, visit gsd.harvard.edu.

Central Park Summer Pavilion
Registration deadline: January 22, 2016
Geared for students and young architects, this competition invites designs of a multiuse area in Central Park that can host various summer activities. With its privileged location, the pavilion should become a cultural reference point and leisure spot for inhabitants of and visitors to the city, a space that is integrated into the natural environment of the park and that is flexible enough to adapt to a wide variety of activities on a modest scale. For more information, visit arquideas.net.

Folly 2016
Submission deadline: January 25, 2016
Socrates Sculpture Park, located in Long Island City, Queens, combines a waterfront setting, accessibility, and community-based programming. Socrates Sculpture Park and The Architectural League invite designers and architects to help shape the physical setting in which the park fulfills its mission into a unique environment for art, creative expression, social programming, and education. For more information, visit archleague.org.

Tiny Homes Chicago
Submission deadline: January 30, 2016
According to the 2015 Chicago Homeless Count and Survey conducted by the City of Chicago, 31 percent of the unsheltered homeless population and 19 percent of those who are sheltered are between 18 and 24 years old. Yet, even when sheltered, it is only temporarily. Tiny houses can provide solutions for young individuals seeking stability, support, safety, and community. This competition invites teams from across the country to submit their ideas for a small community of tiny homes in Chicago. For more information, visit tinyhomeschicago.org.

RIBA International Prize 2016
Submission deadline: February 9, 2016
The Royal Institute of British Architects (RIBA) is now accepting submissions for its 2016 International Prize. The prize will be awarded to a building that demonstrates visionary design while making a generous contribution to society and to its physical context—be it the public realm, the natural environment, or both. For more information, visit architecture.com.

E-mail information two months in advance to recordevents@bnpmedia.com.