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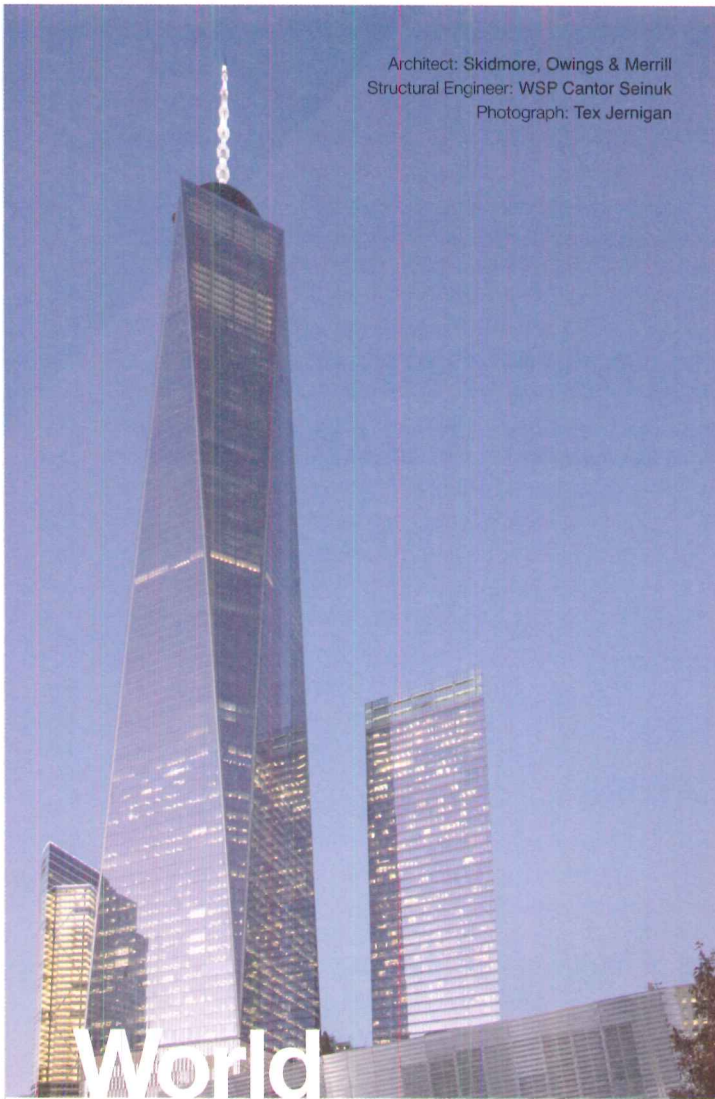
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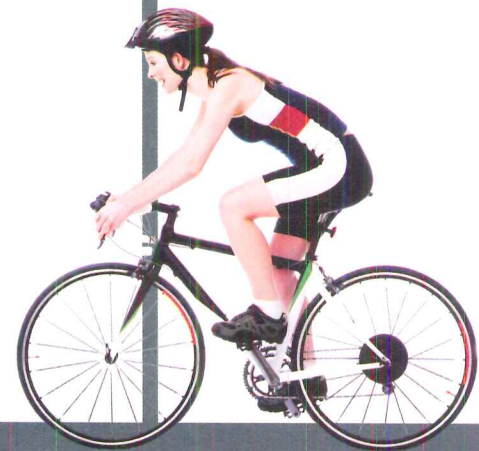
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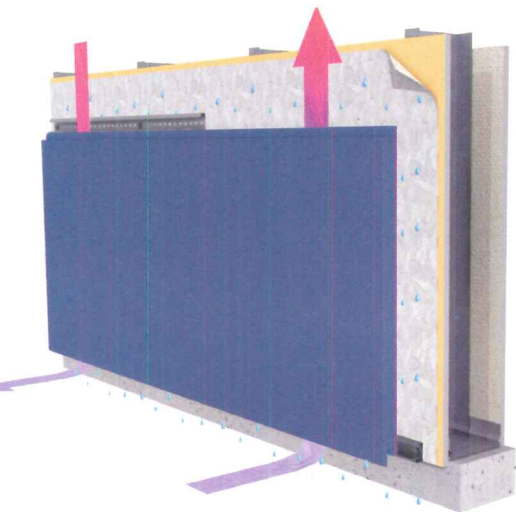


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ON THE COVER: FACEBOOK BUILDING 20, BY GEHRY PARTNERS. PHOTO BY JEREMY BITTERMANN.

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All in a Day's Work

Office design: a constantly changing landscape for architects.

THE WORKPLACE is an ever-evolving design challenge. With continuous upgrades in technology, advances in telecommunications and rising costs of commercial real estate, space for individual employees keeps shrinking—whether for assistants or executives. The average allotment per office worker fell from 225 square feet in 2010 to 176 square feet in 2012, and these days can go as low as 60 square feet. High-walled individual cubicles have given way to smaller, open cubes, and to benching and the temporary, flexible desk space known as hoteling.

But these trends don't necessarily mean that more people only work remotely—collaboration is the buzzword across many industries—and that means face time, as architects of offices know. For brainstorming or serendipitous encounters, they have been designing more conference rooms, breakout spaces, huddle areas, kitchens and snack bars, lounge seating, and stadium-style stairs.

Silicon Valley has been an influential leader in the recent move toward open-plan offices that foster collaboration. And tech companies were pioneers in creating all the amenities (free meals! on-premises dry cleaners!) that keep employees at the office nearly 24/7. In this issue, we're bringing you an up-close look at the gigantic new Facebook headquarters in Menlo Park, California, designed by Frank Gehry—a 1,500-foot-long, 433,000-square-foot structure with a huge roof garden and vast open-plan office space (page 86).

When Facebook founder and CEO Mark Zuckerberg visited Gehry's office early in the design process, the architect asked what kind of space he was looking for. Zuckerberg threw his hands in the air and said, "I want this!" Gehry's simple open office with lofty ceilings, in a converted warehouse near Los Angeles, inspired the Facebook design—though the tech company's enormous size, of course, meant the space had to be cleverly broken up, so it wouldn't "feel like an automobile factory," as project designer Craig Webb put it.

Architects have long thrived in open-plan offices, often adapting space in structures originally built for other purposes. We take a look at some extraordinary conversions for architectural offices, including a former warehouse for repairing naval gunboats in Copenhagen and a deconsecrated 16th-century church in Milan (page 74).

The next frontier for architects designing open office space today is dealing with ambient noise. Acousticians have tended to treat this problem in the past by masking it with white noise or, more recently, pink noise.

The current understanding is that what is especially distracting for workers is being able to clearly hear others' conversations. (For those speaking, the problem is lack of privacy. In a recent *New York Times* article about open-plan offices, an architect complained that everyone who sat near him had learned he was having a colonoscopy.)



The newest acoustical technology includes advanced systems of microphones and speakers that pick up a conversation but scramble the sound, so that someone a few feet away cannot "hear" it when it is emitted through speakers embedded in the space. According to Todd DeGarmo, CEO of STUDIOS Architecture, such systems mean that a group could hold a video teleconference in an open space without disturbing someone 8 to 10 feet away. This could reduce the need for all those enclosed conference rooms, yet such systems are so sensitive they could affect architecture in other ways, too. For example, a curtain wall would have to be designed to almost completely block street noise.

Meanwhile, ARCHITECTURAL RECORD is moving to new office space soon, so the editors will be able to test some of these ideas. On July 1, the magazine and its sister publications, *Engineering News Record* and *SNAP*, were acquired by BNP Media, a family-owned company founded in 1926, with headquarters in Troy, Michigan. The editorial staffs will still be based here in New York City. We plan on bringing you the best in architectural projects, trends, and news, through our print and digital platforms, as we always have, under the stewardship of RECORD's new owners. ■

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief



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Healing Environments: New Design Directions, New System Solutions

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Taking Sustainable Washroom Design Beyond LEED

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Achieving Higher Quality in High-Density Residential: The Strengths of Structural Steel

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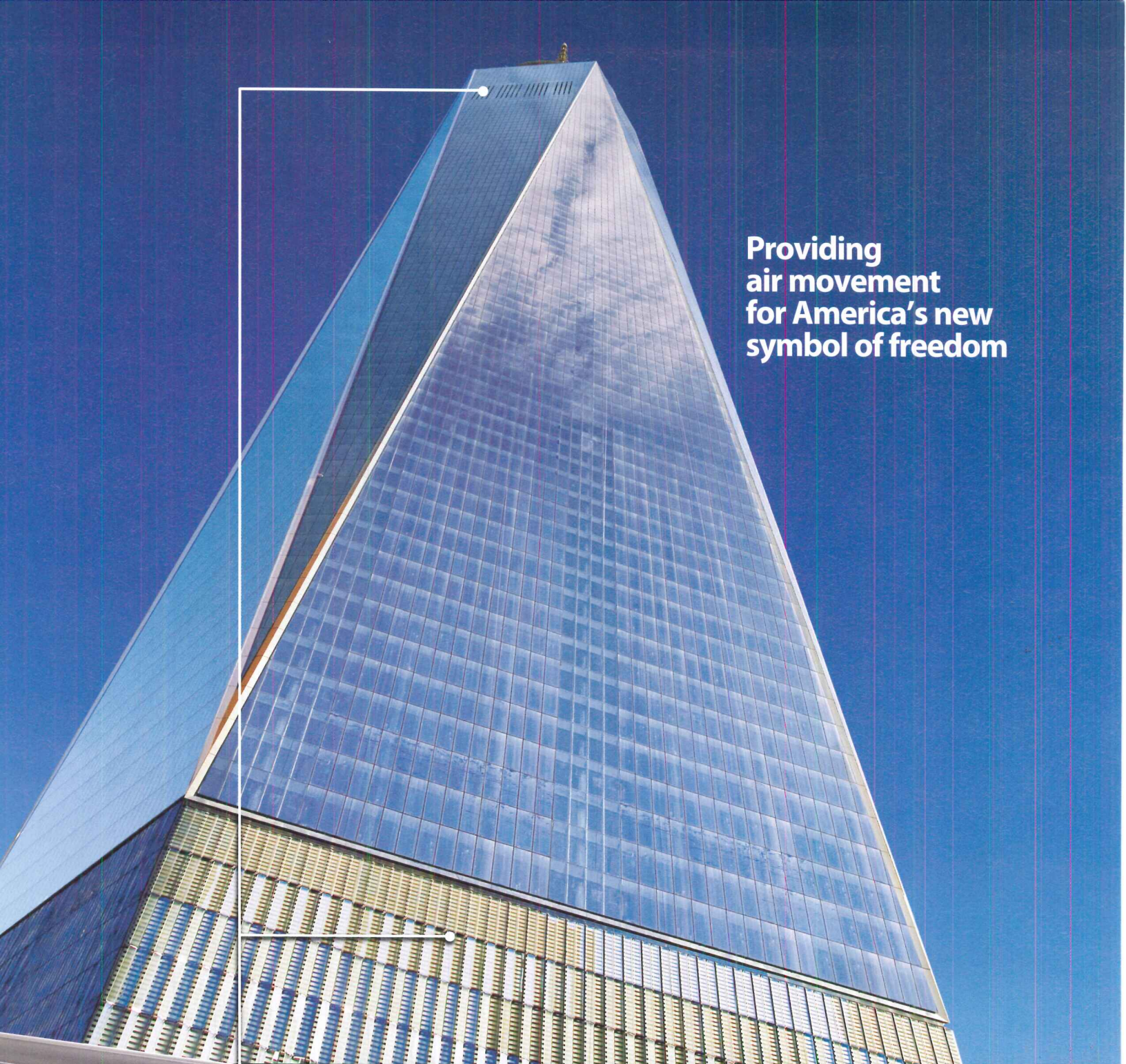
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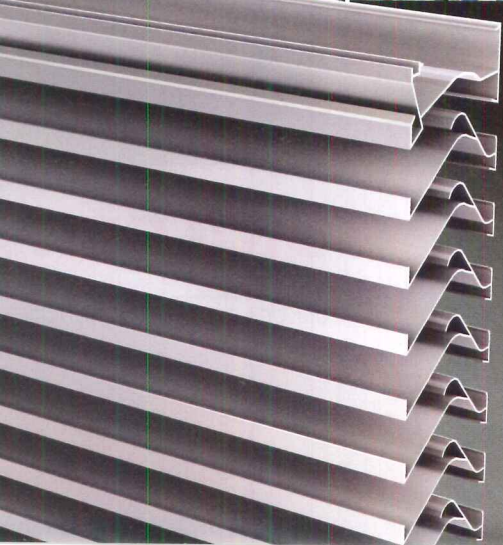
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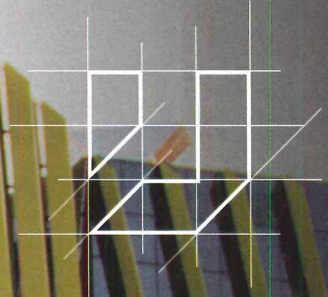
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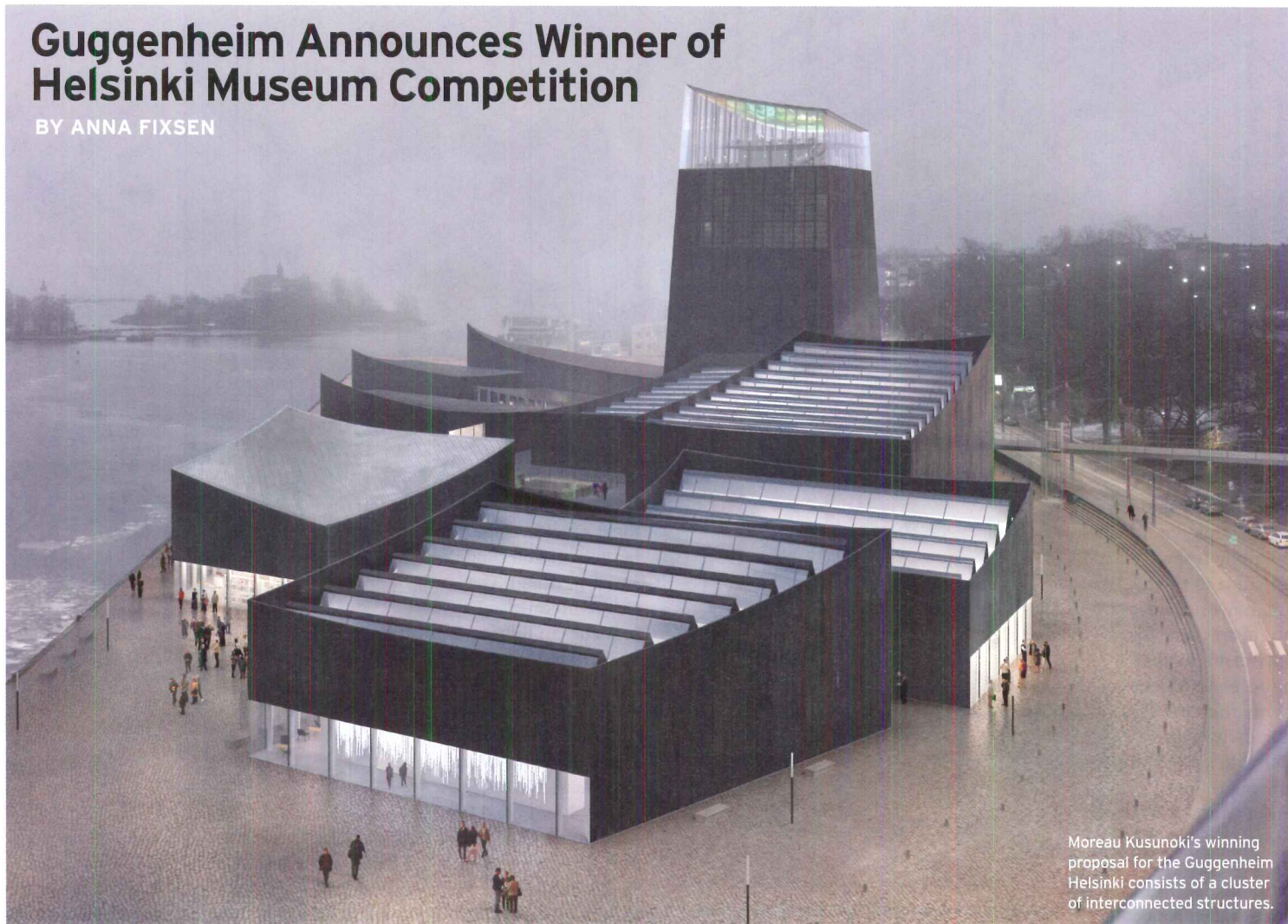
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... the form does pay homage to something more aesthetic – we're going to trust you've seen the music video for Beyoncé's "Ghost."

—Australian firm **Elenberg Fraser**, invoking the inspiration for its 68-story Premier Tower, in Melbourne, news of which rocked the internet the week of July 6

Guggenheim Announces Winner of Helsinki Museum Competition

BY ANNA FIXSEN



Moreau Kusunoki's winning proposal for the Guggenheim Helsinki consists of a cluster of interconnected structures.

THE SOLOMON R. GUGGENHEIM FOUNDATION announced the winning design for its proposed museum in Helsinki on June 23, a scheme of nine pavilion-like volumes designed by Paris-based firm Moreau Kusunoki Architectes. The international competition, which began just one year ago, attracted a dizzying 1,715 entries.

"Rarely has such a concentration of architectural intelligence been directed at a single design challenge," said Guggenheim director Richard Armstrong.

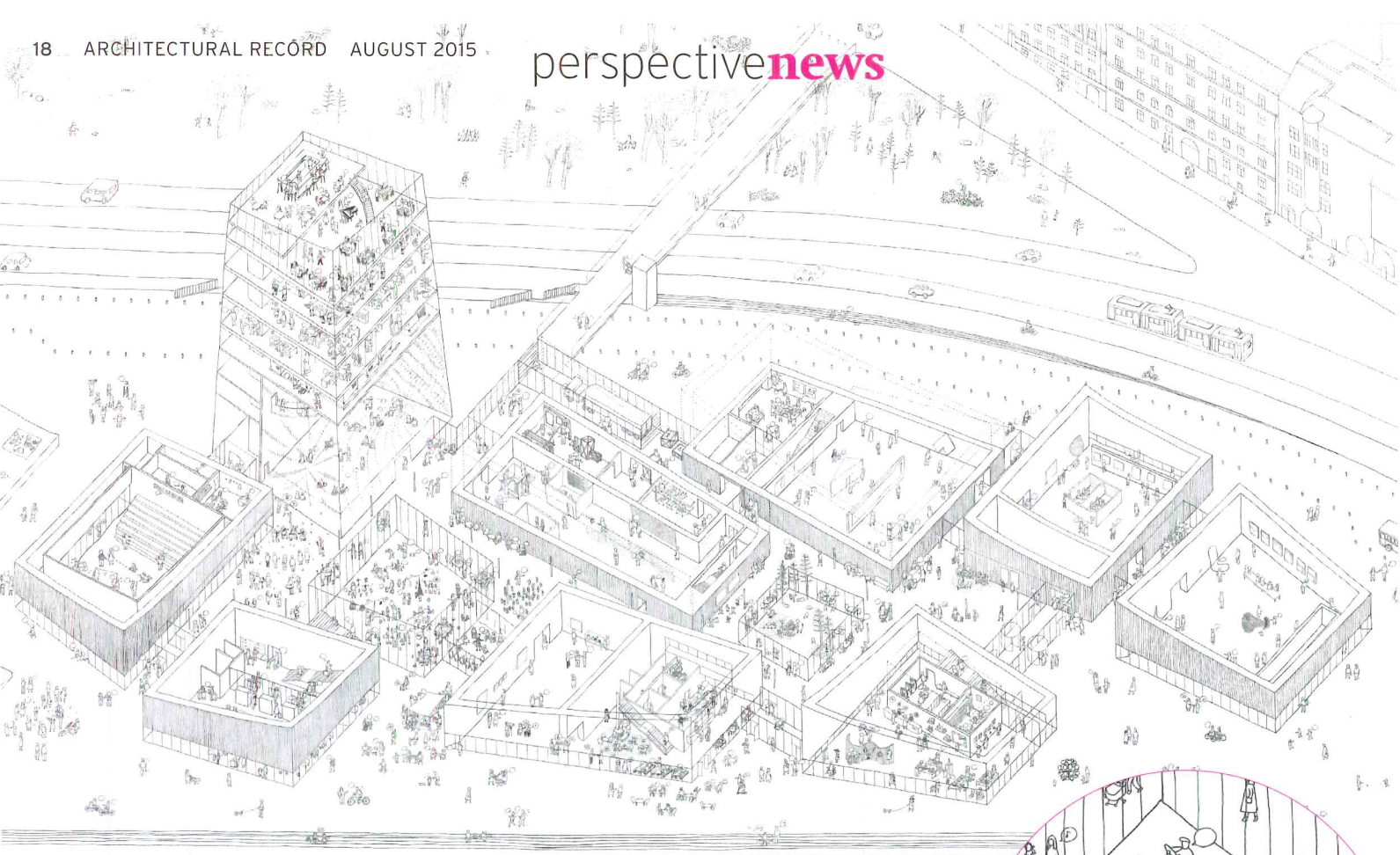
Titled "Art in the City," Moreau Kusunoki's winning design would occupy a waterfront site

along the Finnish capital's South Harbor, oriented along the city's grid. Rather than occupying a single building, the museum would consist of a cluster of independent structures clad in charred timber. The setup includes plazas and pathways, allowing gallery spaces to flow into one another, and culminates with a tower crowned with a glazed top. The site would also feature a new pedestrian bridge and be accessible by a port-side promenade.

The 11-member jury, which included Jeanne Gang, Mark Wigley, Juan Herreros, and others, selected six finalist designs in December,

which included proposals by Asif Khan Ltd., Fake Industries Architectural Agonism, Haas Cook Zemmrich STUDIO2050, SMAR Architecture Studio, and agps, which was eventually named the competition runner-up. Due to both Finnish and European law, the competition was blind, and all designs were kept anonymous. Moreau Kusunoki's design was known only as GH-04380895.

"The jury found the design deeply respectful of the site and setting, creating a fragmented, nonhierarchical campus of linked pavilions where art and society could



meet and intermingle,” the jury said in their statement.

Public responses in Helsinki to the project, however, have not been cause for optimism. In 2011, building a Guggenheim branch was narrowly rejected by Helsinki’s city council, and there is uncertainty about how the museum will be funded, given its estimated \$177 million price tag, which could be covered by private and public sources.

Ultimately, the funding “now lies with Finnish stakeholders at the local and national levels,” says a Guggenheim spokesperson. There are also concerns about the design itself, especially the lighthouse-like tower at the south end of the site. The architects made it lower for the second round of the competition.

But museum representatives are careful to emphasize that the winning design and the project have yet to be set in stone. In 2009, a proposed Guggenheim in Guadalajara, Mexico,



Nicolas Moreau and Hiroko Kusunoki (above) founded their firm in 2011. With the proposal, Kusunoki submitted hand-drawn architectural drawings (top and right).

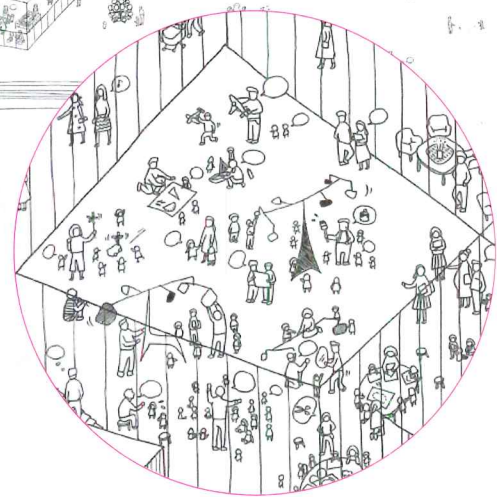
Kengo Kuma. The pair moved to Paris, where Moreau started Kuma’s French office in 2008.

“This great adventure brought us energy, joy, and dreams,” they said in a statement. “The adventure now continues with the Solomon R. Guggenheim Foundation, the people of Helsinki, and lovers of architecture and art.”

The architects approach their work with a refreshing dose of playfulness, as evidenced by a series of imaginative hand-drawn images created by Kusunoki for the competition along with

was canceled so that the institution could focus on efforts for a branch on Abu Dhabi’s Saadiyat Island. The Guggenheim also has branches in Bilbao, Spain, and Venice.

Until the announcement, Moreau Kusunoki was virtually unknown. Nicolas Moreau and Hiroko Kusunoki founded the 10-member firm in 2011. The two met in Tokyo, where Kusunoki worked in Shigeru Ban’s office and Moreau worked with SANAA and



conventionally computer-generated renderings.

These drawings, executed in a whimsical style, depict museum scenes in mind-boggling detail. In a section drawing, tiny visitors stroll the floors, dine in the “lighthouse” restaurant, and, in the garden square, chat, complete with miniature speech balloons. In a drawing titled *A Day at the Guggenheim Helsinki*, locals fish, picnic, and cycle along the seaside promenade, while museumgoers meander through the gallery pavilions and its numerous courtyards. One miniature visitor reclines beneath a miniature Castiglioni floor lamp.

The jury was evidently impressed: “The drawings were imbued with a sense of community and animation that matched the ambitions of the brief to honor both the people of Finland and the creation of the museum of the future.” ■

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CIRCLE 193



Proposed Bill Targets Relief from Student Loans

BY MIRIAM SITZ

A **BILL** headed for Congress this summer aims to relieve student-loan debt for architecture graduates, while attracting new talent to nonprofit firms and community design centers. The National Design Services Act, first introduced in March 2014 by Representative Ed Perlmutter of Colorado and reintroduced this session at the end of June, would give the Secretary of Housing and Urban Development (HUD) authority to create a loan-repayment program for certain architects.



Representative Ed Perlmutter of Colorado has introduced a bill to help architects repay student loans.

The American Institute of Architects (AIA) worked with Perlmutter's office and the American Institute of Architecture Students (AIAS), says AIA manager of federal relations Ian McTiernan, to "develop legislation as a way to address debt load." The effort followed a 2012 survey of AIAS members that found the average student-loan balance after graduation to be \$40,000 or more. "The program is modeled after opportunities for doctors or lawyers to use their skills for community service," he says.

Eligible architects would work for at least a year at a community design center—that is, a nonprofit managed by a licensed architect. Their work could include a wide range of community-development projects, including design of nongovernmental public facilities (libraries, schools, housing, health clinics, etc.), development or rehabilitation plans for blighted or deteriorating neighborhoods, preservation of historic sites, and retrofits for accessibility and energy or water efficiency. The HUD secretary would decide many other program specifics, including how to disburse funds (allocated by Congress) among applicants.

Korey White, 26, graduated from the University of Colorado Denver in 2013 with a dual master's degree in architecture and urban planning and works for Path21 Architecture in Denver. Toward the end of graduate school, White found herself at a crossroads: to pursue the traditional internship-to-job path, or to work on the nonprofit side of architecture. "I opted to go with the 'safer' choice—an internship—because I knew in six months I'd have to start making payments," she says.

"The debate around student loans has become a big issue," says Noah Marine, Perlmutter's legislative director, "and we want to be part of that overall discussion." The bill has six cosponsors and is seeking more. It was referred to the House Committee on Financial Services at the end of June; if it survives, it would head to the House floor once Congress reconvenes after its August recess.

According to Marine, the National Design Services Act could also potentially be added as a provision to the Higher Education Act—if Congress considers reauthorization of that law, which governs federal student aid. "In this environment, it's going to be difficult to move the bill as a standalone provision," said Marine, "but we will be savvy." ■



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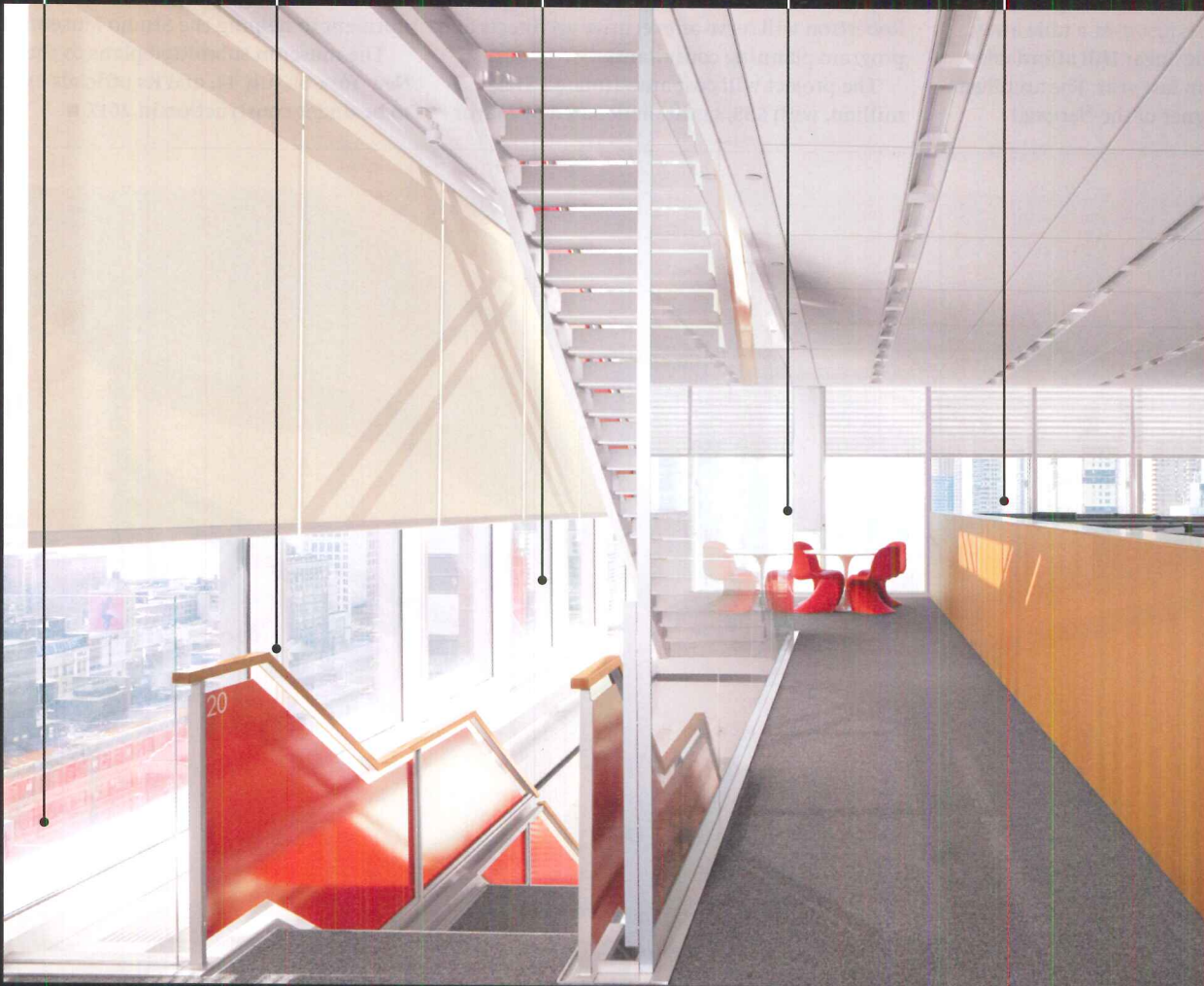
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David Adjaye Designs New Home for Studio Museum

BY ANNA FIXSEN

TO RING in its 50th anniversary, the Studio Museum in Harlem has unveiled the design for a new home by architect David Adjaye.

"[This project] is about a powerful urban resonance, drawing on the architectural tropes of Harlem and celebrating the history and culture of this extraordinary neighborhood," Adjaye said.

The Studio Museum, founded in 1958, is one of the most important institutions for contemporary African American art. In order to keep pace with the evolving Harlem neighborhood and to expand its programming, the museum trustees opted to tear down its existing facility—a 19th-century building renovated by the late African American architect J. Max Bond Jr.—with an entirely new one. They unanimously chose London-based Adjaye and Associates after an international search last year.

It's a fitting choice: just over a mile away, Adjaye completed the Sugar Hill affordable-housing development last year. The architect also is the lead designer of the National

Museum of African American History and Culture, opening in 2016.

Adjaye's proposal is composed of dark monolithic volumes—a style for which the architect is known—and, according to the museum, takes cues from Harlem's brownstone houses and churches, with a staggered facade and soaring atrium. The 71,000-square-foot building will increase gallery space by more than 50 percent and include a 199-seat "inverted stoop" for events, as well as a glazed lower level on 125th Street to welcome the neighborhood in with art visible to passersby. New York-based Cooper Robertson will serve as executive architects and program-planning consultants.

The project will cost an estimated \$122 million, with \$35.3 million donated by Mayor

Bill de Blasio's office, the City Council, and the Office of the Manhattan Borough President.

"For the last 50 years, the Studio Museum in Harlem has been a pillar for this community," said de Blasio. "The city's investment in the future of this organization signals our commitment to helping the Studio Museum grow."

The museum submitted plans to the City of New York on July 14, and its officials expect it to be under construction in 2017. ■



The Studio Museum in Harlem will replace its current facilities with a proposed building by David Adjaye. The five-story museum, inspired by the spirit of the surrounding neighborhood, will increase gallery space by 50 percent.

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CIRCLE 186

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[NEWSMAKER]

Nader Tehrani

BY FRED A. BERNSTEIN

NADER TEHRANI was born in England to Iranian parents and raised in Pakistan, South Africa, Iran, and the United States. He studied architecture at Harvard and the Rhode Island School of Design, and in 1986 he founded the firm Office dA with Rodolphe el-Khoury in Boston; Monica Ponce de Leon joined in 1991. After El-Khoury left in the 1990s and Ponce de Leon and Tehrani dissolved their partnership, Tehrani created the Boston-based firm NADAAA, which has designed schools of architecture at the Georgia Institute of Technology, the University of Melbourne, and the University of Toronto.

But that's not his closest connection to architecture education. Last month, Tehrani, who served as head of MIT's architecture department from 2010 to 2014, was named dean of the Irwin S. Chanin School of Architecture at New York's Cooper Union. The venerable institution has been in the news for its controversial decision to charge tuition for the first time in its 150-year history. New York State's Attorney General is investigating the school's financial management. But Tehrani says he plans to focus on academics. He spoke to **RECORD** by phone from Boston.

Thanks for taking the call. You're probably very busy.

No more, no less than on my regular days. **Which are like what?**

I usually get up with the sunrise, which is early this time of year. I run between 4 and 6 miles. I usually bike another 14 or 16 miles. I get into the office about 8:30. I try to block off the first two hours for working independently; then I do round-table meetings with the different teams in the office.

It sounds like NADAAA has a lot of work.

We have some very exciting projects, which have catapulted our practice from a small boutique firm to a much larger animal. But we're trying to keep it to about 40 people.

Will you continue to practice?

The premise of the appointment was to engage a dean who is trying to merge practice and pedagogy in meaningful ways. I don't mean a conventional professionalization of the curriculum, not at all; I mean looking at ways in which academic research can alter the way architects work.



I was told you won't talk about the school's financial situation.

It's not that I won't talk about it; it's just that I don't know anything about it. Simply said, it was not part of my education in the interview process. I've been in this seat for about one week. I will learn more as we go on. **Will the financial problems affect the quality of the program?**

Cooper did incredibly well this year in admissions. We did not need to go into the reserve, as it were—we got the top picks that we were after. Meanwhile, there's nothing in my budget that's been compromised. If anything, we've got a healthy discretionary fund.

The incoming students should be quite excited.

What have you learned from designing architecture schools?

You learn that no two architecture schools are the same. Their cultures, their philosophies, their finances vary a great deal. In extreme circumstances, it's almost as if you're comparing a school of agriculture with a school of dentistry. Having said that, there are some common issues. One is that the ideal of one person, one desk is

showing itself to be more and more unaffordable. We're researching alternative studios where scholarship and design get blended in the library, where making and design get blended in the fabrication lab, where exhibition and design get blended in the galleries.

What have you learned from visiting the Cooper Union building?

I had never been to the building before, except for a lecture in the basement. I found it's a great environment in which to learn. The heart and soul of the school is the third-floor design studio; from first to last year, everybody's in that same space.

Is your goal to strengthen the coherence of the school?

I want to maintain the intimacy of Cooper, but I'd also like to foster the productive friction we saw at, say, the Architectural Association when Alvin Boyarsky ran it [in the 1970s and '80s].

Both your former Office dA partners have new posts as deans, El-Khoury at the University of Miami and Ponce de Leon at Princeton. What do you make of that?

It's a great coincidence. But what unites us is that we were educated on the Harvard-RISD axis. My name means "from Tehran," but if you asked me where I was from, I'd have to say I'm from Harvard and RISD. ■

noted**Gehry's Eisenhower Memorial Gets Green light**

After a four-year federal process, the National Capital Planning Commission has approved Frank Gehry's design for the Dwight D. Eisenhower Memorial in Washington, D.C. The controversial \$142 million project still has no funding from Congress

Chicago's Marina City Granted Preliminary Landmark Status

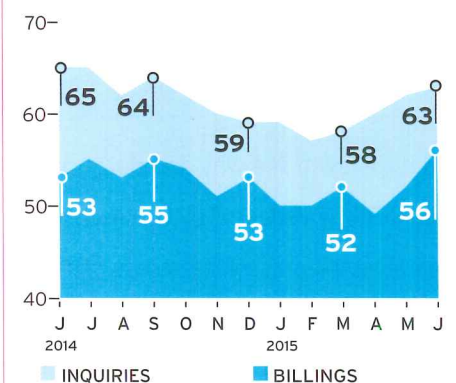
Bertrand Goldberg's iconic Marina City towers in Chicago received preliminary landmark status from the city's landmark commission July 9. According to the *Chicago Tribune*, the towers' owners need to give consent in order to attain full landmark status, protecting its exterior from alteration.

Paris Approves Herzog & de Meuron "Triangle"

Parisian officials have approved a controversial plan to construct a 42-story triangle-shaped tower in the city's Porte de Versailles area. The glass building, designed by Herzog & de Meuron, is the first tower approved in Paris in more than four decades.

Cornell Tech Breaks Ground

The first academic building at Cornell Tech, a \$2 billion campus on New York City's Roosevelt Island, broke ground June 16. The Weiss/Manfredi-designed building is one of three in Phase 1 of the construction stage expected to be completed in 2017.

**ABI Highest Since 2007**

June's Architecture Billings Index (ABI) climbed to 55.7, the highest since 2007, according to the American Institute of Architects. This is due to demand for large projects, including civic, health-care, and education buildings, according to the organization's economists. The new projects index also showed a 1.9-point improvement.

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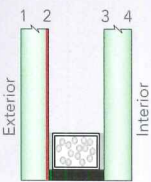
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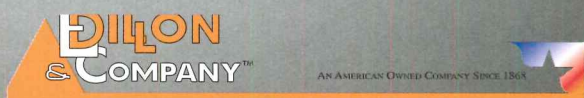


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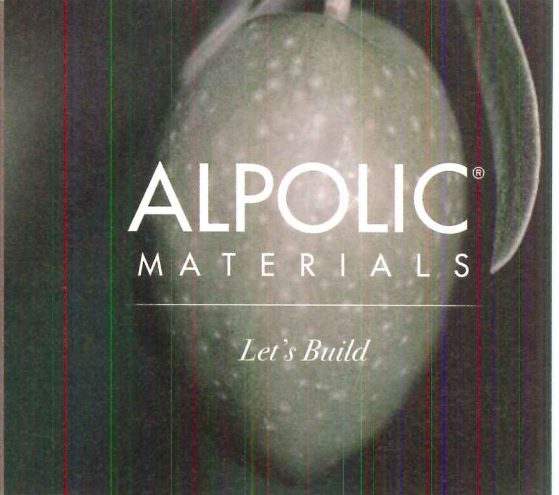
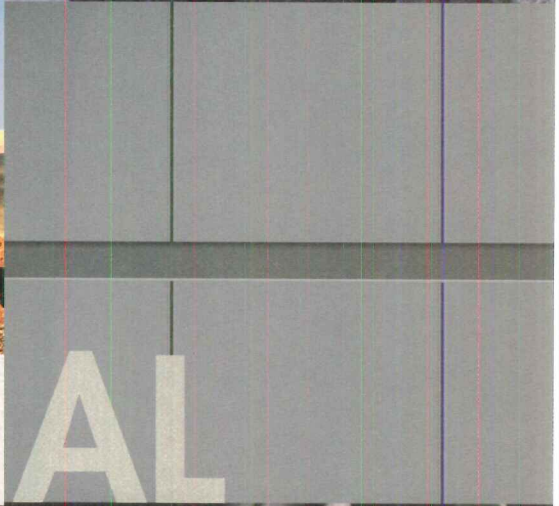
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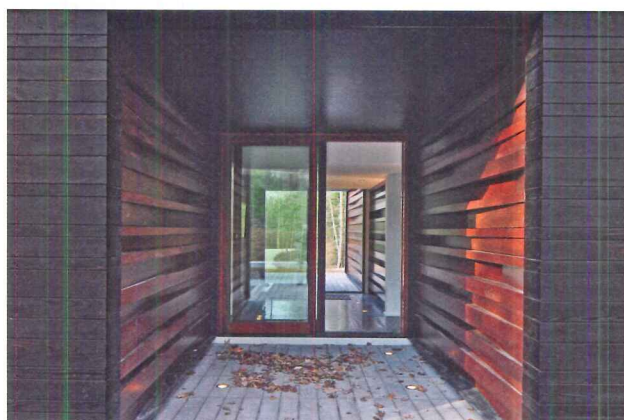
The living and dining areas (left) along the north side of the house adjoin a covered porch lined in board-and-batten (middle). Inside, a white steel stair (bottom) leads to the studio.

- 1 ENTRANCE
- 2 FOYER
- 3 DINING
- 4 LIVING
- 5 KITCHEN
- 6 STUDIO
- 7 PATIO
- 8 PLANTS
- 9 COVERED PORCH
- 10 SERVICES
- 11 GARAGE

AN EMPTY-NESTER couple desired a modest structure that pays “sincere deference” to its forest site on the Door Peninsula of eastern Wisconsin. The Milwaukee firm of Johnsen Schmaling Architects responded with a simple rectangular 1,850-square-foot volume nestled in a clearing on the 4-acre property. Its charred-wood siding echoes the texture and color of the closely surrounding tree trunks. “The challenge with this setting,” says Sebastian Schmaling, who designed the house with partner Brian Johnsen, “is tempering the inherently disruptive act of building in nature. We made an ambiguous boundary, one that softens the geometry and moderates the transition from artificial to natural.”

Called the Pleated House for its series of canted exterior surfaces, the low-profile building makes use of the ancient Japanese technique of charring cedar, *shou sugi ban*, for its main volume. The high-performance material withstands fire and acts as a sealant-free preservative against rot and insects. It also serves as a breathable rainscreen that protects the underlying thermal envelope from solar exposure and moisture.

The architects carved out the entrance in the rectangular mass to make a trellised forecourt that leads to the vestibule. They gave the sequence definition with walls of milled varnished

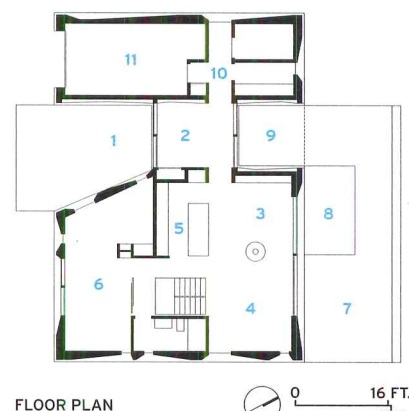


lumber, stacked at slight angles that reverberate in deep relief with the board pattern wrapping the building. The vestibule connects to a covered porch in the rear, where an expansive patio extends the width of the living and dining areas.

There is a quiet tension in this sylvan retreat, by design. The interior materials—in contrast with the dark, tactile exterior—are white for walls, cabinets, and a steel staircase, with a gray polished-concrete floor. An expansive vegetated roof (which, among other green virtues, relieves runoff) visually connects the second-level master suite to the ground. Most striking is the master suite itself—a glazed and varnished-cedar-board box the red-brownish color of the entry wall and of fall foliage—expressed as an object separate from the main structure beneath it.

“This house is about a reasoned manipulation of volume and skin,” notes Schmaling. “Rather than create form that justifies itself, we push a formal vocabulary rooted in a fundamental contextuality.” ■

Therese Bissell is an architectural writer and editor who is based in San Francisco.



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CIRCLE 201

Thomas Heatherwick

A leading designer discusses his thoughts on the creative process.

BY SUZANNE STEPHENS

SINCE THOMAS HEATHERWICK conceived his puffy UK pavilion (known as the Seed Cathedral) for the Shanghai World Expo in 2010, his London-based firm, Heatherwick Studio, has been on a roll. Its design for a park on Pier 55 on the Hudson River in New York (funded mostly by Barry Diller, the head of IAC/InterActiveCorp) has attracted attention—and stirred controversy. Up the river, at the mixed-use Hudson Yards project, Related Properties plans to enliven the public space with a “monumental sculpture” by Heatherwick (details to come). Recently, Heatherwick and the Danish architect Bjarke Ingels of BIG have teamed up to design Google’s headquarters in Mountain View, California. Heatherwick is also working with Foster + Partners on the Bund Finance Centre in Shanghai, currently under construction.

And, now until January 3, the retrospective exhibition *Provocations: The Architecture and Design of Heatherwick Studio* is on view at the Cooper Hewitt, Smithsonian Design Museum in New York. Curated by Brooke Hodge, the show was organized by the Nasher Sculpture Center in Dallas in 2014, then moved to the Hammer Museum in Los Angeles before arriving in New York. Heatherwick spoke to RECORD just before the exhibition opened on June 24.

ARCHITECTURAL RECORD: Your designs embrace an impressive range of work—sculpture, architecture, infrastructure, urban design, interiors. Yet they vary greatly in style: you wouldn’t walk into the sleekly luxurious Longchamps store in Soho (RECORD, September 2006, page 134) and say, “Oh, that’s a Heatherwick.” And the same goes for London’s quirky Rolling Bridge (2004), or the streamlined New Routemaster bus (2012).

THOMAS HEATHERWICK: We never try to have a style; we analyze the place and invent a solution for it. We want to rethink the problem. For example, with the cauldron commissioned for the 2012 London Olympic Games, we were motivated by the way it was lit. It led us to create 204 small copper artifacts, each with a flame, which formed one giant kinetic sculpture. We wanted the cauldron to mean something to so many people coming together.

So much of your work is architecture, including the organically curvilinear concrete



The Learning Hub for Nanyang Technological University in Singapore opened early in 2015. Heatherwick worked with local architects, CPG Consultants, on the design for the poured-concrete cluster of eight-story zucchini-shaped towers.

Learning Hub for Nanyang Technological University in Singapore, which opened this year. Yet you are not an architect.

Of the 170 people we have in the studio, 114 have architectural training. I studied three-dimensional design—in wood, metal, and plastic—at Manchester Polytechnic [now Manchester Metropolitan University], which helped greatly in my approach to architecture. At the Royal College of Art [where Heatherwick got an M.A.], I soon realized the benefits of collaboration.

How does that feed into your creativity?

Creativity is not a solo thing—it’s collaborative. Every project, from a power station to a London bus to a part of the city, is something we methodically research and analyze.

Then how do you arrive at a solution?

For me, there is no clichéd notion of inspiration. I resist even the word inspiration. Everything is solving problems, but you need to believe in the problem. And you need to ask, is this the right question? If you figure out the real question, *that’s* the provocation—you are almost there with the solution. It’s like solving a crime: you investigate clues to get to the real answers; you narrow down the inquiry by seeing what you should and shouldn’t be doing. At some point, you say, “That’s it!” It is through discussions you come to that moment.

What about the varied scale of your projects? Many architects can’t easily leap from a piece of furniture to a skyscraper.

Bigness has a smallness: ideas don’t really have a scale.

What else do you need to come up with ideas?

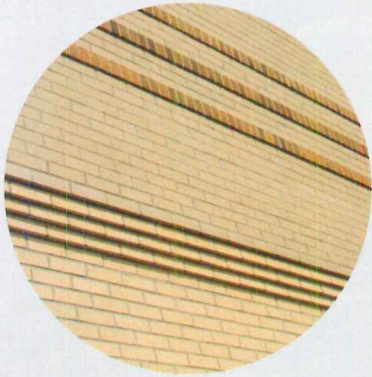
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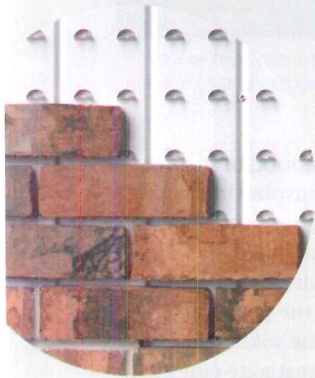
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CIRCLE 173

Last call at Tokyo's Hotel Okura

A midcentury classic closes this month, and much of it will be torn down.

BY NAOMI R. POLLOCK, AIA

WHEN THE Hotel Okura in Tokyo shuts its doors at the end of August, legions of former guests and architecture aficionados worldwide will mourn—myself included. It was here that I stayed on my very first visit to Japan in 1982. The uniformed bellmen with their pillbox hats were my first encounter with Japanese hospitality. Breakfast in the Orchid Room was my first taste of Japanese produce—white peaches painstakingly peeled to perfection. And the building itself was my first experience of the country's magnificent architecture. A masterpiece of Midcentury Modernism with traditional Japanese overtones, the Hotel Okura is in a class of its own.

Completed in 1962, the hotel implicitly heralded the end of Japan's post-World War II reconstruction and the start of its growing role in global affairs. Designed under the aegis of the architect Yoshiro Taniguchi—the father of Yoshio Taniguchi, who renovated the lobby a few years ago—it was intended for the growing number of international visitors.

The building's Y-shaped plan guaranteed views from each of its 550 guest rooms and an exquisite palette of exterior materials, such as decorative *namako* wall tiling, with its puffy plaster grout patterned in traditional motifs, quoted directly from Japan's architectural heritage. Continuing that theme inside, the lobby evoked the spirit of old Japan but in a fresh way—with lighting fixtures reminiscent of paper lanterns, windows partially clad with shoji screens, and a generous use of wood.

Amazingly, that space has stood the test of time and remains one of the very best lobbies in town. But, over the years, much of the hotel's interior, including its guest rooms, has been renovated with little more than a polite nod to the past. Ditto many of its restaurants. And although well detailed, the cavernous, subterranean function halls never were all that enticing. In light of these circumstances,



Located in the Akasaka area, near the U.S. embassy, the hotel opened in 1962 and was designed by Yoshiro Taniguchi and Hideo Kosaka. Its use of decorative *namako* wall tiling on the exterior (left) and light fixtures reminiscent of paper lanterns in the main lobby (below) blends modern and traditional themes.

century buildings are concerned, nostalgia, or even the yearning for a connection to the past, is very un-Japanese. Mitsuyo Katayama's iconic 1964 Olympic Stadium, a more populist symbol of Japan's postwar rebirth, is a case in point. Last summer, prior to the start of its dismantling—and before construction begins on Zaha Hadid's stadium, which will replace it—a “sayonara ceremony” was held, after which the country was expected to pick up and move on.

Though it is very hard to see beloved buildings go, Tokyo's organic brand of urban renewal is one explanation for the city's vitality. Tokyo thrives on an endless cycle of replacing the old with the new, bit by bit. Here demolition is practically inevitable, and rebuilding is a way of life. In part, this is due to Japan's appetite for the new and, in part, because of the city's limited buildable area. In

concrete terms, there is simply no room for nostalgia.

Fortunately, the son of the hotel's original designer is spearheading the building's redevelopment. While images of the new hotel have yet to be revealed, it seems probable that Taniguchi the younger will respect the legacy of his father's masterpiece. Furthermore, he is the author of some of the most elegant architecture



how much of the building truly warrants saving? Is it a truly significant work of architecture?

Perhaps the sadness over the hotel's imminent demise is being compounded by nostalgia. On the surface, the hotel is a charming throwback to an earlier time. Undoubtedly the loss of that sense of history is difficult to bear. But let's consider that in context: where 20th-

in Japan today. Many of these works blend contemporary design with Japanese aesthetics even more effectively than those of his father. Crossing my fingers, I would like to think that the new Okura is in good hands.

Don't get me wrong: I am deeply saddened by the loss of Tokyo's iconic hotel. But, for better or for worse, hanging on to it just isn't the Japanese way. ■



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The answer to the July issue's Guess the Architect is **FREI OTTO**, who designed the Diplomatic Club Heart Tent in 1980, a cable-supported structure in the gardens of the Tuwaiq Palace, Riyadh, Saudi Arabia. For more details, including the winner, go to guessthearchitect.com.

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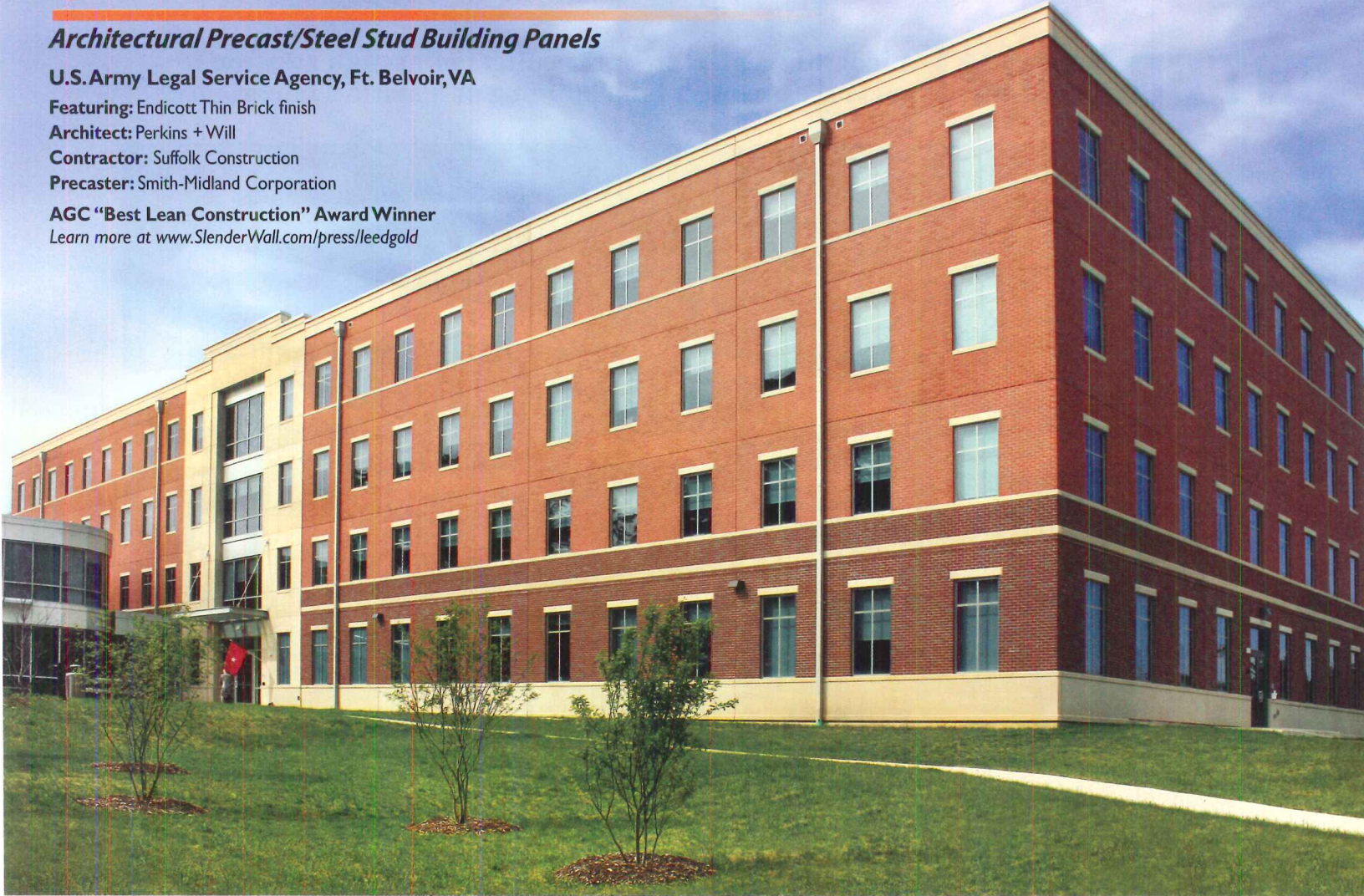
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CIRCLE 174

Ganges Water Machine: Designing New India's Ancient River, by Anthony Acciavatti. *Applied Research + Design Publishing, March 2015, 402 pages, \$50.*

Reviewed by Martin C. Pedersen

ANTHONY ACCIAVATTI'S book *Ganges Water Machine: Designing New India's Ancient River* is an insanely ambitious piece of field research. Starting in 2005, the New York-based architect and author began crisscrossing the most populous river basin in the world, traveling on foot and by boat, with a camera and hand-held GPS unit, documenting cities, towns, and villages, as well as infrastructure and agriculture. Dismayed to discover that the most recent maps of the fabled river dated back to the 1960s, he set out to chart the route from its source at the Gangotri Glacier in the Himalayas to the city of Patna, taking more than 25,000 photographs, filling 15 sketchbooks, and creating some 350 maps. Originally, Acciavatti set aside a year to do it. The resulting book, produced nine years and many trips to India later, is what he calls a "dynamic altas," a dense, historical, visually rich look at the ecological and spiritual heart of India.

Like all great rivers, the Ganges has a deep history of commerce, conflict, culture (including some stunning buildings along its path), colonial and postcolonial politics, and myth-making—of virtually everything, in other words, that humans do when they are drawn to water to form cities and towns. In India, that connection is even more intense: "Every 12th year, the sleepy university town of Allahabad is transformed into a colossal tent city populated by millions of pilgrims for the Kumbh Mela (literally Pitcher Celebration)," writes Acciavatti. "And it all seems to happen so fast. The waters of the Ganges and Jamuna slowly recede after the monsoon. A city grid is tattooed into the banks and shoals at the Sangam. Tents and temples pop up in October. Pontoon bridges stretch from one bank of the Ganges to the other and pilgrims begin to arrive in January."

Despite the river's spiritual hold on India, the Ganges is also, according to Acciavatti, "one of the most engineered spaces on the planet." It is, indeed, the huge water machine

of the book's title. In the 19th century, the vaunted genius of British engineering took on the winding, flood-prone river, creating a vast network of irrigation canals, aqueducts, bridges, and power stations. This partial taming of the river, which floods annually during the monsoons, was both beneficial (improving access to water and increasing farm output) and overtly political (controlling the river, ultimately, meant you controlled the colony). In the long history of the river that frames much of the book, Acciavatti repeatedly points out the political dynamic underscoring the origins and the continued evolution of the Ganges water machine. Now, as always, water is power.

In addition to his own physical survey of the river, the author has done great work as a documentarian, finding dozens of rare maps as well as cultural and historical images from archives all over the world. Combining the

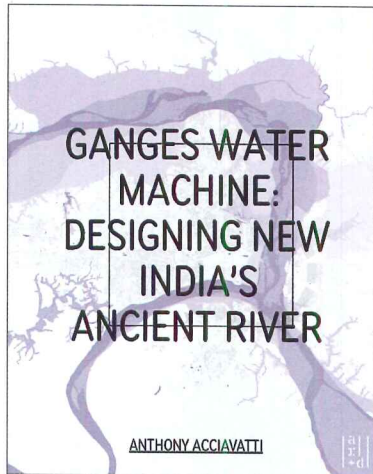
two approaches creates an intriguing blend of field research and history lesson, giving the large, lavishly designed book (executed by Julie Ostrow) its contemporary atlas-almanac feel. It's a handsome tome and a striking physical object.

Although the book feels in some ways comprehensive, there's no way it ever could be, given the bottomless depth of the subject matter. And therein lies a problem: *Ganges Water Machine* manages to be

highly visual (the last 80 pages or so contain a series of "transect" montages, with minimal copy) and extremely dense at the same time. It's not a casual read, and, in places, a full appreciation of the material appears to require some expertise on the part of the reader. The book, in fact, would have greatly benefited from more extensive captioning for many of the images shown. Missing also is a fuller explanation of what climate change might mean for a region so inextricably tied to the seasons.

Still, Acciavatti has produced an impressive work of original research—one that should be of keen interest to the Indian government and the World Bank as they embark on their \$1.5 billion cleanup of a murky, mystical river that manages to be both India's heart and its soul. ■

Martin C. Pedersen is a New Orleans-based writer and editor and the former executive editor of Metropolis magazine.



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My Beautiful City Austin, by David Heymann. John M. Hardy Publishing, November 2014, 176 pages, \$24.

Interruption of the Cocktail Hour: A Washington Yarn of Art, Murder, and the Attempted Assassination of the President, by Arthur Cotton Moore. CreateSpace Independent Publishing, February 2015, 146 pages, \$12.

Reviewed by Peter M. Wheelwright

ARCHITECTS ARE, by nature, storytellers; they tell stories to their clients, to each other, and occasionally to a credulous public. Typically, these are stories about what buildings can do, or how the “sense of a place” matters, or how their own professional or socio-artistic practice can deliver on such things. So what happens when no one listens?

My Beautiful City Austin by the Texas architect David Heymann, and *Interruption of the Cocktail Hour: A Washington Yarn of Art, Murder, and the Attempted Assassination of the President*, by the Washington, D.C., architect Arthur Cotton Moore, are works of fiction and, as their titles suggest, both hit close to home—not only in terms of locale, but also in their bemused accounts of the vicissitudes of architectural practice.

Heymann’s book is a collection of seven short stories set with affectionate humor in the Texas capital—poignantly charming meditations on the place, the people who “keep it weird,” and a young architect’s attempt to make sense of them both. The author’s descriptions of the natural landscape, the quirky university town, and the changes that bad client decisions make to each are beautifully done, as is his touching acceptance of a fledgling professional practice as it emerges from wounded ideals.

Narrated in the first person with the insight and intimacy of journal entries, each story stands on its own, but all take the architect-client relationship as their theme. This could be tiresome if the author were a complainer, but his stories are generous, with a wry, head-scratching marveling at how, and in what kind of architecture, some folks choose to inhabit the land: “Landscapes change and their paths ignore whiners . . . People do not, I told myself, build with maliced intent. They build to be happy, and it was only my problem that I

didn’t get their happiness. I looked out over that brightening vast emptiness, steadied myself, and saw my busy future.”

If Heymann’s stories are sweetly sobering, Moore’s “yarn,” set in the nation’s capital, is just that: a raunchy over-the-top tale told while whittling a swizzle stick in the bar of the Watergate Hotel.

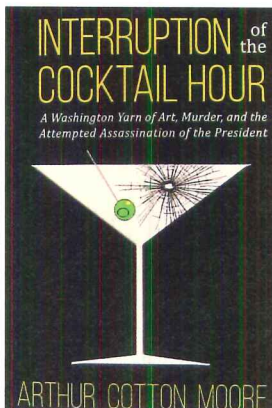
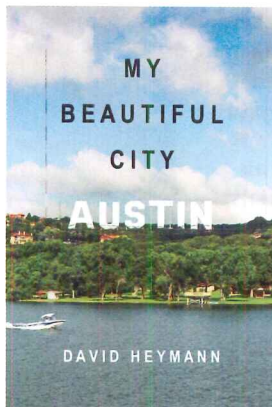
Moore’s boozy, philandering, and self-deluding protagonist is A. Pierpont “Pete” Preston—failed architecture student, failed painter, and failed scion of Washington’s social aristocracy. Living in self-imposed exile among the “fat, a bit dim, and rather toothless” locals of fictional Scapoosa County, Maryland, Pete is out for revenge against those he believes responsible for his fallen state.

When he accidentally acquires a killing machine, in the quaint form of a handheld calculator triggered by the numeral 5, carnage ensues, some of it humorous, some not so (the physics are never explained, but the point-and-press device guarantees a fatal coronary in its target). After offing a snooty art critic, a gallerist, his imperious mother-in-law, and a few others of the “grisly gaggle of wretched malcontents and dysfunctional borderline members of humankind,” Pete poses as an architect in one final gambit involving the President’s bisexual chief of staff. Enough said; no spoilers here.

Moore’s relentless wisecracking (Jerry Rigg Concrete Company, Teeter Totter and Down Structural Engineers) and sardonic inside jokes (Stanford White appears as Stanford A. Brown, aka “Stumpy”) can be exhausting. Where Heymann’s city of Austin is rendered tenderly as refulgent, Moore’s Washington and its denizens are roasted with a flamethrower.

In the endnotes to *My Beautiful City Austin*, Heymann writes, “This book is entirely a book of fiction. To my beloved clients: rest assured you do not appear in these stories.” I do not believe him, but it doesn’t matter. Either way, both his and Moore’s book will affirm for all architects the absurdity of their own encounters with real-life practice. ■

Peter Wheelwright is an architect and former chair of architecture at Parsons School of Design. His novel, As It Is on Earth, received a 2013 PEN/Hemingway Honorable Mention for Literary Excellence.



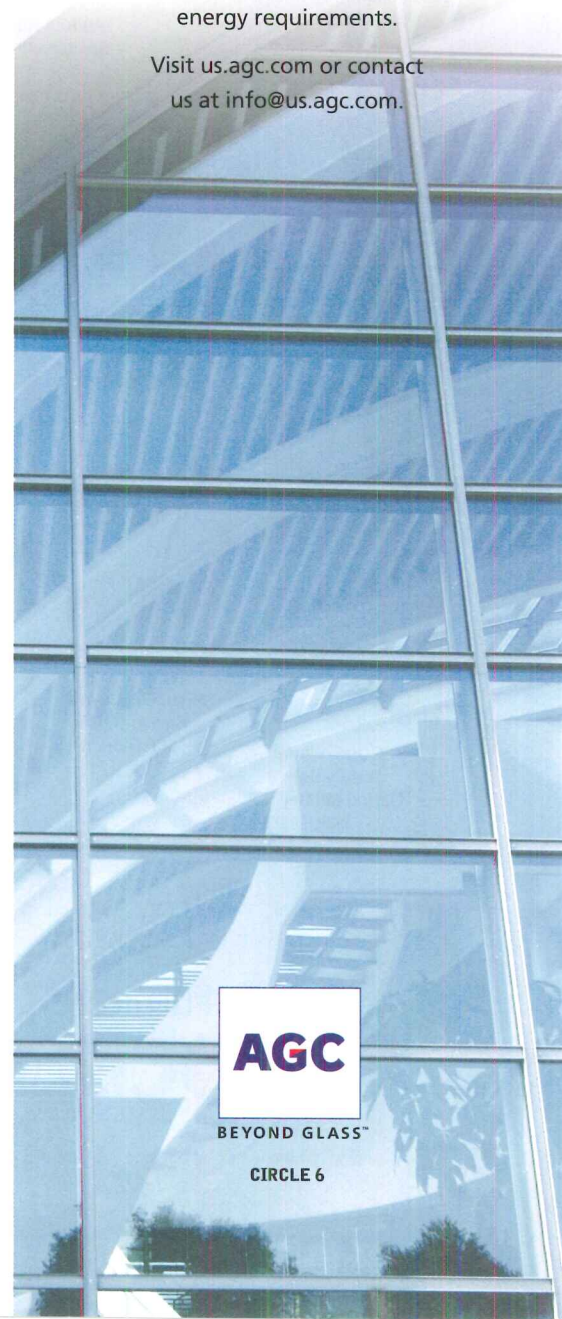
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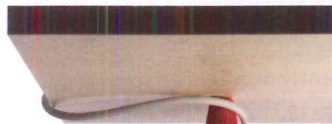
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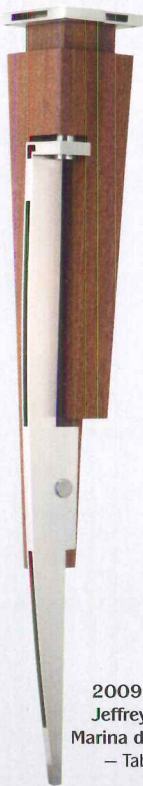
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An Eames Anthology, by Charles and Ray Eames, edited by Daniel Ostroff. Yale University Press, April 2015, 392 pages, \$50.

Reviewed by Zachary Edelson

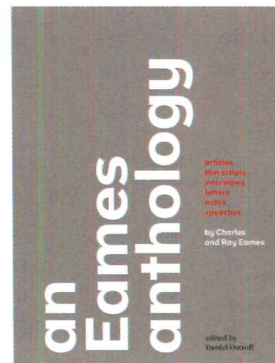
DESIGNING A chair is an eternally tempting but precarious prospect: the humble seat, legs, and back must resolve the essential challenges of structure, function, form. And the end result is inevitably compared to a canon of predecessors. How is it, then, that Charles and Ray Eames produced a number of iconic chairs, while also leaving their mark as architects, filmmakers, educators, and industrial designers? A new collection of historical materials, titled *An Eames Anthology*, attempts to delve into the Eameses’ body of work to discover the methodology and ideas that drove their designs. Edited by writer

and curator David Ostroff, the book contains a range of texts including letters, interviews, lectures, and more. Some documents are previously unpublished; Ostroff did extensive research and editing to discover and distill the anthology’s contents.

While heavily text-based—relying on the Eameses’ words to best communicate their thoughts—the book includes ample historic photography and doesn’t feel dense. It covers the couple’s work from 1941, when they met at Cranbrook, to 1986, not long before Ray died. But the Eameses are well known to designers everywhere, so the book raises the question: is there new information to be gleaned from these documents?

Ostroff does not investigate each Eames creation but rather focuses on the how and why of their practice, slowly building a surprisingly consistent portrait of

the two designers’ collective mind-set. While these texts do touch upon the breadth of the Eameses’ work—furniture, architecture, media, and more—they do so at vastly different levels of resolution. For instance, a few lengthier documents delve into the details of their design process, right down to how they selected a particular material to serve as a shock absorber on a plywood chair. Other texts are more conceptual; in one interview Charles explains the relationship between art and design: “One could describe design as a plan for arranging elements to accomplish

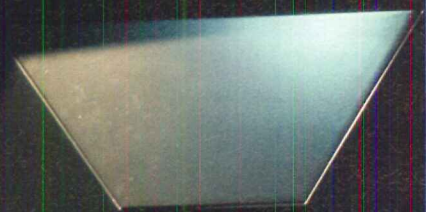
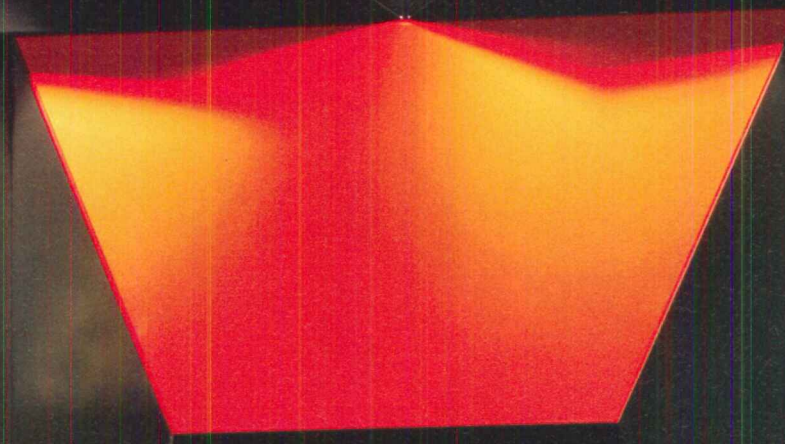


a particular purpose . . . It may, if it is good enough, later be judged as art.” Some lessons are more quirky and idiosyncratic, such as one lecture that briefly explains the unique qualities of driftwood as “the result of elements working with a consistent attitude on a given

material,” so that it becomes a wonderful new thing.

For those already familiar with the Eameses’ lectures and writings, small tidbits do emerge that could only be gleaned by reading these otherwise dispersed texts. For instance, by virtue of repeated mention, it becomes clear that Leonardo da Vinci was an often-present figure in Charles’s thoughts. Similarly, the challenge of creating a drinking vessel—in terms of fluid dynamics, thermal properties, texture, fit in one’s hand, etc.—is a frequent trope for Charles in defining a designer’s role. As these examples indicate, Ray’s voice appears infrequently in the anthology, despite her essential and omnipresent role in the couple’s work. That aside, *An Eames Anthology* crafts a substantial portrait of the designers’ perspectives, ideas, and methodologies. ■

Zachary Edelson is an art and architecture journalist in New York.



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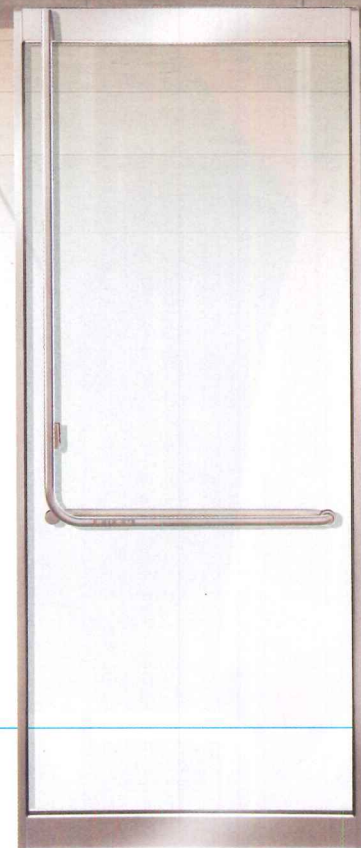
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LEFT TO RIGHT: SHIFT GRIP, FLUTE BY THE ROGER THOMAS COLLECTION CABINET PULLS AND DOOR HARDWARE

Back to Basics

An Ecuadorian firm builds both structures and community.

BY ANNA FIXSEN

CONTEXT MATTERS to Al Borde, perhaps to an extreme: for a house embedded in the side of a volcano, the Ecuadorian architecture firm conducted a traditional ceremony to ask the mountain permission to build there; they've also constructed a one-room schoolhouse from materials found on-site, with a budget less than the cost of a kitchen sink.

This four-member firm—David Barragán, Pascual Gangotena, Marialuisa Borja, and Esteban Benavides—takes a homespun approach to design, creating community-oriented structures in a manner that is profoundly populist and devoid of fixed dogmas. It is fitting, then, that Al Borde is Spanish for “at the edge.”

“If you are in your comfort zone, you will never try something different or know your limits,” says Barragán.

Barragán, Gangotena, Borja, and Benavides met at Pontificia Universidad Católica del Ecuador, in Quito. They noticed that while there was plenty taught about the architectural legacy of the U.S., Europe, and Japan, Latin America was disappointingly underrepresented. They also were acute-

ly aware of Ecuador's tumultuous political and economic past: a severe financial crisis in 1999 and a subsequent coup d'état left the country in upheaval, the impact of which is still felt today. The four architects thought there was little use in ignoring those circumstances; perhaps they could create an architecture for everyone.

“In order for architecture to be the link between our society and the world we live in,” they note, “we have to open ourselves to society and especially to its problems.”

Al Borde's first project after the firm's formation in 2007 was the volcano house, Casa Entre Muros (House Between Walls), a low-slung adobe building for a private client. Soon after, the firm began taking on community-oriented work. A 2012 project, for instance, commissioned by the Ministry of Heritage, called Vagon de Saber—the Knowledge Train—transformed an old boxcar into a mobile center for culture. Other projects have included a pavilion for traditional Ecuadorian performance, and a movie theater.

Perhaps the project that most typifies Al Borde's design ethos is its Esperanza, or Hope, series in Manabi, a coastal village in rural Ecuador. In 2009, they were asked by a local teacher to design a one-room schoolhouse and community center. Relying on traditional construction techniques and materials, including palm branches and wood, and enlisting the community to help, they executed the



Al Borde (left, top), works within existing architectural frameworks for their projects, such as with their Nueva Esperanza school (above) or a community pavilion designed with PICO Studio called Espacios de Paz (below), and the conversion of a boxcar into a performance space (left, bottom).

project with a budget of \$200. Two years later, they completed an extension there for \$700, Esperanza Dos (RECORD, March 2012, page 72). In 2013, they embarked on Ultima Esperanza—Last Hope—a program to teach villagers to be their own architects. This humble project was a finalist for the London Design Museum's 2015 Architecture Design of the Year awards, alongside projects by Frank Gehry and Herzog & de Meuron.

In spite of their recent success, Al Borde's brand of work is tough for the firm financially. Barragán admits, “We never know at the end of the month if we will have a salary.” But they have sustained themselves with commissions, grants, and teaching. In October, they will unveil an exhibition-based project at the Chicago Architecture Biennial.

“We like to have a debate about what we are doing and why,” says Barragán. “Maybe our next project will be completely the opposite of what we're designing today.” ■



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Under the Big Top

Google's radical proposal for flexible offices includes stackable modular components.

BY JAMES S. RUSSELL



SINCE IT was founded in 1998, Google has hardly been a pioneer in office architecture. But, last March, the company submitted a proposal to the city of Mountain View, California, that radically reimagines the concept of the suburban office park. The extraordinarily innovative 2.5 million-square-foot project, designed by a team led by Bjarke Ingels Group (BIG) and the Heatherwick Studio of London (page 33) is composed of four immense, translucent tent-like buildings—a far cry from the many spec office buildings Google currently owns and occupies in Mountain View. Since 2004, its main headquarters, known as the Googleplex, has been in a corporate office park originally designed by STUDIOS Architecture (a member of the BIG/Heatherwick team) for Silicon Graphics and completed in 2000, then refitted by Clive Wilkinson.

Unfortunately, the city of Mountain View has only approved 500,000 square feet of the BIG/Heatherwick plans, one fifth of the proposal. While the architectural team continues to work on the design—perhaps to take it to another site, though no one is commenting—it's worth studying the original, to see how Google has come up with an entirely new idea for the office of the future. The hugely ambitious design breaks open the hermetic office

The enormous tentlike structures (below) would stand outside the stacked workplace modules (above) and admit daylight and allow ventilation. The tent membrane is designed as a lightweight two-layer system with an insulating airspace between. In the cavity, umbrella-like elements would open or shut to control light and shade.



park, dramatically lowers energy use, and invents demountable structural components that could vastly simplify future renovations or retrofitting.

These innovations could transform architecture.

For the four buildings, Google proposed to demolish more than a dozen of the aging spec structures the company is occupying and to replace acres of surface parking with extensive landscaping, public space, and a restored waterway. With city incentives to reduce commuting by single-occupancy vehicles, 4,700 bike-parking slots—but only 2,500 parking spaces for cars—would serve the entire complex (that's one third the car space Apple is providing at its new headquarters in Cupertino, for a similar head count of around 10,000 employees). A public "green loop" would link these parcels, via bike lanes and walkways, with several other Google sites in Mountain View, including the Googleplex, which would remain.

Supported by a cable-net grid, the tentlike structures rise on widely spaced columns, well outside and above the stacked floors of workspace, which permit a finely tuned exterior for daylighting—as well as natural ventilation and solar-heat control—while allowing unprecedented layout flexibility. Between the tent and workspaces, the generous ground-level perimeter would be largely dedicated to sun-drenched gardens and shared services.

The tent membrane is proposed as a lightweight system, with two layers separated by an



The proposed plans (above and below) included gardens and a "green loop" of bike paths and walkways to link various Google sites in Mountain View with each other.

insulating airspace about 5 feet deep. The insulating-glass outer membrane integrates PV panels and roof vents to exhaust hot air or smoke in case of fire. Within the cavity, leaf-like shades wrap pipes that hold the layers apart. They would deploy umbrella-like elements to control shade and light diffusion. Glass, ETFE, or a composite material could form the interior layer.

But most radical is the workspace structure. The plans call for up to eight stories using a modular column, beam, and floor-tray system

that the designers think of as akin to furniture—with components easily added or removed. If such floor-space flexibility can be affordably manufactured, it could open enormous possibilities for transcending the current limitations of corporate real estate—reducing the disruptions of renovation and the expense of unused space.

The system's building block is a 45-by-15-foot metal tray, deep enough to accommodate plenums, ducts, ceiling sprinklers, and data cables. The trays bolt together to form 45-foot-square floor modules that attach to columns. Users could pull up magnetized wood floor panels to reconfigure utilities. The idea is to use replicable utility layouts as much as possible and bring the trays on-site with utilities pre-installed to minimize on-site labor. The plans show widely varying configurations, from loose stacks of modules to dense rows, suggesting just how flexible the system could be. Daylight reaches almost every square foot via atria, light chimneys, and crevices.

The giant tent structures, rising above suburban greenery, may be a riff on Buckminster Fuller's utopian bubbles and owe a debt to Frei Otto. But the commitment to the deep exploration of design and technology by BIG and Heatherwick suggests that Google now sees dramatically reimagined physical facilities as essential to its ongoing competitiveness. The question is just how—and where—the company will turn such visions into pragmatic reality. ■

*James S. Russell is an architecture critic and author of *The Agile City: Building Well-being and Wealth in an Era of Climate Change*.*



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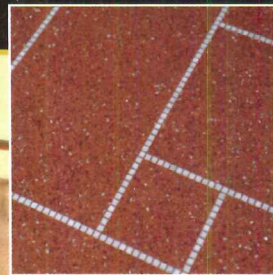
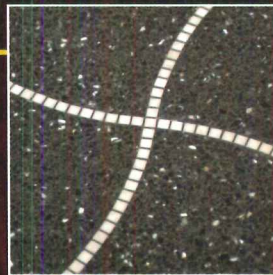
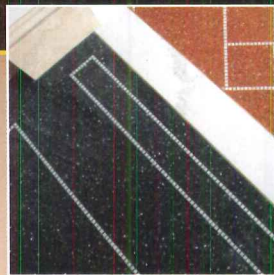
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Treasure Island

New cultural projects by Sou Fujimoto and Hiroshi Sambuichi add to the lure of Naoshima.

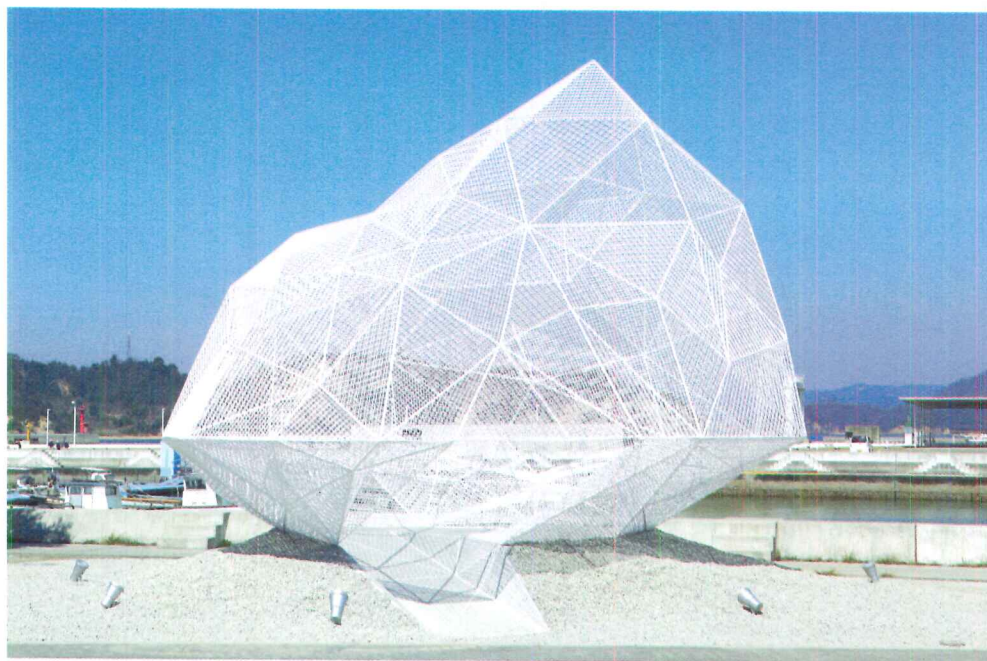
BY CLIFFORD PEARSON

ON NAOSHIMA, the 3.15-square-mile island in Japan's Seto Inland Sea that Tadao Ando and other architects have turned into a popular station on the art-world pilgrimage route, the projects keep coming. In March, Sou Fujimoto completed a metal-mesh pavilion on the waterfront that lures visitors and local residents to climb inside its faceted form, while Hiroshi Sambuichi has designed a community center that will serve as a venue for Bunraku, a traditional type of Japanese puppetry, when it opens this fall.

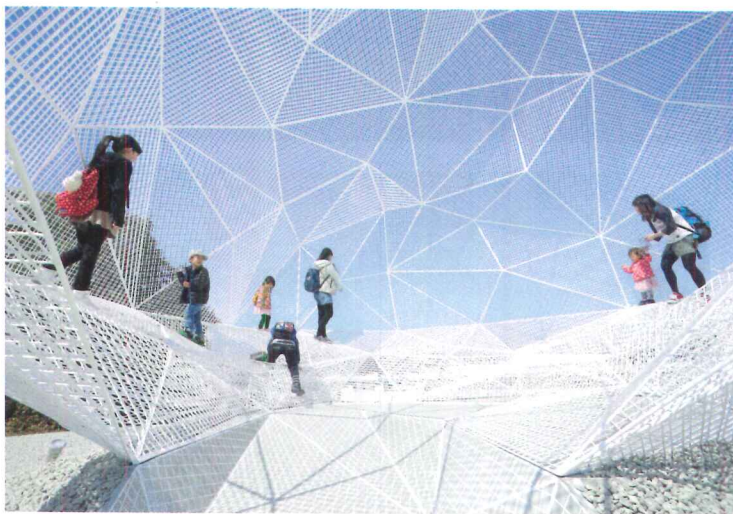
Since 1989, Benesse Holdings and the Fukutake Foundation, a public-interest foundation that is a major shareholder of Benesse, have been using art and architecture to revitalize Naoshima and some of its neighboring islands, which had been environmentally damaged by industrial operations for much of the 20th century. Ando helped put Naoshima on the map, starting with the Benesse House museum and hotel in 1992, followed by the Chichu Art Museum (RECORD, October 2005, page 116), the Lee Ufan Museum, and the Ando Museum (RECORD, December 2013, page 60). Ando as well as individual artists such as James Turrell, Rei Naito, and Hiroshi Sugimoto have worked to convert abandoned old houses on the island into site-specific works of art.

On nearby Inujima Island, Sambuichi and artist Yukinori Yanagi created the Seirenscho Art Museum within the ruins of a copper refinery (RECORD, July 2009, page 60) and on Teshima Island, Ryue Nishizawa designed a tear-drop-shaped concrete-shell structure to house an artwork by Rei Naito that employs water as a key element (RECORD, March 2011, page 136).

When Soichiro Fukutake, the chairman of the board of the Fukutake Foundation and executive advisor to Benesse Holdings, first visited Naoshima, some of its hills had been denuded by copper-smelting and other indus-



PLAYTIME Sou Fujimoto designed a 23-foot-high pavilion made of white stainless-steel mesh for a waterfront site on Naoshima (above and below). A community center (bottom) by Hiroshi Sambuichi will serve as a performing arts space when it opens in the fall. Both projects were commissioned by the local government.



trial operations. "I felt angry when I saw this destruction," says Fukutake.

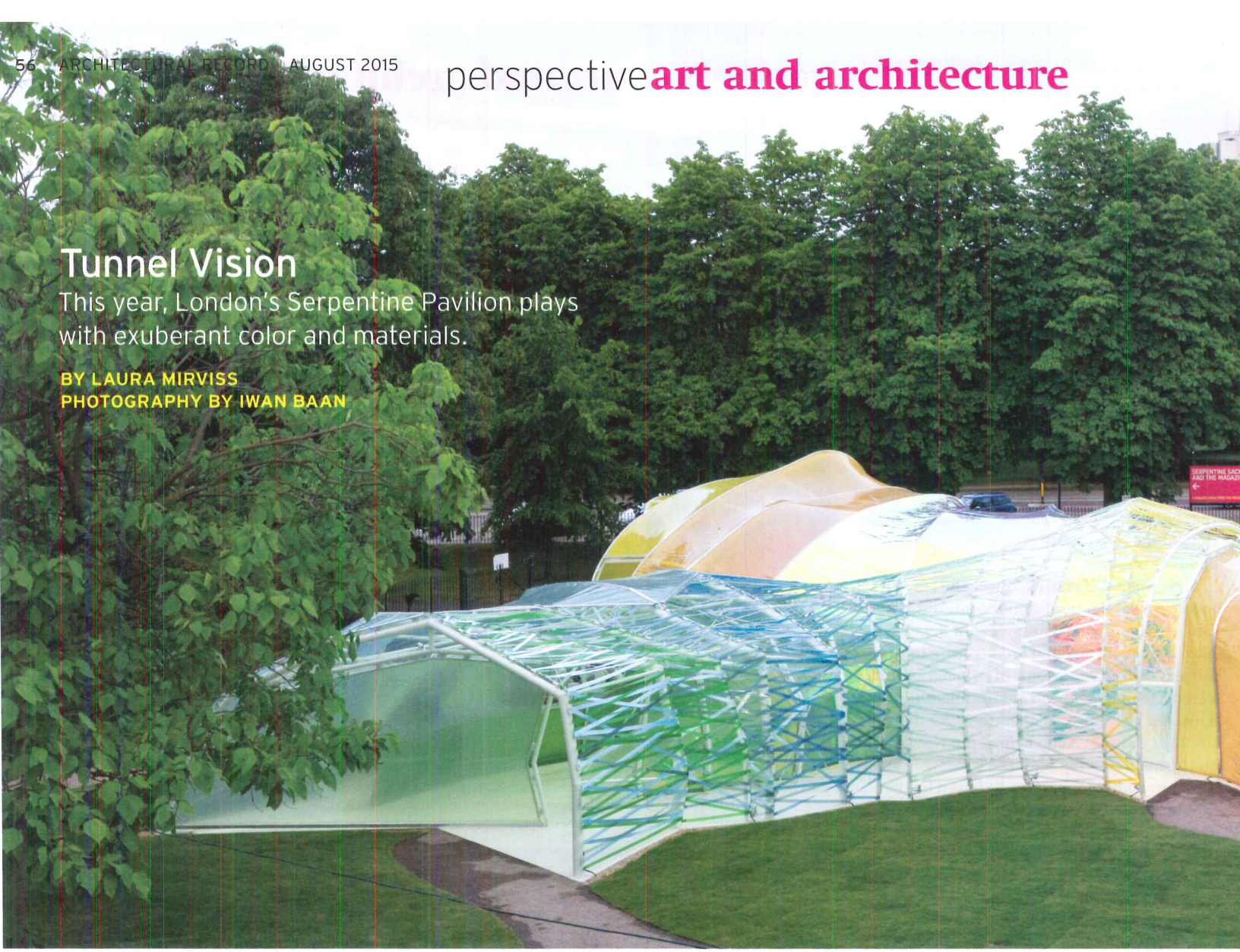
Despite its spectacular setting, 125 miles west of Osaka, Naoshima had been losing population for decades, as young people moved to big cities. By 2003, it had just 3,600 residents, most of them elderly. "My goal was to breathe new life into the island and bring people back," said Fukutake. By building museums and integrating artworks into the natural and social context, Fukutake hoped not just to attract tourists but to change the people living on Naoshima. He speaks about "the Naoshima method," which encourages residents to interact with artists during the creative process and then transmit that knowledge to people who later visit the island. "We use senior citizens to show people around and help explain the art," says Fukutake. "It makes the elderly feel younger. It makes them happy."

The businessman and benefactor likes to spur his architects by exhorting, "Use what exists to create what is to be." Sambuichi took this to heart in reusing the old copper refinery to create the Seirenscho Museum on Inujima and his growing reliance on passive sources of energy. His community center now under construction on Naoshima will rely on natural ventilation only. ■

Tunnel Vision

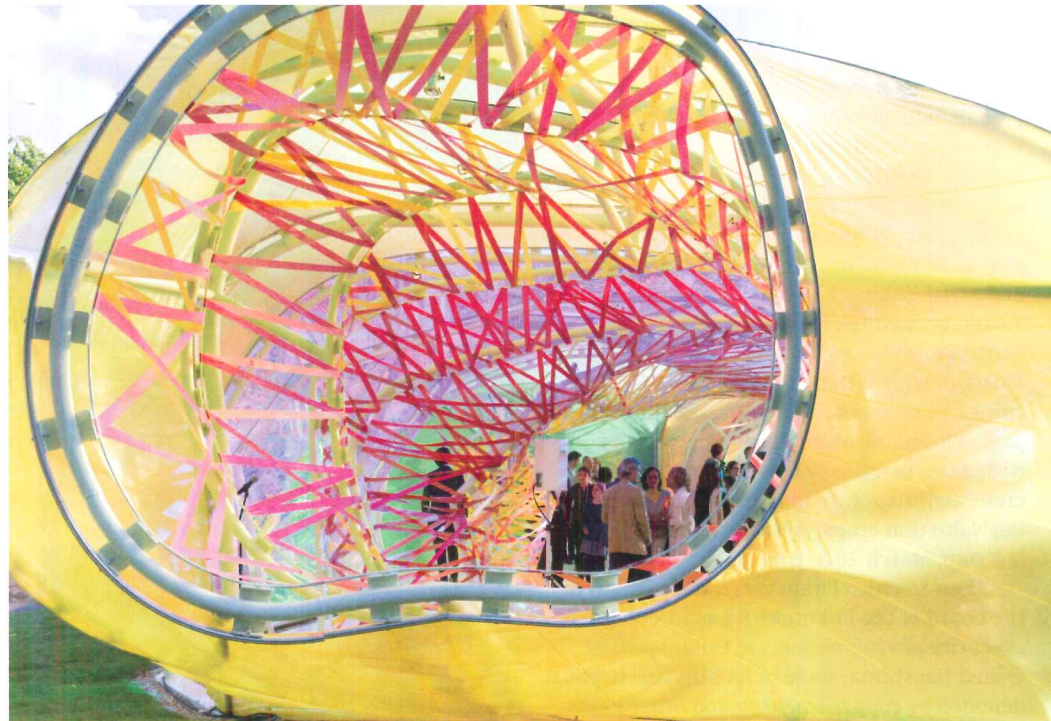
This year, London's Serpentine Pavilion plays with exuberant color and materials.

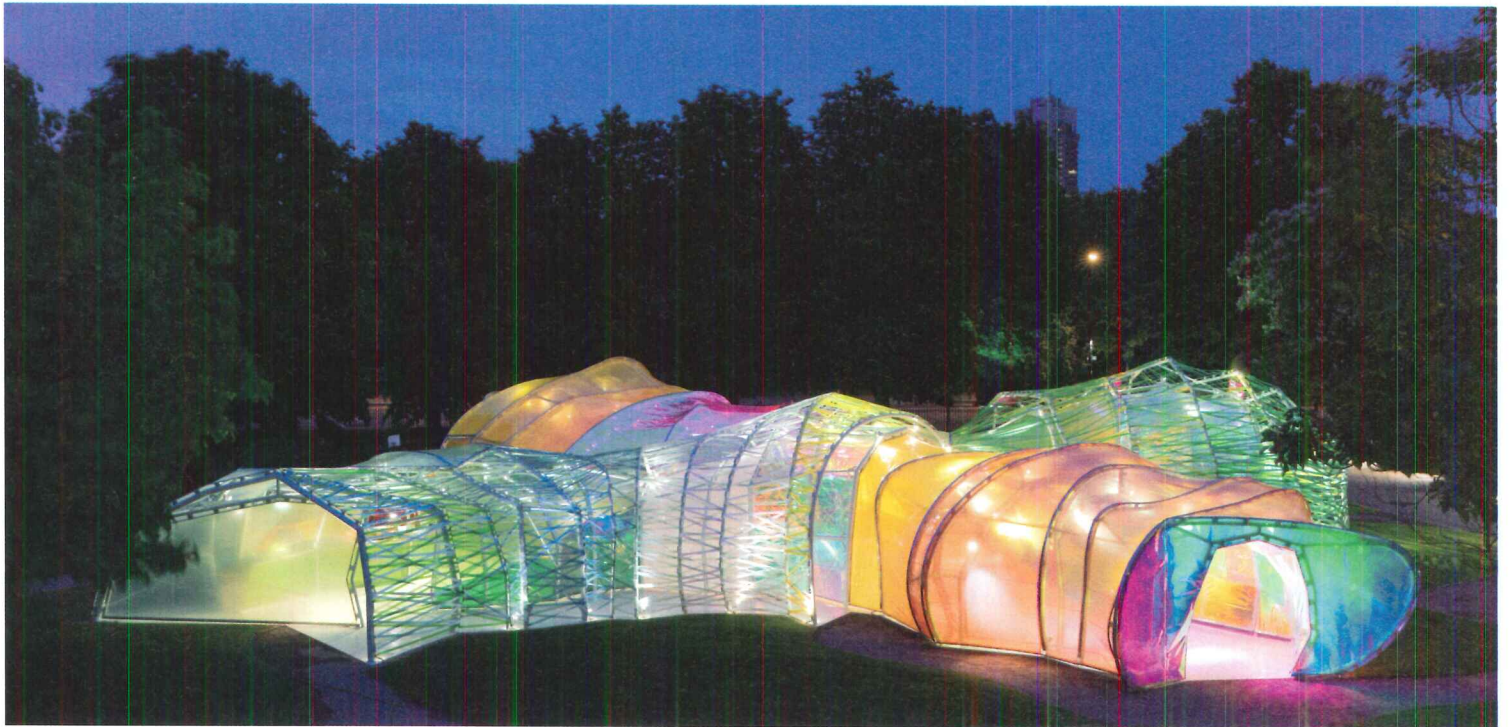
BY LAURA MIRVISS
PHOTOGRAPHY BY IWAN BAAN



SELGASCANO, the Madrid-based firm known for its playful buildings wrapped in polychromatic plastic, has applied its signature material to the design of this year's Serpentine Pavilion in London. The temporary structure is a steel frame clad in shimmering plastic webbing. The cocoon is formed from a double layer of ETFE, a fluorine-based membrane the firm has used in a number of projects, such as El B Auditorium and Congress Hall in Cartagena, Spain (RECORD, July 2012, page 52). The installation, the gallery's 15th, will be on view through mid-October. Located in Kensington Gardens, it worms across a verdant lawn near the Serpentine Gallery, housed in a former neo-Georgian tea salon.

OUT LOUD The X-shaped 2,840-square-foot pavilion (above) is situated across the lawn from the brick Serpentine Gallery, now a contemporary arts space (opposite, top). The installation is illuminated in the evening for public events (opposite, middle and bottom). Visitors can enter through one of four apertures (right), with a café and seating area at the core.





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The architects selected eco-FICIENT Grand H insulated metal panels in a variety of widths and colors to achieve a mosaic design on La Joya ISD's Child Nutrition Center and Police Station. Built to accommodate an increase in students, the structures incorporate sustainable design while the medley of colors emanates a youthful environment.

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LOCATION: La Joya, Texas

ARCHITECT: Gignac & Associates

CONTRACTOR: Leyendecker Construction

PANEL PROFILE: eco-FICIENT® Grand H (Brite Red / Snow White / Slate Gray)

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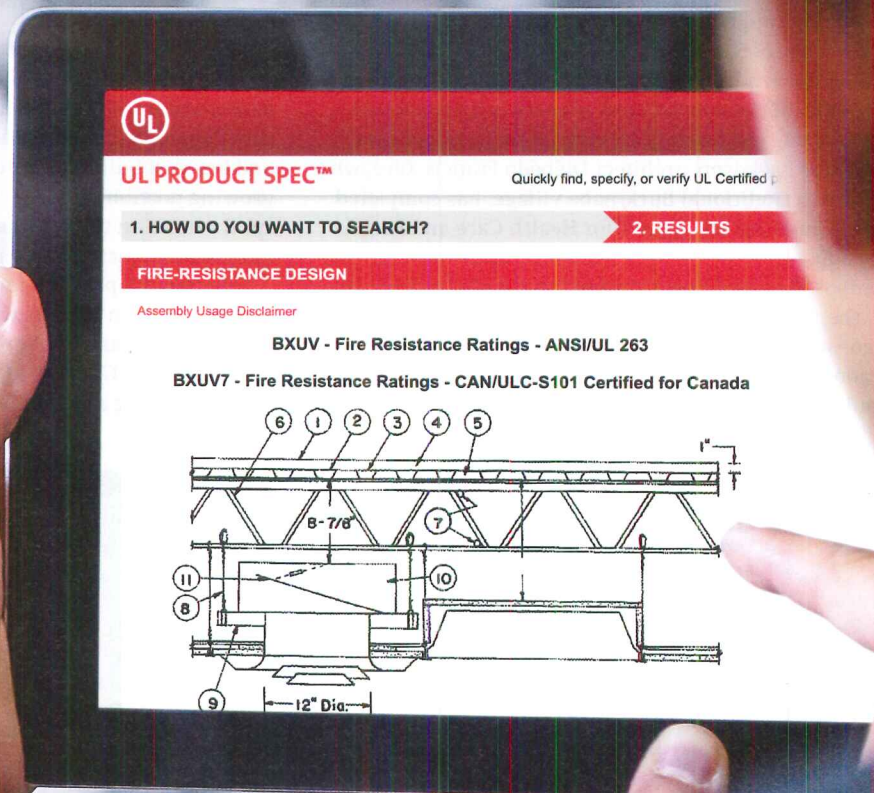


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Just What the Doctor Ordered

Diébédo Francis Kéré's latest project brings much-needed medical care to a remote area in Burkina Faso.

BY JENNA M. MCKNIGHT

LIKE MOST African nations, Burkina Faso struggles to provide adequate health-care services for its citizens. In this landlocked West African country, there is only about one doctor for every 20,000 people; the average life expectancy is 58 years; and roughly 10 percent of Burkinabe children die before the age of 5.

While modern hospitals can be found in cities and major towns, most of the Sub-Saharan country is undeveloped, impoverished, and severely lacking in medical facilities. Against this backdrop, architect Diébédo Francis Kéré, who grew up in a traditional Burkinabe village, has completed his latest building: the Center for Health Care and Social Promotion.

Composed of rectilinear volumes made of clay and concrete, the 14,000-square-foot clinic opened last fall in Laongo—a rocky rural area about 25 miles from Ouagadougou, the country's capital. The \$500,000 project was built by volunteers from the German nonprofit

Grünhelme (Green Helmets) and local workers, who earned a small wage and gained valuable skills. "People were really motivated to help because the project created opportunities for them," says Kéré, noting that the country's GDP per capita is \$720 per year.

The clinic is one of a dozen civic-minded projects that the award-winning architect has designed for his homeland. Kéré runs a small studio in Berlin, where he earned his architecture degree, but he remains focused on creating sustainable and low-cost buildings for underserved areas in Africa. His growing portfolio includes schools, health centers, and cultural venues on the continent, in addition to more lucrative European projects that help support his practice.

The clinic is part of a larger mixed-use development known as Opera Village. Encompassing 37 acres, the ambitious project was spearheaded by Christoph Schlingensiefel, an avant-garde German film and theater director who envisioned building a world-class performing-arts venue in

The outer walls of the double-skin building are made of painted concrete block (bottom and opposite, top). The health center is located in an impoverished rural area where motorized vehicles are scarce (opposite, bottom).





Burkina Faso. He commissioned Kéré to design the village, which over time evolved to include housing, a primary school, and a medical facility. Schlingensiefel had cancer when he initiated the project; he died in August 2010, just eight months after construction began.

The development has, nevertheless, continued to take shape, with funding coming from Schlingensiefel's nonprofit organization, Festspielhaus Afrika, and various donors. The school opened in 2011, as did several small art studios. Eleven single-family dwellings have been built, now occupied by teachers, medical professionals, and foreign visitors. In total, 16 structures have been completed at the site, all of which feature natural materials, passive ventilation, and a modernist design vocabulary merged with local motifs.

The new medical center sits on the periphery of the development, since Kéré wanted sick patients separated from entertainment facilities. Resting atop a concrete and stone foundation, the building comprises three boxy volumes organized around a central reception area. Each space has distinct programming—gynecology and obstetrics, dentistry, and general medicine—and each contains a landscaped courtyard. The open-air enclosures aid in natural ventilation and also provide a place for family members to congregate, which is an important consideration in Burkina Faso. “You have to provide a space for relatives to stay, a place for people to gather,” said Kéré. “This is embedded in African culture.”

The building's design marks a departure for Kéré in that there are no exterior clay walls and no overhanging roof (which shields earthen walls from rain)—both standard elements in the architect's Burkinabe projects. For this building, he employed a double-skin facade, using concrete blocks for the outer layer and compressed-earth blocks for the inner wall. The roof, made of sheet metal and supported by steel





FLOOR PLAN



- | | | |
|--------------------|----------------------------|----------------------|
| 1 ENTRY | 6 STAFF ROOM | 10 DENTIST |
| 2 RECEPTION | 7 STAFF QUARTERS | 11 STORAGE |
| 3 EXAMINATION ROOM | 8 WAITING ROOM | 12 PHARMACY |
| 4 INPATIENT ROOM | 9 MATERNITY/
GYNECOLOGY | 13 WARDEN'S QUARTERS |
| 5 COURTYARD | | |

credits

ARCHITECT: Kéré Architecture – Diébédo Francis Kéré, principal and lead architect; Ines Bergdolt, Dominique Mayer, design team

GENERAL CONTRACTORS: Grünhelme, Association Dolai

CLIENT: Festspielhaus Africa

SIZE: 14,000 square feet

PROJECT COST: \$611,000

CONSTRUCTION COST: \$444,000

COMPLETION DATE: November 2014



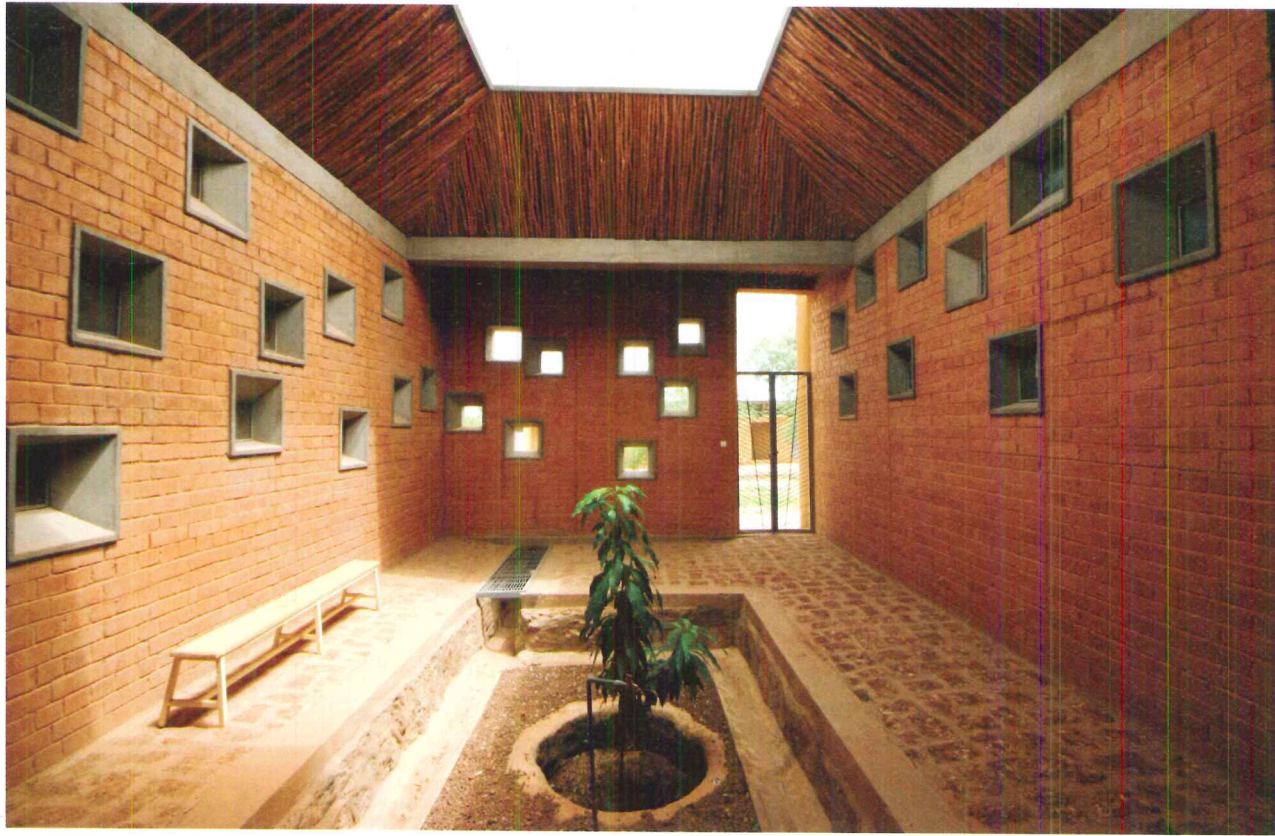
trusses, does not extend beyond the building, as shade-producing eaves would have attracted animals seeking respite from the sun. “You don’t want to have animals staying here when you have newborn babies inside,” Kéré explained.

One of the center’s most distinctive features is its fenestration—a seemingly random array of operable square openings. These “picture windows” not only pull in fresh air but also frame views of the surrounding terrain. “We are in a beautiful area. I wanted people to have a connection to this fantastic landscape,” said Kéré. “I wanted patients to have a view of the nature around them, whatever position they are lying in.”

Inside, modest rooms have exposed-brick walls, tile flooring, and locally made furnishings. Power and water are supplied by public utility networks, along with rooftop solar panels and a deep well. The regional government now staffs and manages the clinic, with some support from foreign organizations.

The facility is attracting patients from across the region, who are drawn to its exceptional design and level of care. “There are other medical centers in the area, but this is a model of quality. And we really want to deliver quality for the people,” said Motandi Ouoba, director of the Opera Village. “There are many people taking the road to come here because they know they can get the service they need.” ■

Jenna M. McKnight is a New York-based writer and senior U.S. editor for Dezeen.



Locally produced clay bricks form the inner walls of the building (this page). Square, operable windows aid in natural ventilation and frame views of the landscape for patients (this page and opposite).





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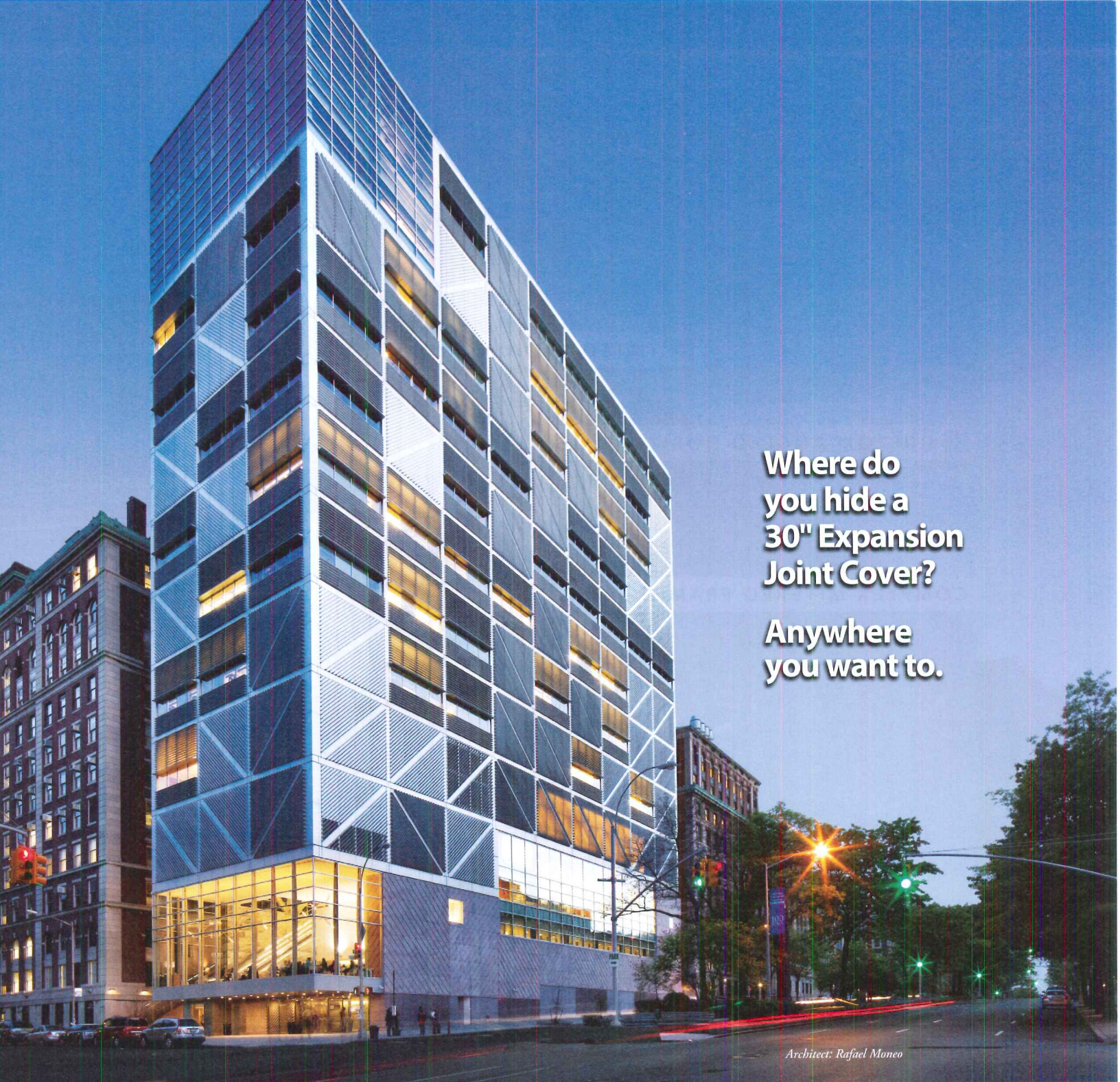
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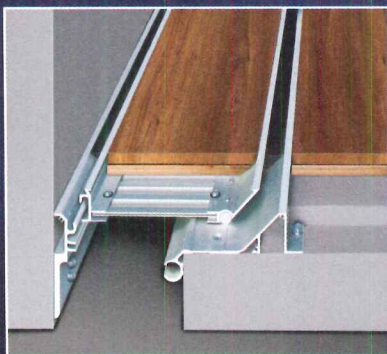
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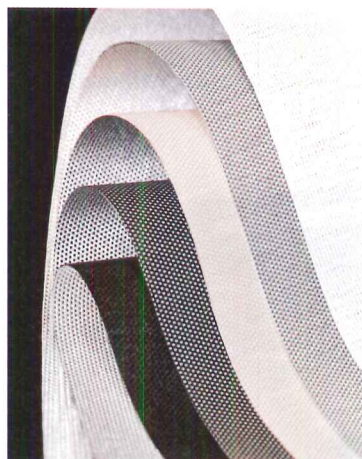
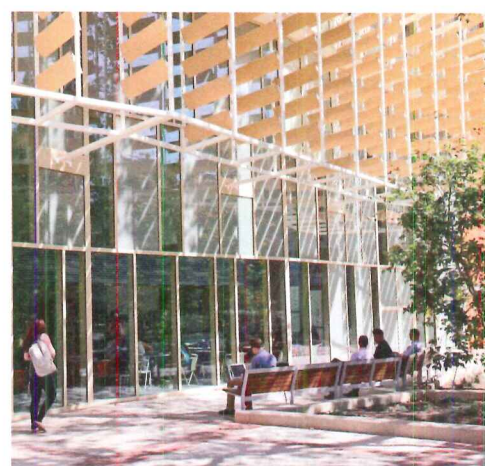
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Wanderlust**Hunter Douglas Hospitality** hunterdouglas.com

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Shildan/Moeding Baguette Sunscreen**Shildan** shildan.com

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ThermaShade**YKK AP America** ykkap.com

The industrial look remains a popular aesthetic in architecture today, so YKK AP has tweaked its award-winning ThermaShade exterior sun-control system to offer two different styles. Originally the design enclosed the anchors to present a clean, bolt-free appearance; the new option leaves them exposed. Both versions can be specified with 24", 30", or 36" outrigger projections and a choice of eight louver and five fascia designs. **CIRCLE 209**

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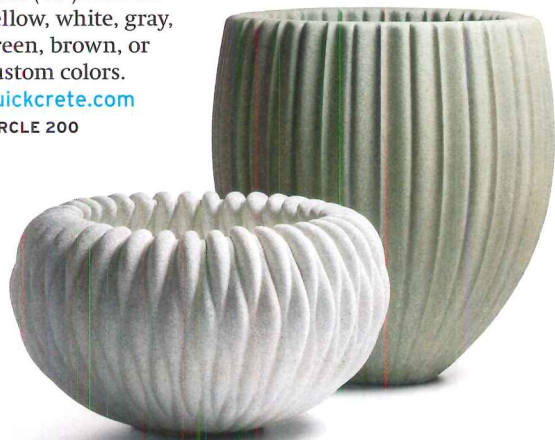
By Sheila Kim

Agora Planters

After a successful collaboration two years ago on a GSA landscape project in San Francisco, sculptor and designer Cliff Garten and Quick Crete Products have reteamed to create a collection of cast recycled-concrete planters and site furnishings. The planters are offered in six styles—ranging from a quilted to a ridged design—in small to tall (up to 44") and wide (40") sizes in yellow, white, gray, green, brown, or custom colors.

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CIRCLE 200



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maglin.com CIRCLE 204



Hillside Pavilion

Walpole Outdoors launched a new line of pavilion structures, among them Hillside. With a fixed roof atop Tuscan columns, it is composed of cellular PVC and aluminum with a weathered green patina finish. Additional options include lattice screens, arches, and dentil molding. walpolewoodworkers.com

CIRCLE 203

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CASE STUDY

International Magnet School for Global Citizenship in South Windsor, CT – Architect: Perkins Eastman; Contractor: Cutter Enterprises; Installer: The Imperial Company
Profile: SNAP-CLAD Metal Roofing; Colors: Hartford Green & Dark Bronze

Metal standing seam roofs of nearby New England barns are recreated on the International Magnet School for Global Citizenship using SNAP-CLAD Metal Roofing

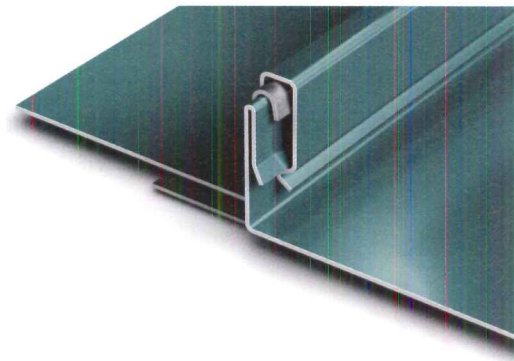
Designed in a village configuration, the new 65,000 sq. ft. magnet school blends beautifully with the Connecticut countryside.

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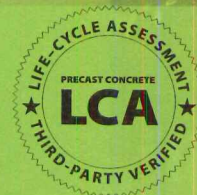
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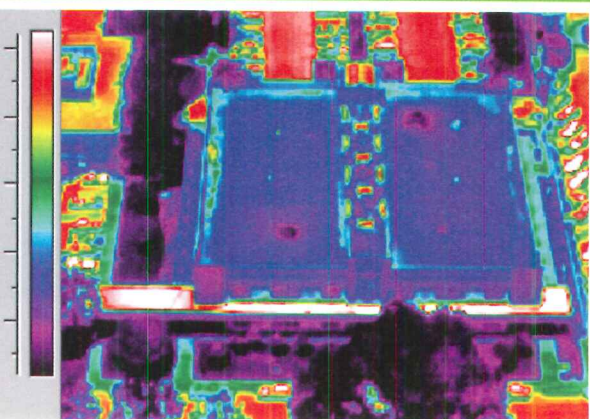
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Places Architects Call Home

Architects' offices in Copenhagen, Milan, and Delft demonstrate a sensitivity to the historic setting in which each is located.

BY SUZANNE STEPHENS

3XN Studio, Copenhagen

PHOTOGRAPHY: © ADAM MORK



THE WAY architects design their own offices is laden with clues about their attitudes toward function and workplace comfort, not to mention how they want to represent themselves to clients. An even more interesting test arises when an architectural firm converts a landmark building for its own use. The historic structure, which has withstood the vagaries of time, now must be updated for a range of creative and administrative activities. As the following pages illustrate, three architectural firms have achieved this while demonstrating their skill in keeping the character of the building intact and the sense of past alive.

3XN Copenhagen

The Danish architectural firm 3XN prides itself on a Nordic sensibility that combines natural materials with an abstract, dynamic, modernist approach. Established in 1986 in Aarhus, the firm, which gained prominence with its design for the Royal Danish Embassy in Berlin (1999), moved to Copenhagen in 2004. As it increasingly won large-scale commissions, such as the Saxo Bank in Copenhagen (2009), its own loftlike warehouse space facing the harbor in Christianshavn felt more and more cramped. With 100 people, 3XN—which refers to the surnames of its three founders, Kim Nielsen, Hans Nielsen, and Lars Nielsen (none related)—decided to relocate. Last December, the architects moved into five of 32 wood buildings once used by the Royal Danish Navy for the repair and storage of military gunboats in Holmen, a group of small islands in the city. From 1690 to 1993, Holmen had served as the navy's base, but after its departure, the area, not far from the Copenhagen Opera House, began to turn into a cultural enclave. The Royal Danish Academy of Fine Arts schools and educational facilities for theater and music

are now located there, and the black-stained wood gunboat sheds are being renovated and leased to assorted businesses in fields such as media, advertising, and architecture.

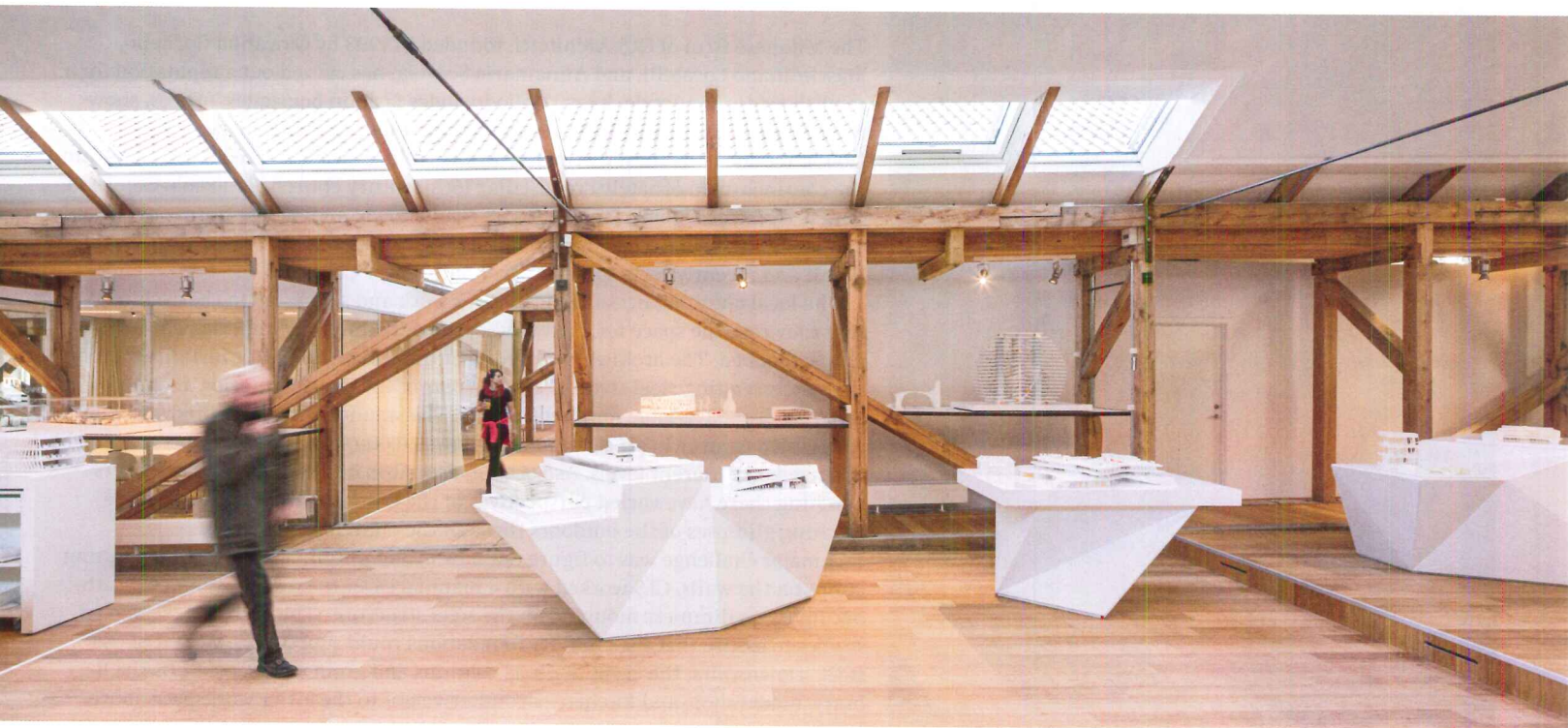
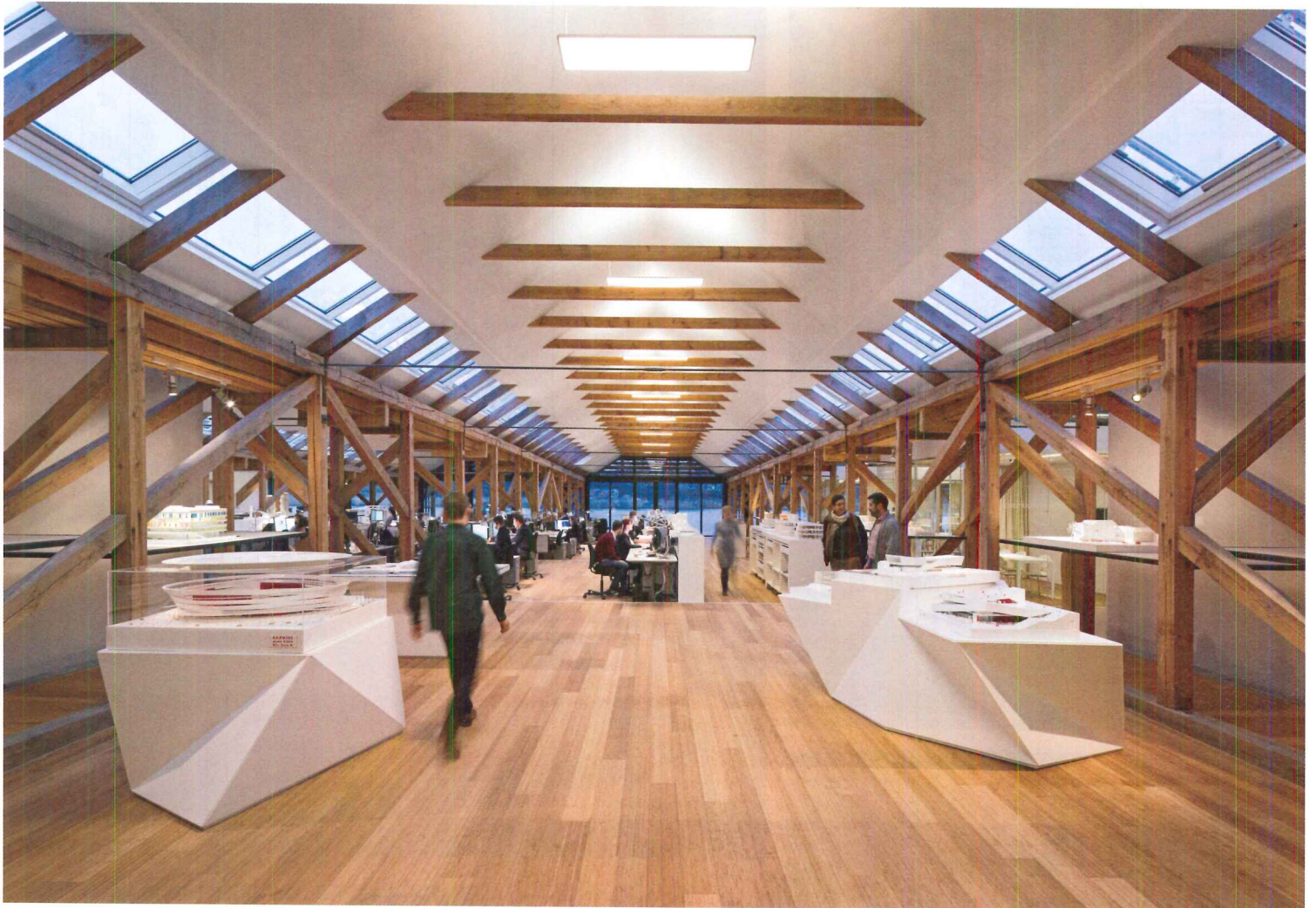
As 3XN's creative director, and sole remaining founder, Kim Nielsen says, "We needed to be together to share knowledge, and now we have 22,000 square feet on the same floor." In renovating the red tile roofs and lark-wood landmark structures, built in 1860, 3XN only enclosed five meeting rooms, leaving the rest of the space open. Here, Nielsen notes, the firm can display architectural models, which "we refer to all the time as we develop our ideas."

Skylights, along with glass partitions and doors, admit ample illumination; white acoustical plaster on the ceiling brightens the exposed wood-framed interiors while modulating noise. Glass walls with views of the water bring a sense of calm to a busy work environment. As is customary in Copenhagen's design world, the shiplike office includes a large communal kitchen for lunch, lectures, and other gatherings. Nearby, 3XN's research group, GXN, comes up with solutions for new technologies and sustainability in a setting that combines a respect for the vernacular and the new.

LONG HOUSE

The new offices for 3XN occupy five historic gunboat structures formerly part of the Royal Navy Base in Copenhagen. The entrance to the complex of lark-wood buildings is on a small street (below). The architects renovated the interior with shiplike timber framing (opposite, top). In an open plan that affords long views toward the water, the new space also allows the firm to display architectural models (opposite, bottom).







CLS Architetti Milan

The Milanese firm of CLS Architetti, founded in 1993 by Giovanna Cornelio, Massimiliano Locatelli, and Annamaria Scevola, has carved out a reputation for a modish *modernismo* style. Its portfolio includes fashion boutiques, offices, showrooms, apartments, and the Lia Rumma Contemporary Art Gallery in Milan (2009). Yet one of its most distinctive works is the office it created for itself within the confines of an ornately crepuscular 16th-century church, San Paolo Converso, not far from the Duomo. Known for its richly hued Renaissance frescos by Antonio and Vincenzo Campi, the landmarked structure was deconsecrated after World War II and recently served as the Milan outpost for Christie's.

The local church diocese knew of CLS's work and suggested to the architects that they rent the space for their studio; the only catch was that the walls could not be touched. The architects moved in at the end of 2014 after installing a four-story freestanding steel structure at the rear of the church interior in order to leave the front available for public events. The staunchly built scaffold (although it is designed to sway in an earthquake) allows 20,000 square feet of workspace to be arranged on different levels. As Locatelli describes it, architects and designers perching there have varied perspectives of the Campi brothers' frescos while catching glimpses of the outdoors through the church windows.

A major challenge was to figure out how to add illumination without fastening lamps on the walls. CLS worked with a manufacturer to create custom cold-cathode lights on dimmers mounted on the steel structure. (The firm had conducted studies to assure that the church's foundations could support the weight of the steel.) Downstairs, the crypt, with its columns and groin vaults, contains the library, model shop, and kitchen—a counterweight to the airier workspace above.





LASTING IMPRESSION
 Late last year, the Milanese firm CLS Architetti moved its offices into a deconsecrated 16th century church, San Paolo Converso (opposite, top, left). Known for its frescos by Antonio and Vincenzo Campi (right), the church-as-landlord had one sacrosanct requirement of the new tenant: not to touch the walls. CLS inserted a four-story black-steel frame in the rear to solve the problem (opposite, top, right). Fifty architects and designers work in and around the open structure, which allows them various perspectives on the encrusted walls and ceilings in the 47-foot-high space (opposite, bottom, left). The architects worked with a lighting manufacturer to insert neon tubes on dimmers into the scaffolding.

Cepezed Delft, the Netherlands

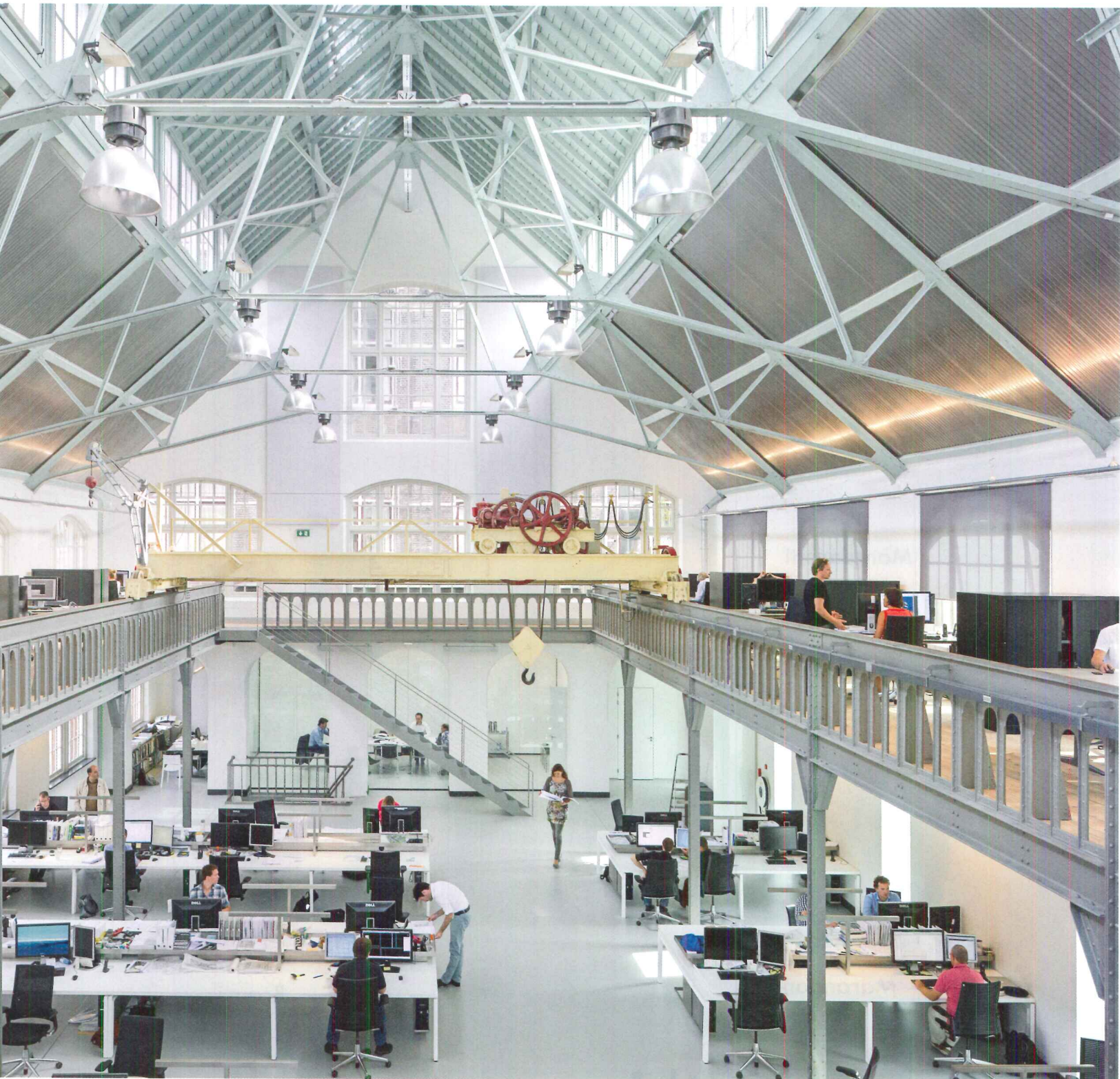
The Dutch firm Cepezed Architects, founded in 1973, is known for its quick-assembly, on-site construction with factory-made elements. From 1999 until just recently, it occupied a glass and steel building it had designed that demonstrated the firm's commitment to a modernist method of fabrication. But as principal Ronald Schleurholts notes, "We were expanding rapidly, and our office was dispersed over four different areas in that structure." Schleurholts and his partner, Jan Pesman, discovered a landmarked complex of three buildings in Ezelsveldlaan, in the south part of the city, where they could use their "custom prefab" techniques to remodel the space for 50 employees. They chose to occupy the largest main hall and leave the middle-sized and smallest for two other creative offices.

The neo-Dutch Renaissance complex had been designed between 1905 and 1911 by a government architect, Jan Vrijman, as part of the Delft University of Technology. The 32,000-square-foot ensemble of gabled brick halls and low-rise annexes originally contained workshops for the Department of Mechanical and Marine Engineering. After the university moved, the workshops were converted to the Museum of Technology. Then that institution also relocated, and the city looked for a buyer for the property. Cepezed formed a development company, Made in Delft, to renovate the ensemble as a "creative cluster," which now leases the space to each of the three tenants.

The architects were drawn to the industrial quality of the lightweight, airy Polonceau trusses in the main hall,

where two segmented triangles are held together by tension rods. The 52-foot height of the gabled roof accommodates mezzanines for additional work areas while augmenting the sense of spaciousness. In rebuilding the low-rise annex next door, the architects used a steel frame with slender, minimal profiles and slightly recessed double-insulated glazing. "We try to build a kit of parts," says Schleurholts, "but it is customized, so you don't see it as a typical prefab." The elegant result fits the firm's philosophy, without losing a sense of history. ■





INDUSTRIAL CHIC As it expanded, the architectural firm Cepezed decided to relocate to a 40,370-square-foot landmark complex of three neo-Dutch Renaissance brick structures in Delft (opposite, bottom). The firm moved into the largest of the early 20th-century buildings, originally workshops for a technical university, where light Polonceau trusses are exposed in the dramatic 52-foot-high space (above). The architects rebuilt the annex (opposite, top) using glass and steel to provide additional meeting rooms.

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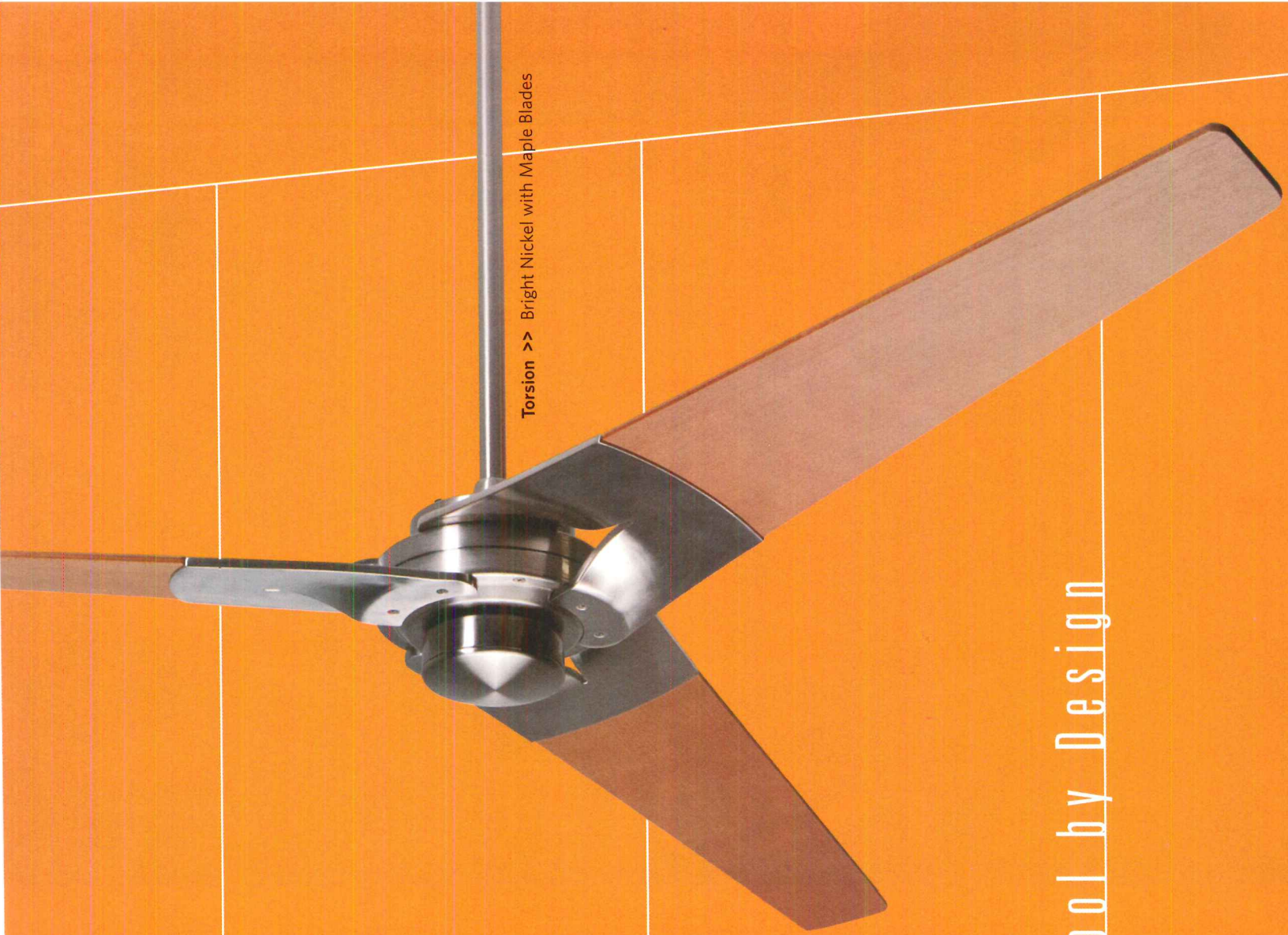
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OFFICE BUILDINGS

Saying a building isn't iconic might sound like a put-down. But the selection of office projects showcased here demonstrates that architects are increasingly putting other considerations—such as the adaptability of a workspace, the best configuration for encouraging collaboration, or the impact of a building on its surrounding community—ahead of making a formal statement. And that isn't a bad thing. The projects on the following pages, including a headquarters for Boston Public Schools, offices for a hydroponic vegetable grower, and even Facebook's new headquarters by Frank Gehry, are all relatively quiet. But at the same time, the buildings deftly satisfy their clients' needs, signaling a new direction in office design.

1511

FACEBOOK, MENLO PARK, CALIFORNIA, GEHRY PARTNERS



Facebook Building 20 | Menlo Park, California | Gehry Partners



STATUS UPDATE

Channeling Facebook's startup culture, Frank Gehry creates a mammoth, vibrant warehouse for the social-media company.

BY LYDIA LEE

PHOTOGRAPHY BY JEREMY BITTERMANN



TECH HUB Clad in stainless steel, the main entrance adds a sense of architectural identity to the somewhat utilitarian building, which lacks Gehry's signature curves.

The challenge presented by Facebook for its first ground-up building could have been from an architecture school studio assignment: design something cool on a modest budget for a client in need of fresh ideas. It was catnip to architect Frank Gehry, who in early 2012 was overseeing the construction of the Fondation Louis Vuitton (RECORD, October 2014, page 80), a glass sculpture with a seemingly limitless budget. But first he had to convince Facebook CEO Mark Zuckerberg to let him compete.

By all accounts, Facebook was not interested in hiring a marquee architect to make a structural statement. The company downplays corporate branding and discourages "Facebook blue" on its existing 57-acre Menlo Park campus, at the southern edge of San Francisco Bay. The company of intense young programmers didn't want a space that would define them. "We were used to being hermit crabs, moving into someone else's space and adapting it," says John Tenanes, Facebook's vice president of global facilities and real estate. When Gehry first talked to Zuckerberg, a connection made by friends in high places, the company had already hired Gensler to extend its existing 57-acre campus with a set of four low-rise buildings accompanied by a parking garage. "I think it was a learning curve for Mark," says Gehry, who is quick to mention that Bilbao was built for \$300 a square foot. "He thought that to build for those prices, he had to have generically produced architecture. But it turned out that he didn't have to."

Zuckerberg visited Gehry's own office, a renovated warehouse in Los Angeles, and liked the open daylit space, where architects could gather around large physical models. Gehry assured the young corporate head that he could design something to suit the company's budget and tight timeline, and won the commission.

For the campus extension—located on a narrow 22-acre site, adjacent to the older Facebook complex—the design team created a 1,500-foot-long structure with a continuous workspace on one floor. "Every time we met with Mark at his office, more [partitions] would be torn down, so it was pretty clear how they liked to work," says Craig Webb, design partner at Gehry Partners and the project designer. The steel structure sits on a reinforced-concrete podium supported by concrete columns, forming an at-grade, open-air parking garage. Like Gehry's office, the workplace has a lofty height of 25 feet. Based on feedback from city building officials, the structure, clad primarily in stucco and glass, is articulated into four primary masses to reduce its scale.

Nicknamed MPK20 (short for Menlo Park building 20), the elongated building is said to feature the world's largest open-plan office, yet it feels rather contained inside. Like many tech environments, it is organized into "neighborhoods," with clusters of desks interspersed with enclosed private conference rooms of various sizes. "The dilemma was how to make this 400,000-square-foot space not feel like an automobile factory," says Webb. "We created a little city under the roof—we practiced indoor urbanism."

This "city" is designed without a regular office grid, giving it an ad-hoc, organic quality. A meandering path runs down each side of the building, with several cross-streets. The tall ceiling height also accommodates small



mezzanine areas that offer more secluded work environments. “This is the new paradigm for creative office space,” says Webb. Should the rumblings of discontent with open floor plans someday grow into a roar, the benefit of starting with a large open shell is that there is the flexibility to adapt.

Responding to Facebook’s preference for raw, unfinished space—one of the company’s tenets is that nothing is ever finished—the design team revealed everything overhead, including large-scale metal ductwork, custom skylight diffusers, and power and network cables that dangle down to the desks (for easy reconfiguring). Adding to the utilitarian ethos, exposed structural elements still have their construction markings on them, circulation routes are concrete (albeit polished), and conference rooms are simple boxlike gypsum board structures that could be torn down without much fuss. A bright and spacious cafeteria, anchoring one end of the building, offers the prime perk: three free meals a day. Here, everything from duck-confit pot pie to whole-wheat mango scones is made on-site in a large open kitchen. (Easy access to food is a big part of the design, with 14 coffee-dis-

pensing micro-kitchens scattered throughout, two eateries under construction on the opposite end, and a grilled-cheese and potato bar planned for the roof.)

According to Gehry, Facebook did splurge a little on the rooftop park, which added about 10 percent to the overall cost. Initially proposed by the architect’s team as a sustainability measure, the concept expanded into a full-fledged park. The ½-mile loop with numerous branching paths accommodates “walking meetings,” a popular way to conduct one-on-one confabs in Silicon Valley. When you are in the rooftop park, buffeted by the winds coming off the Bay, it feels like being on the crest of a hill. Buckling-restrained braces are in place to resist seismic forces. These supports also help manage the load of soil, plantings—including full-sized trees—and up to 5,000 people. Three glass-walled



SOCIAL CLIMBING

The triple-height lobby becomes a beacon at night (opposite, left). The site-specific artwork, one of 15 in the building, is by Brooklyn-based artist Maya Hayuk (above); the pink cardboard chairs are a Gehry design. A plywood-clad stairway (right) lends a rough-and-ready appeal to the mammoth space.



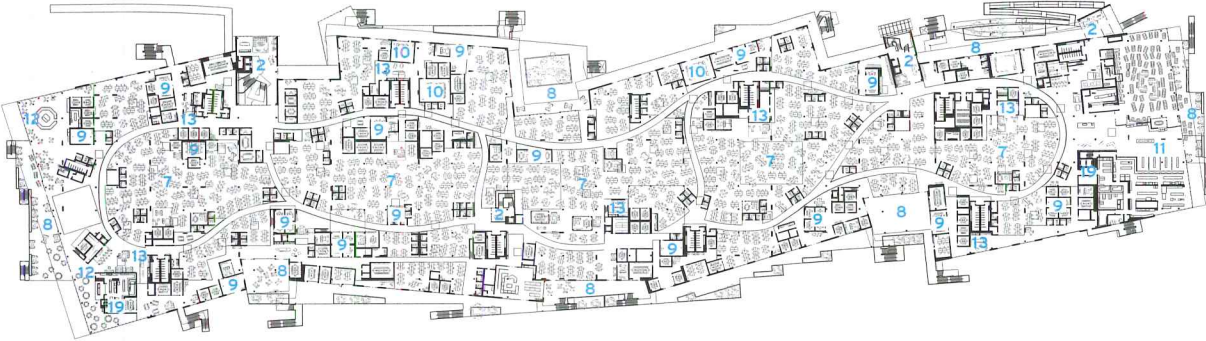
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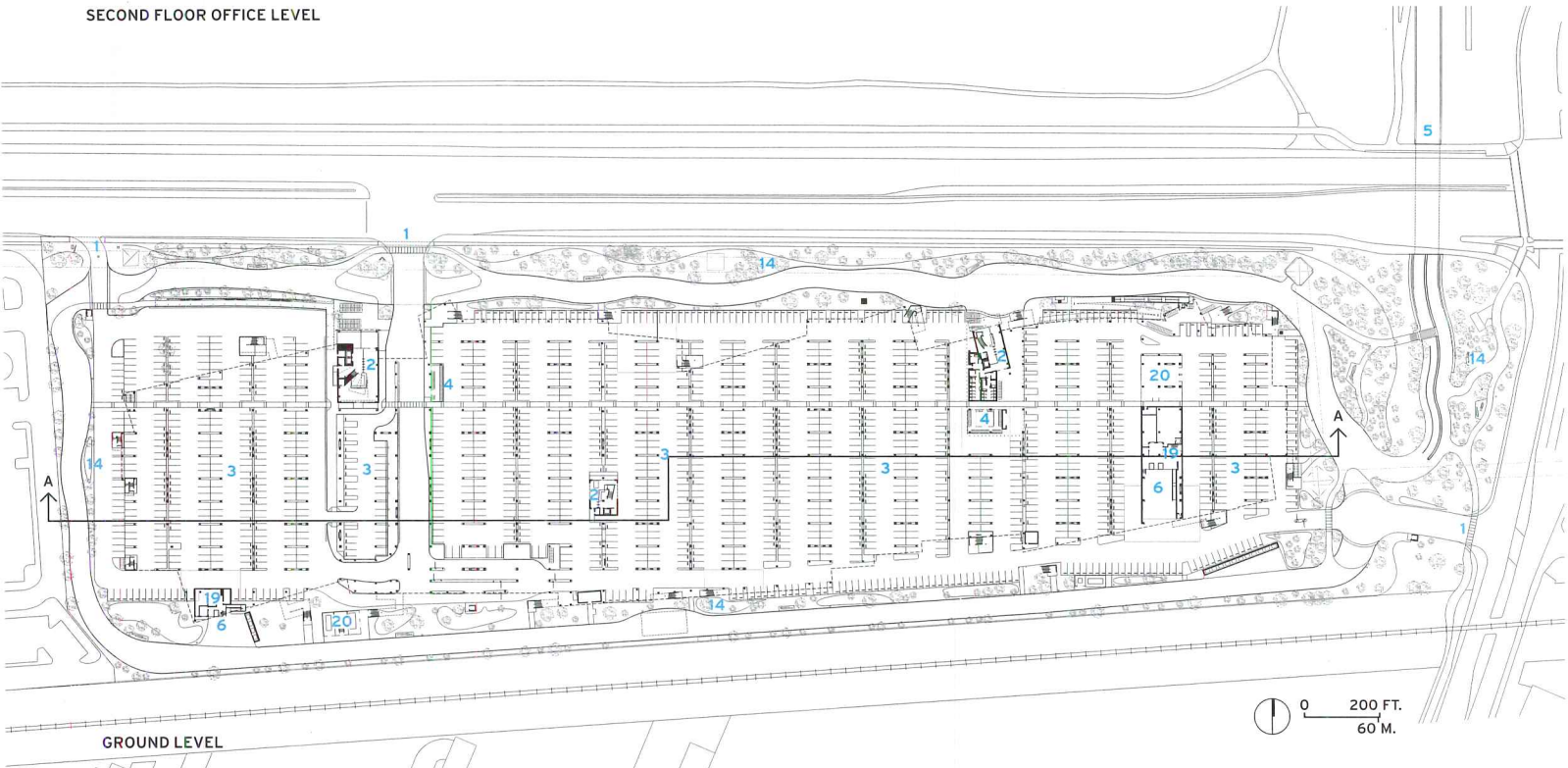


ROOF PLAN

- 1 SITE ENTRY
- 2 LOBBY
- 3 PARKING
- 4 BIKE STORAGE
- 5 BIKE/PEDESTRIAN UNDERCROSSING
- 6 LOADING DOCK
- 7 OPEN WORKSPACE
- 8 TERRACE
- 9 CONFERENCE ROOMS
- 10 TRAINING ROOM
- 11 CAFETERIA
- 12 CAFÉ
- 13 MICRO-KITCHEN
- 14 GARDEN
- 15 SUNKEN GARDEN
- 16 POP-DOWN
- 17 POP-UP
- 18 EVENT LAWN
- 19 SERVICE ELEVATOR
- 20 MECHANICAL



SECOND FLOOR OFFICE LEVEL



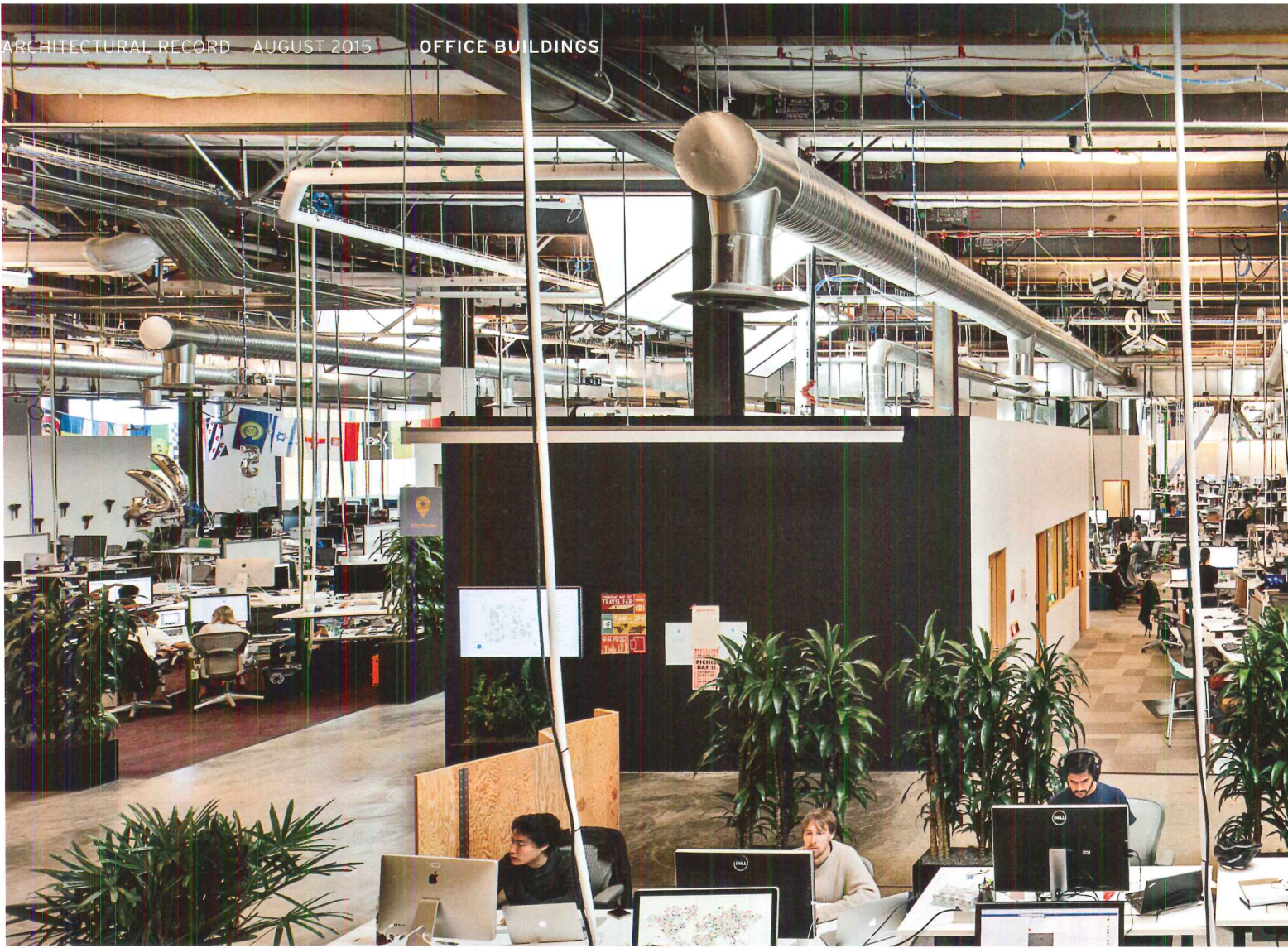
GROUND LEVEL

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60 M.



OFFICE PARK
The rooftop park connects with the surrounding landscape (this photo), with views of the Santa Cruz Mountains and San Francisco Bay. Glimpses of the park are revealed to employees inside (below), thanks to three sunken patios.



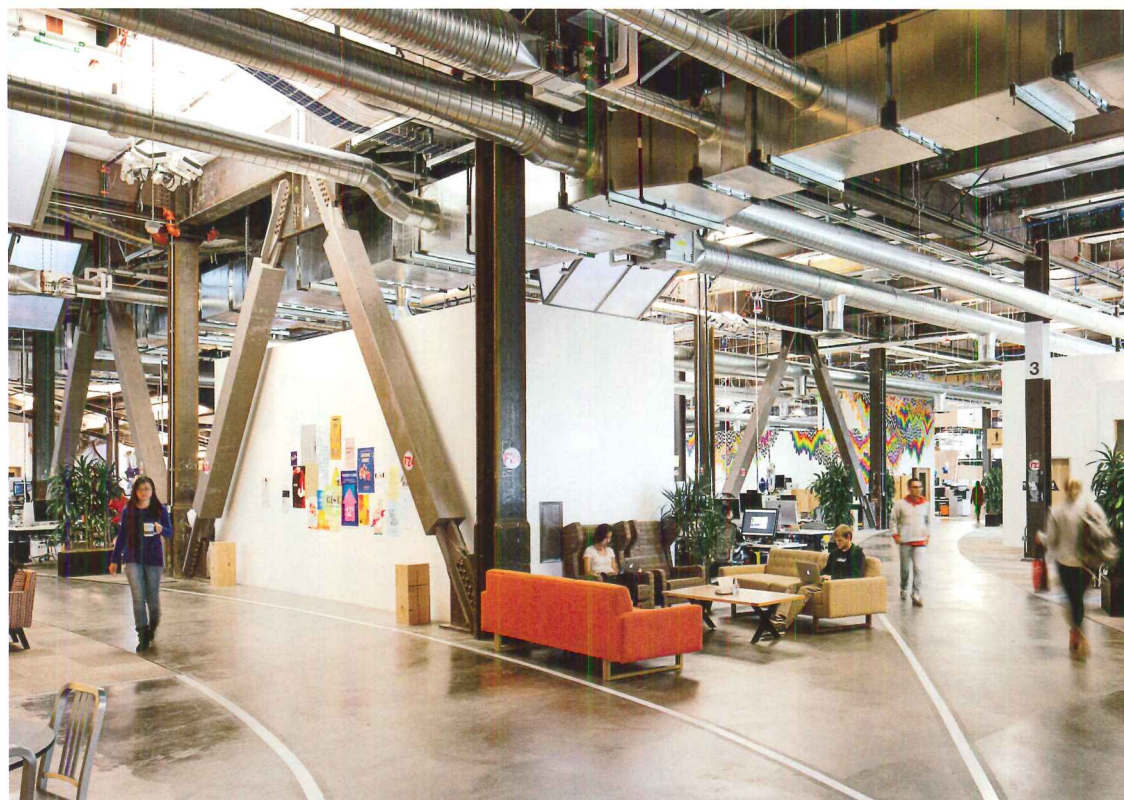


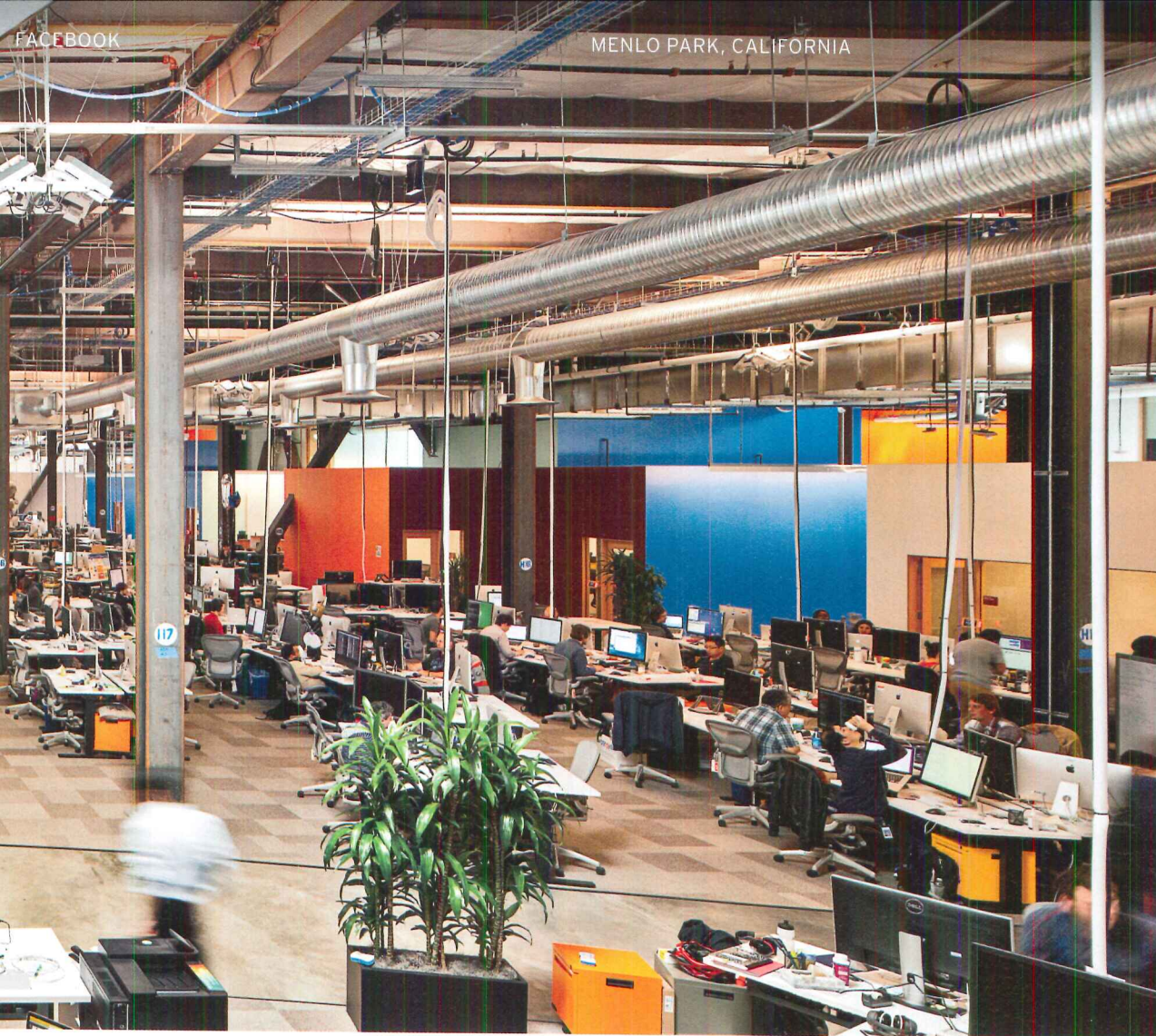
sunken patios break through the roof line and provide glimpses of the greenery from within.

While the architects were “constantly trading amenities” to meet the budget, says Gehry, there are several distinct moments where the architecture asserts itself. The main visitors entrance, Lobby 4, is a triple-height space clad in stainless-steel panels. Within the sunlit volume, a sculptural staircase is clad in plywood: a humble material used to glorious effect.

Upstairs, the overall atmosphere is one of calm and quiet. “A couple of hours after we moved in, people were hard at work,” says Tenanes. “The space felt so natural to everyone.” One flight down, on the main office floor, an employee printout on one wall reads: “Facebook Life Event: Saw Frank Gehry in a Frank Gehry building.” ■

Lydia Lee is a San Francisco-based journalist who writes on architecture, design, and urban development.



**DESK SET**

The world's largest open-plan office has a lofty exposed ceiling and is partitioned by enclosed conference rooms (left). Power and network cables hang from the ceiling. "You can just sit down and work," says Gehry. "It's welcoming, not precious." Circulation routes (opposite, bottom) are designated by polished concrete, while work areas are carpeted. The cafeteria (bottom) doubles as an all-hands meeting area.

**credits**

ARCHITECT: Gehry Partners – Frank Gehry, design partner; Craig Webb, project designer; Brian Aamoth, John Bowers, project partners; Jeffrey Wauer, project architect; Meaghan Lloyd, chief of staff

ENGINEERS: Forell/Elsesser (structural); BKF (civil); PAE (m/e/p/telecom)

CONSULTANTS: CMG (landscape architect); L'Observatoire (lighting); Newson Brown (acoustics); Brightworks (sustainability); Cornerstone (environmental and geotechnical); Cumming (project and cost management)

GENERAL CONTRACTOR: Level 10 Construction

CLIENT: Facebook

SIZE: 433,000 square feet

COST: withheld

COMPLETION DATE: March 2015

SOURCES

CURTAIN WALL: Kawneer

GLAZING: Viracon

CLADDING: Rimex (stainless-steel panels)

GREEN ROOF: American Hydrotech

CEILING: Baswaphon (acoustical); USG (grid)

WALLS: Ecoustic, Acoustical Surfaces

FLOORING: Pioneer Millworks (recycled wood); Interface (carpet); Mondo (resilient in elevators); Dex-o-Tex (resinous)

DOORS: Kawneer (entrance); Curries (metal); Eggers (wood); Horton (sliding); Cookson (fire)

FURNITURE: KI, Herman Miller

LIGHTING: Phoenix, Bartco (ambient); Targetti (downlights); Finelite, Kurt Versen (conference rooms); Bega (exterior)

CONTROLS: Lutron, ETC (lighting); Alerton (building)

ELEVATOR: Otis

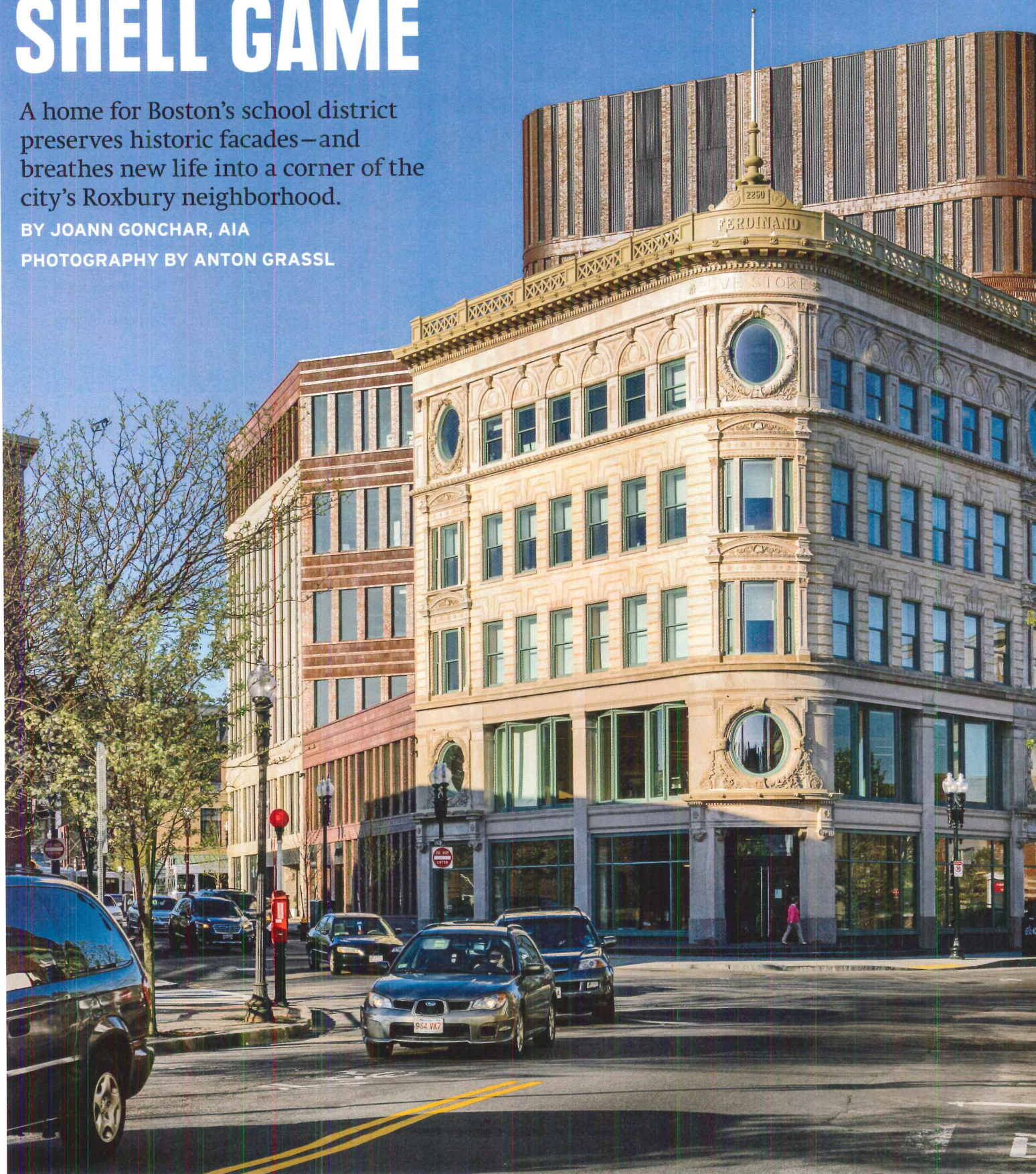
Bruce C. Bolling Municipal Building | Boston | Mecanoo and Sasaki Associates

SHELL GAME

A home for Boston's school district preserves historic facades—and breathes new life into a corner of the city's Roxbury neighborhood.

BY JOANN GONCHAR, AIA

PHOTOGRAPHY BY ANTON GRASSL



A sign on the door of Dudley Dough, a soon-to-be opened café on the ground floor of Boston's recently inaugurated Bruce C. Bolling Municipal Building, advertises "pizza, coffee, and economic justice." This improbable menu gives a clue to the larger goals behind the construction of the 215,000-square-foot, six-story structure completed this past spring. The \$96 million building, which is the administrative headquarters for Boston Public Schools (BPS), was first conceived about a decade ago by the late mayor Thomas Menino to help rejuvenate Dudley Square—the once-thriving commercial center of the city's Roxbury neighborhood.

One could hardly imagine a more challenging spot for such an urban-revitalization project. The client's roughly triangular block is bordered on two sides by traffic-filled streets and by a busy bus station on the third. And until it was rerouted in the late 1980s, an elevated train rumbled through the site. Although the tracks had been demolished long before Netherlands-based Mecanoo and local firm Sasaki Associates were hired as the architects in 2011, leaving the lot largely open, it was not a clean slate. Three late 19th-century structures occupied the property. At the northern corner was the five-story Ferdinand Building—a landmarked former furniture store with a graceful, but severely deteriorated, bowed facade of blond brick, granite, and terra-cotta confections. Two more modest four-story storefronts—the red brick Curtis Building and the granite Waterman Building—sat at the southwest corner.

Originally, the Bolling project, named after the first black president of the city council—a champion of investment in Roxbury—encompassed only the Ferdinand. But the team convinced the city that, in order to achieve the kind of transformation it envisioned, it was important to incorporate the other two.

The team opted to retain only the facades of the three historic buildings, in part to satisfy BPS's desire for open and flexible interiors but also because the structures were in very poor condition. At the Ferdinand, for example, stomping hard enough could have created holes in its shallow-arched floor slabs, says Jimmy Su, senior structural engineer with Arup. Saving the facades meant maintaining their stability during demolition and carefully weaving in a new permanent structure of steel framing and composite slabs on metal deck. The restoration work also entailed removing decades of grime, matching mortar, and recreating or repairing damaged ornamentation.

As the primary material for the new parts of the building skin, the architects chose a subtly reflective brown iron-spot brick in three different textures—smooth, a rough wirecut, and an almost bumpy artisan.

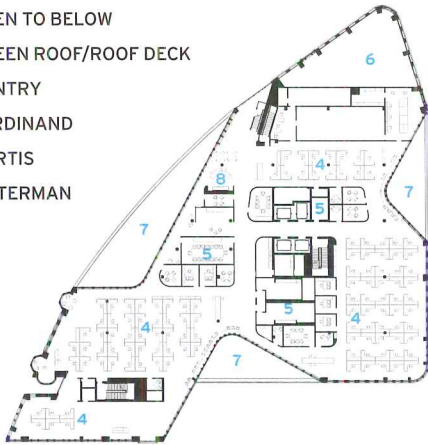
The new brick meets the old facades but steps back at angles, curving around corners as the building rises and culminating in a mechanical penthouse that is dramatically illuminated at night. This brick is laid in several patterns, including stacked bond between the windows and subtly corbeled spandrels of running bond and angled soldier courses. "The older buildings have a tremendous amount



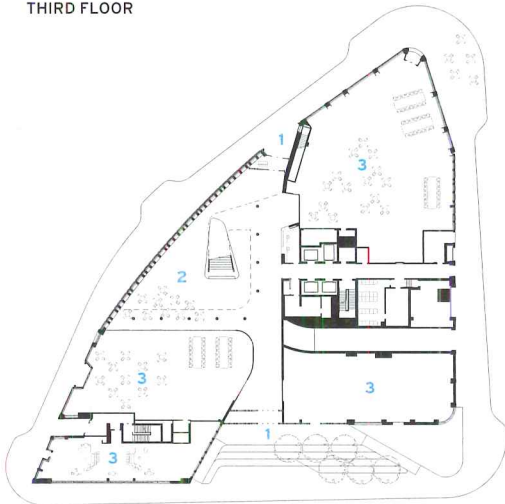
JEWEL BOX
The new BPS headquarters incorporates the facades of three late 19th-century structures, including the graceful bowed face of the Ferdinand Building (opposite). The headquarters' main entrance (above) sits where an elevated train once turned to cross the site. Its path is marked by lighting recessed in the lobby ceiling and above the entry (above).



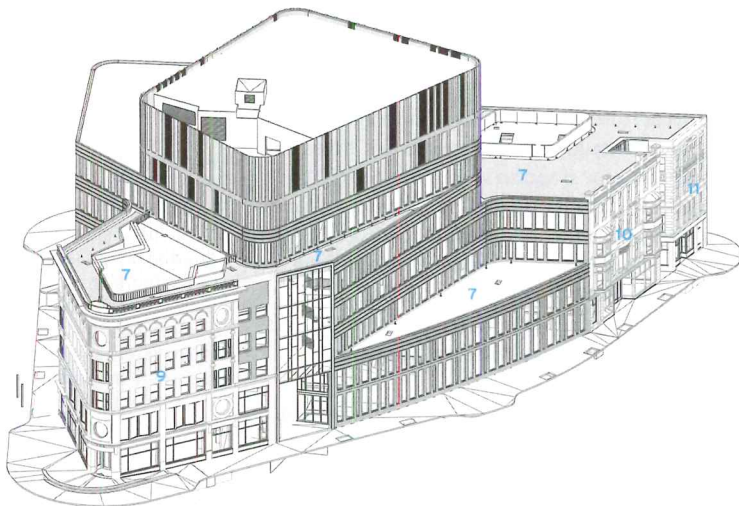
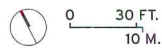
- 1 ENTRY
- 2 LOBBY
- 3 RETAIL
- 4 OPEN OFFICE
- 5 MEETING/Private OFFICE CORE
- 6 OPEN TO BELOW
- 7 GREEN ROOF/ROOF DECK
- 8 PANTRY
- 9 FERDINAND
- 10 CURTIS
- 11 WATERMAN



THIRD FLOOR



FIRST FLOOR



AXONOMETRIC DIAGRAM



credits

ARCHITECTS: Mecanoo and Sasaki Associates – Francine M. J. Houben, Friso van der Steen, Fedele Canosa, Marta Maria Roy Torrecilla, Luuk van Wijlick, Richard Hagg, Louise Bjørk, Eduardo Garcia Diaz, Conxa Gene Garcia, Ines De Almeida Lourenco, Alberto Seller, Mecanoo project team; Fiske Crowell, Victor Vizgaitis, Elizabeth Meek, Steve Hamwey, Sasaki project team

CONSULTANTS: Arup (structural, m/e/p, fp); Building Conservation Associates (historic preservation); LAM Partners (lighting)

CM AT-RISK CONTRACTOR: Shawmut Design and Construction

CLIENTS: Property & Construction Management Department, City of Boston; Boston Public Schools

SIZE: 215,000 square feet

CONSTRUCTION COST: \$96 million

COMPLETION DATE: March 2015

SOURCES

BRICK: Endicott

HISTORIC FACADE WINDOWS: Duratherm Window Corporation; Graham Architectural Products

HISTORIC FACADE CORNICE: Duro Fiber Company

GLASS: Guardian

SUSPENDED CEILINGS: Armstrong



CAPTURED CORNERS The architects chose brown iron-spot brick for most of the building's cladding. The subtly light-reflective bricks are laid in a variety of patterns, including stacked, running, and soldier bond. These new facades meet the historic ones, including the red brick face of the Curtis Building (opposite), but step back at angles and curve around corners as the building rises. In order to assert or, as Mecanoo's Houben says, "grab" the building's south (top) and southwest (above) corners, the architects chose another material—rough ashlar granite.



of detail,” says Victor Vizgaitis, a Sasaki principal. “We wanted to respect that idea of craft.”

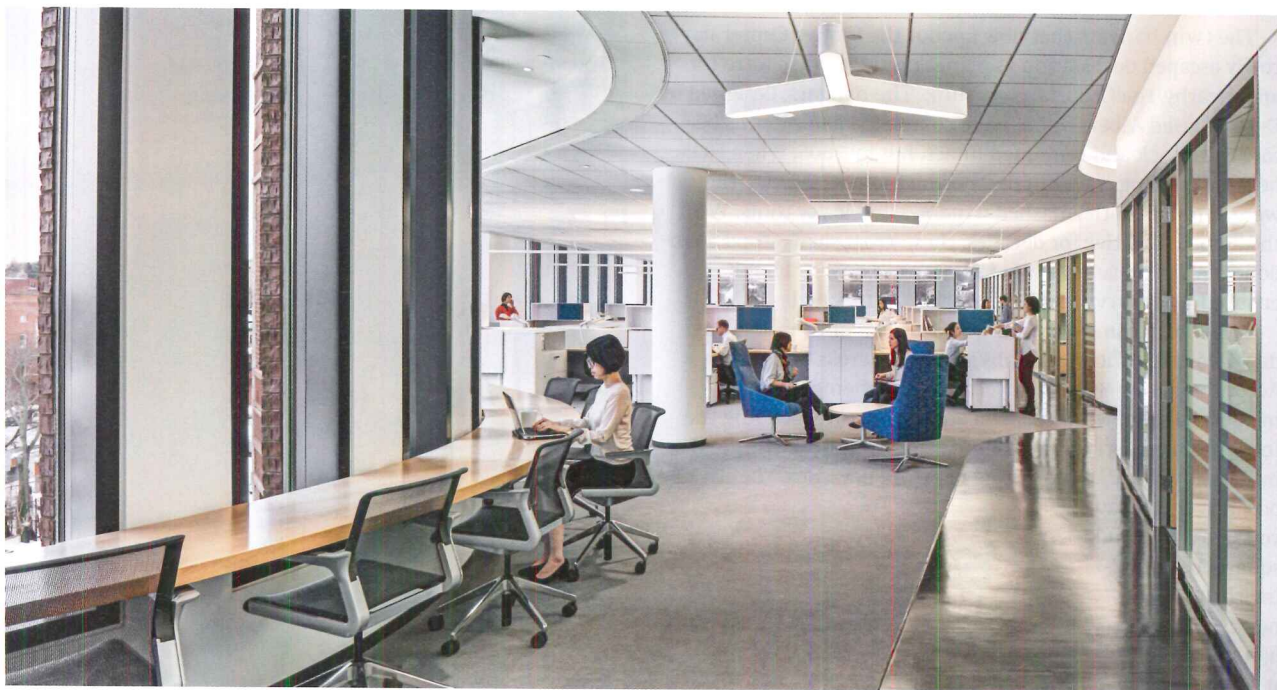
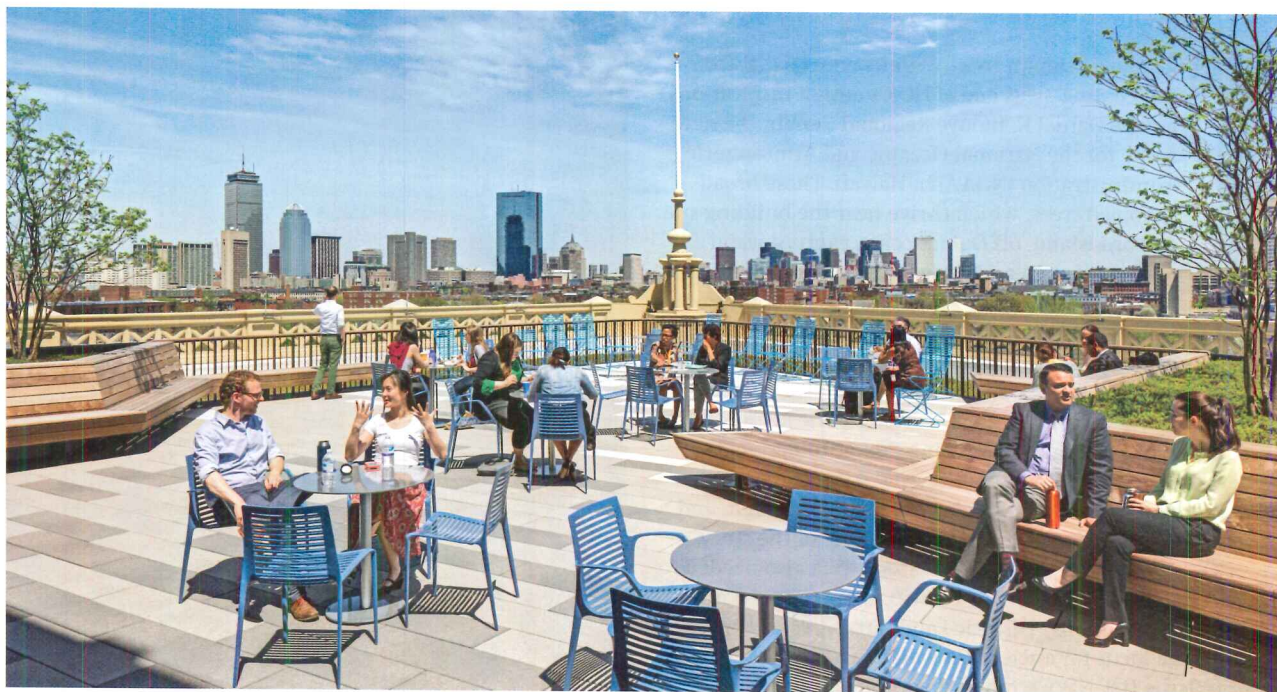
Given the brickwork’s complexity, the team placed relieving angles at each floor. The strategy provided bricklayers with much-needed adjustability. It also allowed the architects to stagger the windows—which range in width from 16 to 40 inches—so that neither the windows nor the two-brick-wide piers between them line up from level to level. The resulting skin has a delicacy sympathetic to the historic facades but with a “jazzy” rhythm, says Francine Houben, Mecanoo’s creative director.

Less successful is the treatment of the building’s south and southwest corners. There the architects chose rough

ashlar granite from the same quarry that the 19th-century craftsmen used on the Waterman. Sasaki and Mecanoo combined the stone with large glazed openings and smaller ones that mimic the rhythm of the windows on the new brick portions of Bolling. The intent was to assert, or “grab,” the site’s three corners and then tie them together “in a sculptural way, with the brick as cement,” explains Houben. However, the new stone facades look like a mash-up of traditional load-bearing masonry and Modernist fenestration.

These caveats shouldn’t detract from the design team’s considerable accomplishments, including creating flexible and comfortable workspace for the BPS staff. The offices have basic finishes, like carpet tile and suspended ceilings,

PUBLIC-PRIVATE
Three floors of flexible, daylight-filled BPS offices (opposite, bottom) are sandwiched between public spaces like the double-story lobby (above)—with its rich terrazzo floors and birch elements, and a sixth-floor roof deck positioned at the prow of the Ferdinand Building (opposite, top).



but are intelligently laid out to make the most of the odd-shaped footprint: easily reconfigurable cubicles are placed near the building perimeter, while conference rooms, private offices, and small enclosed spaces for collaborative work are located within cores. Cove lighting washes the walls—enlivening the few areas with little access to daylight.

The office floors, on levels three through six, are reached through the handsome double-story lobby, with its black terrazzo floor and a ceiling of birch-wood slats. A generously proportioned stair that doubles as informal seating leads to a mezzanine level with a school-committee room that can be reserved for cultural and community activities, as well as to the Roxbury Innovation Center, a business incubator. The top

floor also features spaces for both the public and BPS staff, including meeting rooms and, at the prow of Ferdinand, a roof deck with a view of downtown Boston.

Arguably, the public amenity that has the potential to make the biggest impact on the vibrancy of Bolling's surroundings is its street-level retail. So far, five of the six spaces have been leased to businesses that include an optician, a clothing store, and Dudley Dough. This café will be run by Haley House—a nonprofit with a bakery training program for underemployed men and women. Houben says she was worried at first that Bolling would be “just an office building.” But with its social justice goals, preservation of history, and revival of craft, it appears poised to become much more. ■

The albizia saman tree—with its natural gift for self-cooling—was one of HOK’s design inspirations for the Daniel K. Inouye Regional Center, the new home for the National Oceanic and Atmospheric Administration (NOAA) in Hawaii. These broad-canopied trees, which thrive near the building site on Ford Island, off Oahu’s coast, capture water vapor as their leaves open and close with changing light. It’s hard to imagine a better design influence for a federal agency with a focus on weather and climate.

With NOAA’s mission spanning from oceans to skies, its Ford Island facility needed to bring together diverse entities—from the National Weather Service Pacific Region Headquarters and Tsunami Warning Center to national centers for environmental satellites and data, marine fisheries and sanctuaries, oceanic and atmospheric research, and others. “But NOAA’s complexity was just part of the story,” says HOK design principal Paul Woolford. “We also needed to address the historic site and its existing structures.” Ford Island, today a National Historic Landmark at Pearl Harbor, was a sacred locus for ancient Hawaiian fertility rites before it became the U.S. Navy strategic operations base that the Japanese attacked on December 7, 1941.

The twin hangars that now anchor the Inouye Center narrowly escaped devastation as planes on the tarmac were hit and, nearby, the USS Utah was sunk. The hangars, designed by Detroit-based Albert Kahn, were completed just months before the attack and remained intact. But by 2005, when HOK began exploring ways of repurposing them for NOAA, they were derelict—with smashed windows and leaky roofs. With the airfield inactive for decades, these great sheds stood abandoned. An historic review at the project’s onset, though, ensured their survival, with exteriors untouched.

NOAA had come onboard with the goal of consolidating departments, offices, and labs scattered across Oahu. Accommodating 800 employees, HOK’s scheme links the historic hangars with a central entry structure, echoing the industrial aesthetic and rectilinear rhythms of the original buildings while distinguishing old from new. Now themes of ocean and air draw you into the 300,000-square-foot building through the new recessed entry bay, with views straight to the water behind, where NOAA’s research vessels are moored.

Critical to NOAA’s mission is sustainability, and



AFTER INFAMY A new glass-and-steel structure links a pair of 1941 hangars on either side (right). HOK installed innovative passive cooling units with translucent penthouses on the rooftop. New landscaping distinguishes between the original coastline and landfill added in the 1930s when Pearl Harbor was deepened. During the Japanese attack in 1941, planes caught fire in front of one hangar (above).





NOAA Inouye Regional Center | Honolulu | HOK

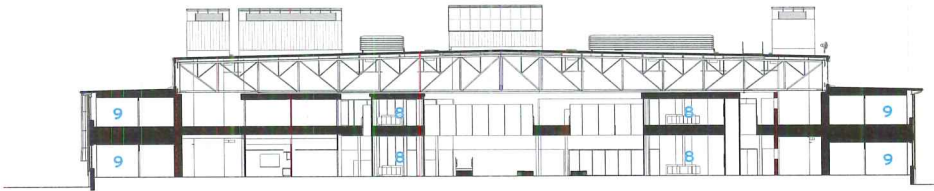
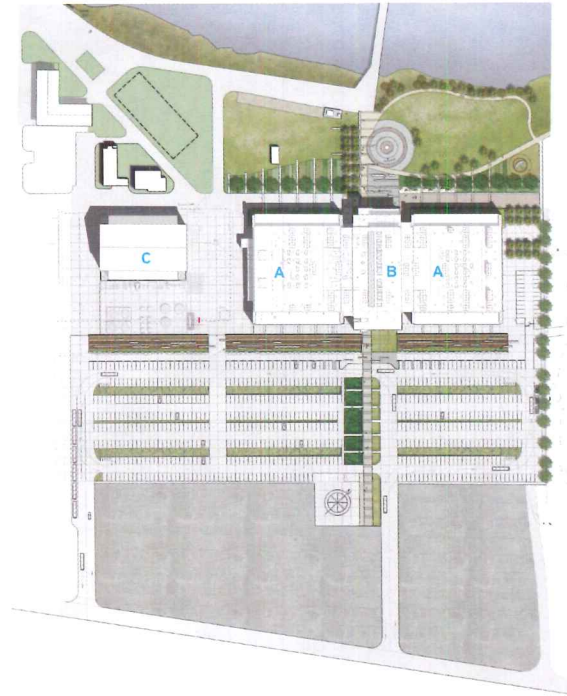
FROM SEA TO SHINING SEA

Historic hangars at Pearl Harbor have been renovated and expanded as offices and labs for the National Oceanic and Atmospheric Administration.

BY SARAH AMELAR

PHOTOGRAPHY BY ALAN KARCHMER

- | | |
|--------------------------|----------------------|
| 1 ENTRY/RECEPTION | A ORIGINAL HANGAR |
| 2 ATRIUM/CENTRAL GALLERY | B ADDITION |
| 3 EXHIBITS/DISPLAYS | C HISTORIC WAREHOUSE |
| 4 AUDITORIUM | |
| 5 DINING | |
| 6 LIBRARY | |
| 7 LABORATORY AND SUPPORT | |
| 8 COLLABORATIVE SPACE | |
| 9 OFFICES | |
| 10 OPEN TEAM SPACE | |



SECTION A - A

0 30 FT.
9 M.



SECOND FLOOR



FIRST FLOOR

0 100 FT.
30 M.

credits

ARCHITECT: HOK – Paul Woolford, design principal; Ted Davalos, project director; Brigitte Williams, project designer; Suk-King Yiu, John McGuire, project managers; Kyle Prenzlow, project architect; David Herron, senior interior designer; Zorana Bosnic, sustainability leader

ASSOCIATE ARCHITECTS: Ferraro Choi & Associates – Joseph Ferraro, principal in charge

ENGINEERS: SOHA Engineers (structural); WSP Flack + Kurtz (m/e/p); Kennedy Jenks (civil); Kleinfelder & Geolabs (geotechnical)

GENERAL CONTRACTOR: Walsh Construction

CLIENT: Naval Facilities Engineering Command

OWNER: National Oceanic and Atmospheric Administration

SIZE: 300,000 square feet

PROJECT COST: \$135 million

COMPLETION DATE: January 2014

SOURCES

CURTAIN WALL: PAC Glazing Solutions and Pacific Aluminum

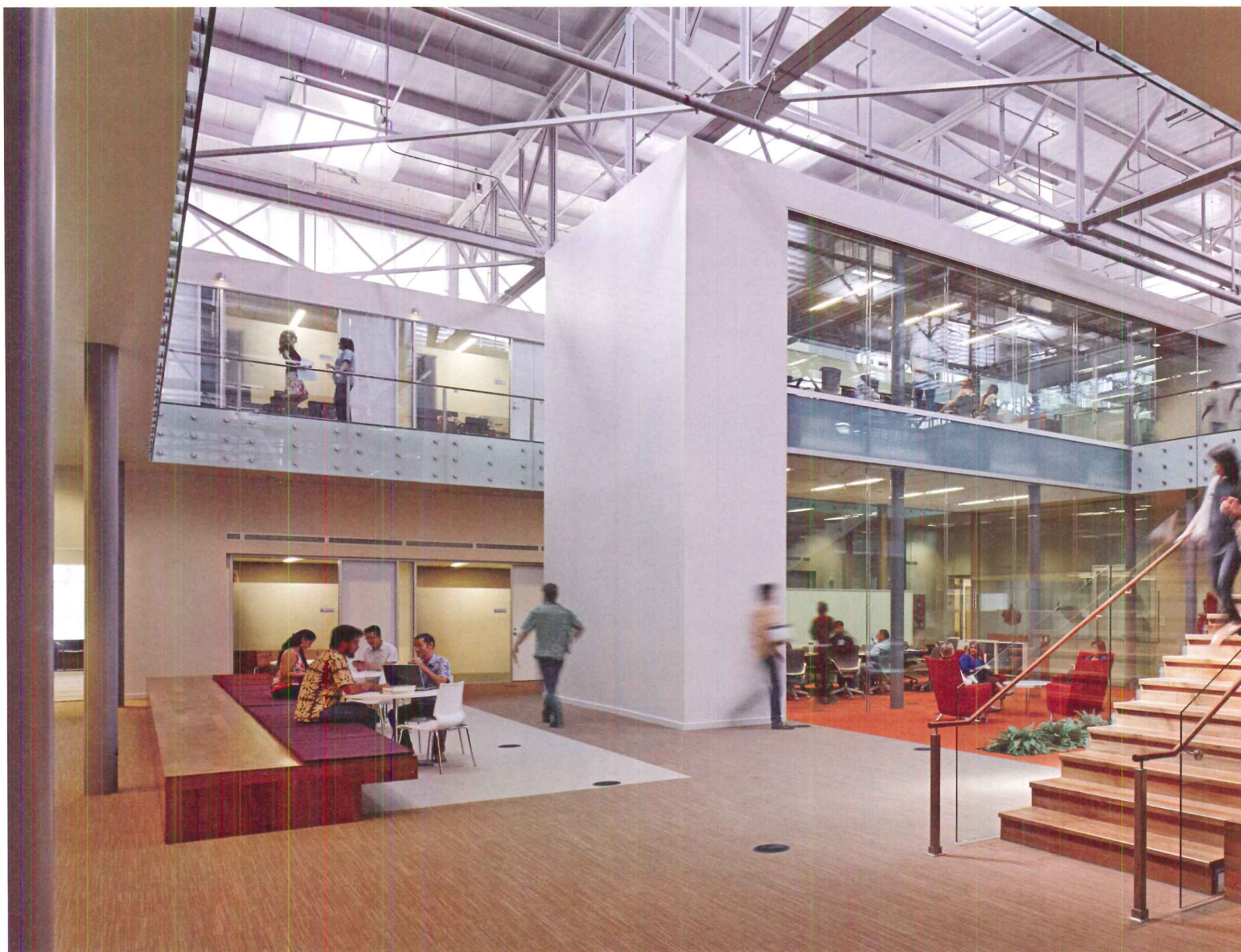
RAINSCREEN: Eternit

SKYLIGHTS: Viracon

INSULATED PANELS: Sunpal



MAIN STREET Work areas and walkways overlook the three-story central atrium, creating a sense of openness and transparency. Sun and privacy screens made of ohia wood recall Hawaiian lanais.



the center—on track for LEED Gold—is particularly innovative in its cooling system. Evoking the *albizia samans*, it draws on passive means to self-modulate temperature, humidity, and ventilation. Rooftop scoops capture prevailing trade winds, channeling them across point-chilled coils of water from geothermal undersea wells. The heavier, cooled air forms downdrafts, dropping into vertical supply chimneys, while buoyant warmer air rises to exhaust vents. When outside temperatures dip below 65 degrees, the system reverses itself, assisted by heating, instead of cooling, coils. With natural stack and venturi effects, no mechanical fans are needed, though the point-chilling does require conventionally generated energy. As condensation on the coils feeds a graywater system and the roof funnels rainfall into bioswales, no gray- or stormwater leaves the site.

Favoring native materials, HOK paved the forecourt in Hawaiian basalt, leading from a parking lot still studded with aircraft tie-downs from its days as a runway. The volcanic pavers continue into the soaring, skylit, triple-height

lobby, alongside *ohia*, a local hardwood. This central space does double duty for gathering and exhibitions, with displays including live NOAA satellite feeds. Within the flanking hangars, HOK inserted two additional floor levels, reusing the original steel structure, with open work areas, walkways, and stairs overlooking the lobby. *Ohia* screens—reminiscent of Hawaiian lanais, or porches—veil the glassed-in work floors. Throughout the building, rooftop diffusers, translucent partitions, and multiheight spaces bring daylight deep inside, illuminating a vast footprint of 730 by 270 feet.

Casual communal spaces, generous circulation routes, and clear sight lines—plus an auditorium, library, airy cafeteria, and outdoor deck—foster employee collaboration. “Geographic proximity is everything,” says site manager Steven Gallagher. “Pantries are positioned for sharing among departments. Adjacencies lead to interaction without a trip across town.” Now marine-mammal and fisheries teams abut each other; research vessels dock near related

SOCIAL HUB

Open stairways rise through communal spaces, encouraging interaction between departments (above). The architects reused most of the 1940s steel structure. Rooftop diffusers as well as clerestory windows bring daylight deep into the building (opposite, bottom). The diverse program includes state-of-the-art laboratories (opposite, top).



labs; and a repurposed aircraft shed houses rehab tanks for endangered monk seals and Hawaiian sea turtles.

Though preservationists were relieved that the hangars survived, the size and prominence of the wind scoops, resembling conventional rooftop HVAC penthouses, have drawn some criticism. Nonetheless, much was saved, revived, and creatively integrated, including original hangar pocket doors, now partially drawn like massive curtains outside new double-glazed facades.

Hawaiian Senator Inouye, who was dedicated to educating children about the ocean, played a key role in realizing this \$135 million project. When he died before its completion, it was named in his honor and has already fulfilled such aspirations of his as science and ocean camps for students. "Many things are possible here that we could never do before, and this design anticipates growth," says Gallagher. "Now NOAA is talking about importing this model—for sustainable design, adaptive reuse, and consolidation—to all its centers." ■

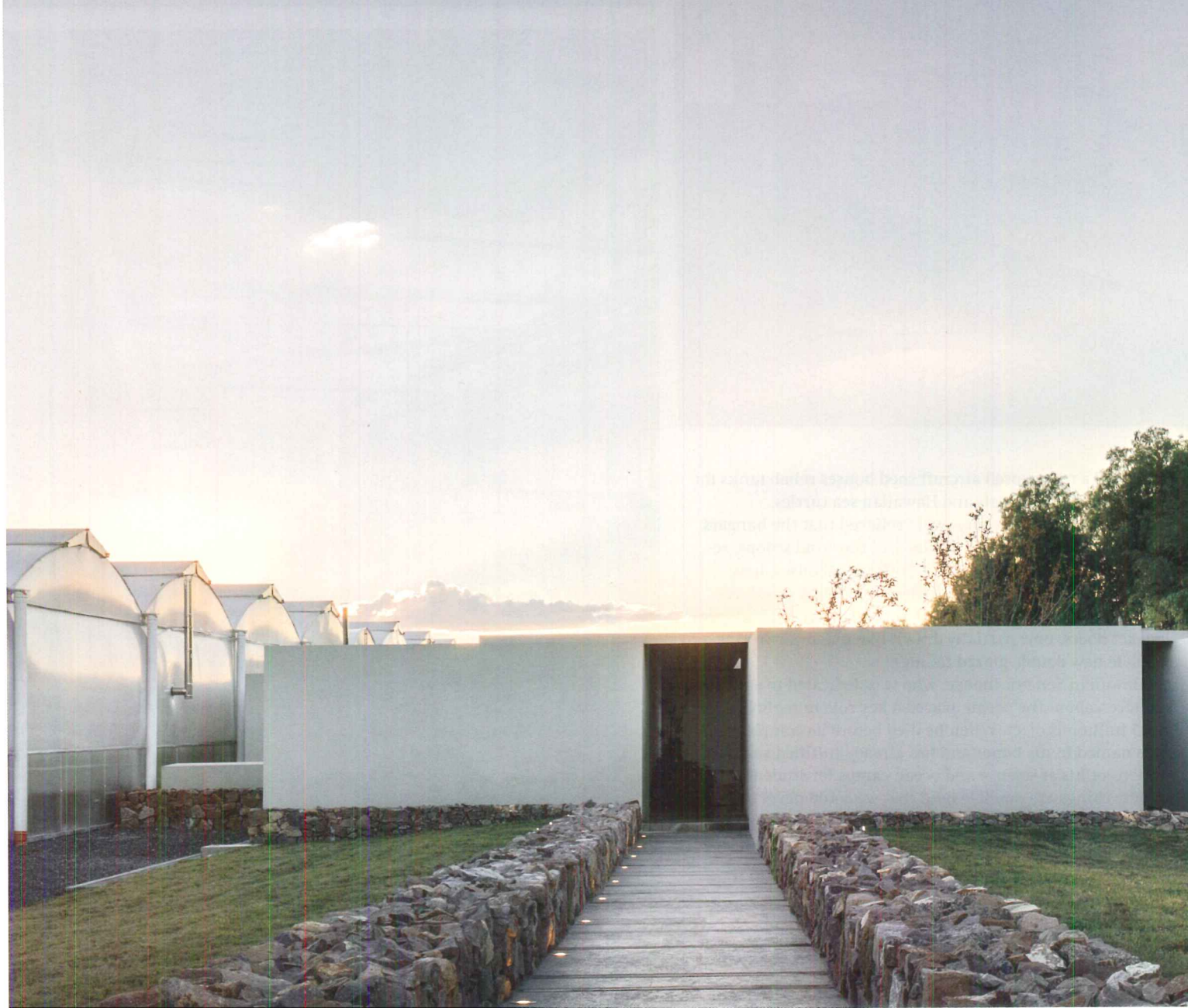
Next Vegetales Headquarters | León, Mexico | CC Arquitectos

FARM TO (WORK)TABLE

A small office building bridges the gap between greenhouse workers and managers of a hydroponics company.

BY DEBORAH SNOONIAN GLENN

PHOTOGRAPHY BY RAFAEL GAMO



When the Mexican hydroponics company Next Vegetales bought land adjacent to its greenhouse in rural Guanajuato state, the owner wanted to do more than expand its production capacity. He asked his friend Manuel Cervantes of CC Arquitectos in Mexico City to design an office that would, in Cervantes's words, "improve the employees' quality of life and unite them in a shared sense of purpose." The low-slung minimalist building he conceived skillfully weaves together indoor and outdoor spaces to offer a collaborative, relaxed atmosphere within a cutting-edge agricultural operation.


The site—located near the city of León in central Mexico—presented unique challenges for an office building. The new structure, to house about 30 managerial and administrative staff, would coexist with two adjacent greenhouses covering 10 acres, where 300 workers cultivate, pack, and ship several varieties of leafy vegetables that are grown using nutrient-rich water and sold under the brand name Eva. "The local context is farmland, with distant views to the horizon," says Cervantes. "So the question became how to define a complex that is humanly scaled—more homelike than office-like—while providing a visual break from the surroundings and relating to the greenhouses where the production work is done."

For security reasons, the complex is not open to the public. Turning off the main street in the town of San Francisco del Rincón, you navigate cobblestone and dirt roads to a parking lot with a gated checkpoint. From there, you walk down a paved access road past one greenhouse to the office's entry path, an assemblage of stone tiles, wooden railroad ties, and rustic stone walls. It's a reminder of the bumpy roads you took to get here.

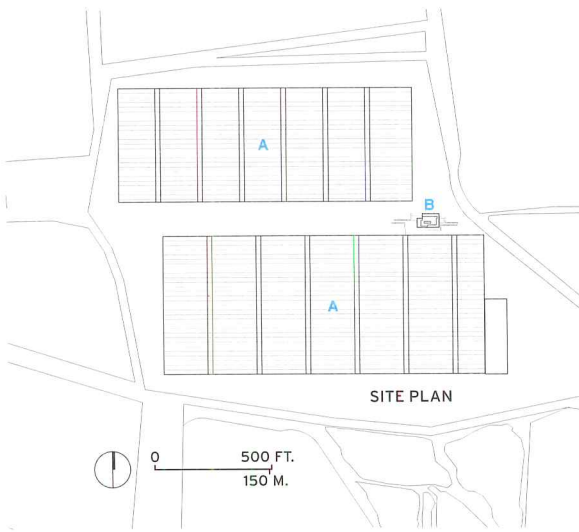
From this vantage point, Cervantes's 13,500-square-foot, stucco-clad concrete building seems nearly as monolithic and impenetrable as the greenhouses that flank it. In a public location, this effect might be off-putting, but here it mitigates the differences in scale among the structures so that the office doesn't seem dwarfed by its enormous neighbors. And the white stucco harmonizes with the gray aluminum-and-polyethylene facades of the greenhouses, linking the three visually.

Once inside the low-key building, you see that the floor plan reveals a much different character. Past the entry, you encounter a series of interconnected volumes housing various functions: conference and meeting rooms, training areas, workstations. They all spill into a breezy, semi-enclosed central courtyard, which serves as an informal gathering spot and a backup workspace with casual seating and Wi-Fi access. The hefty concrete roof slab hovers over it all, linking these airy spaces. You feel not so much indoors as tucked into the surrounding landscape, and natural ventilation keeps temperatures bearable even on hot, humid days. Only the offices have central air-conditioning, and it's not used often, says Cervantes. The cooler, north-facing rooms don't have it at all.

Providing visual connections among coworkers and offering access to nature emerge as two key motifs. Walls of glass and white stucco allow for ample daylighting and framed outdoor views. There's not a partition or solid wall to be found between workstations or enclosing private offices, and a glass wall permits office workers to look directly into the newer greenhouse to the south, which features the latest hydroponics equipment. (Picture an indoor field of lettuces, grown in trays and stretching practically as far as the eye can see.) In addition to sharing the central courtyard, nearly every functional area opens onto a dedicated patio. A vibrant one adjacent to the workstations was designed by artist Jerónimo



WALK THIS WAY Rustic stone walls flank a walkway of unpolished marble tiles and wooden railroad ties, creating a rugged entry to the office building.



- 1 ENTRY
- 2 RECEPTION
- 3 TRAINING
- 4 PATIO
- 5 OPEN OFFICES
- 6 PRIVATE OFFICE
- 7 MEETING

- A GREENHOUSE
- B OFFICE BUILDING

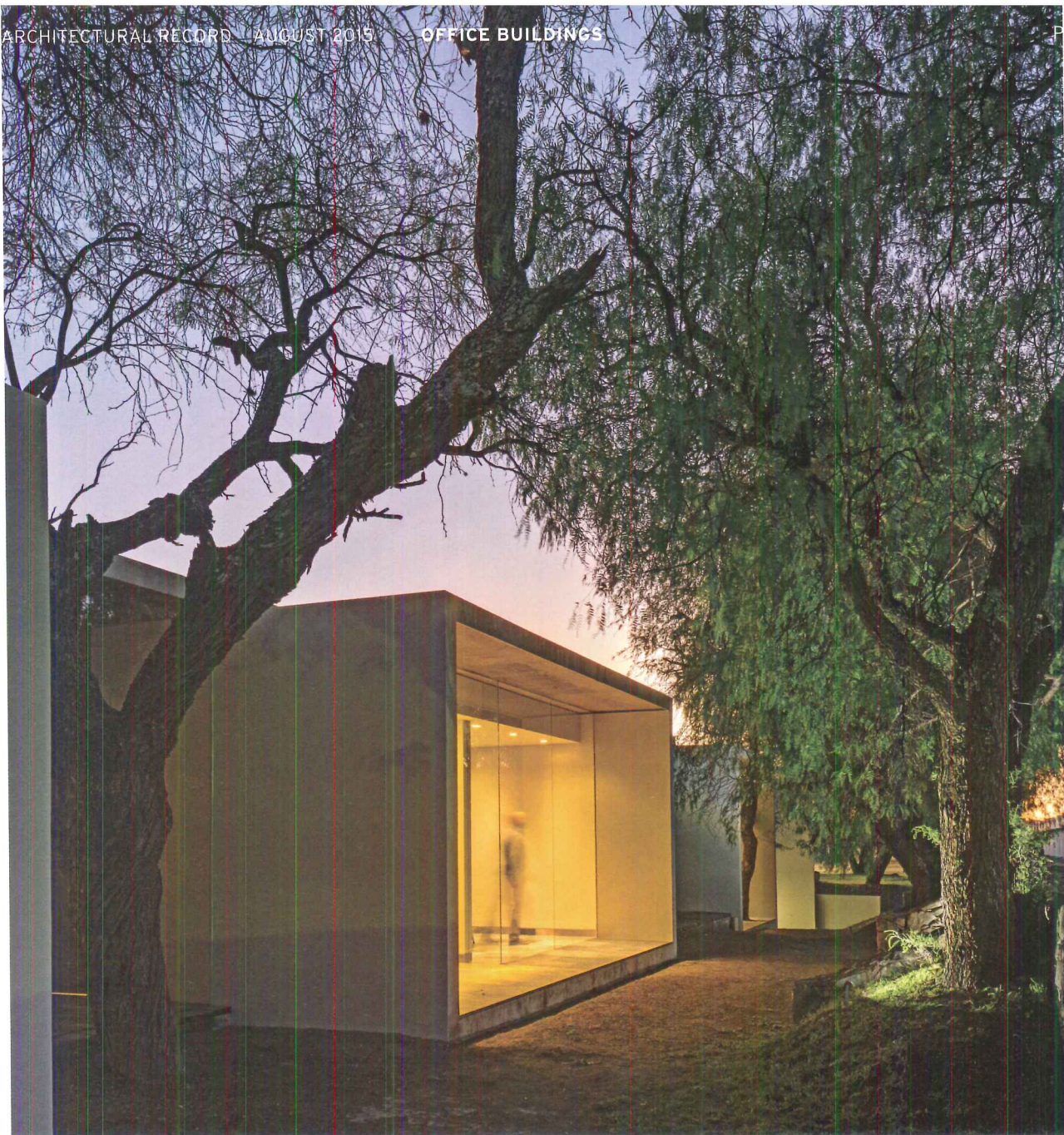




SECOND NATURE

The building was sited to accommodate old-growth mesquite trees (above). An office area opens onto a garden-like patio animated by a cheery yellow wall, designed by artist Jerónimo Hagerman (opposite, bottom). Planters, a water feature, and a large opening in the roof slab offer direct connections to nature in the central courtyard (right).





FITTING IN
Conference rooms of different sizes occupy separate boxlike volumes that follow the site's gentle slope. Floor-to-ceiling glass lets in plenty of daylight, but trees and a north orientation prevent the sun from heating up the interiors.

Hagerman and features hanging *Cissus antartica* vines with dark-green leaves that are adaptively changing hue because of the bright-yellow wall behind them.

Materials, many of them sourced locally, were chosen for their durability and neutral appearance. Cervantes manipulated them to define transitions—in short halls or passageways between volumes, for example, where the walls and ceiling are covered in the same smooth walnut used for doors and furniture in the conference rooms. Marble floor tiles are polished indoors but left unpolished on patios, in the courtyard, and on the entry walkway, a nod to the rugged nature of the outdoors and a feature that makes them less slippery when wet.

Following the lead of tech-company facilities, many office designs today try to encourage interaction and break down barriers between management and workers. Cervantes's project for Next accomplishes these goals while establishing a sense of calm and order, and underscoring the importance of the natural world to the business being conducted. For employees, it seems to have hit the right notes. As Arnulfo Canchola Caro, a maintenance supervisor, said on a recent visit, "It's a pleasant place to be. Often when I'm here, I forget I'm at work." ■

Deborah Snoonian Glenn is a Los Angeles-based writer and editor.

credits

ARCHITECT: CC Arquitectos

– Manuel Cervantes Cespedes, principal

CONSULTANTS: Entorno Taller Paisaje (landscape)

GENERAL CONTRACTOR: Segura Constructora

CLIENT: Grupo Altex

SIZE: 13,500 square feet

CONSTRUCTION COST: \$1.4 million

COMPLETION DATE: October 2014

SOURCES

OFFICE FURNITURE: Organitec

DOWNLIGHTS AND EXTERIOR LIGHTS: Construliita

RECEPTION FURNITURE: Custom by CC Arquitectos

PAINTS: Comex

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- Eric Richey**
Associate Partner,
ZGF Architects
- Peter Ruggiero**
Design Director, HOK
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NJIT Center for Building
Knowledge
- Lindsay Urquhart-Turton**
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- Scott MacTavish**
Director U.S. Operations,
Bespoke Careers
- Alex James**
Bespoke Careers
- Leslie Quichua**
Bespoke Careers



◀ Gary Handel, Leslie Quichua, Lindsay Urquhart-Turton and Paul Petrunia (l to r) discuss innovative strategies for attracting and retaining talented staff at the recent AIA Convention in Atlanta.

HOW DO YOU attract and, equally important, retain talented staff? This was the question posed to representatives from leading design firms at an Architectural Record/Bespoke Careers roundtable held during the recent AIA Convention in Atlanta. Participants grappled with an issue that is increasingly common across the profession: How can architecture firms successfully navigate the rapidly evolving landscape of hiring and nurturing high-quality employees?

Right out of the gate, all the firms acknowledged that they were hiring... and that it was a challenge to attract talented individuals. "The younger generation feels like they have a lot more choices," noted Meg Brown, chief talent officer at Perkins+Will, with the result that firms need to be more proactive in convincing high-quality recruits to join them, and they need to offer more than just the quality of their design work. "Candidates may be attracted to firms because of their projects, but the reason they stay is much more than that: Firm brand, environment and culture all play a part," Brown continued. Kap Malik, principal at Gensler, reinforced this sentiment: "We are selling more than a job. We spotlight lifestyle, work/play balance, overall work environment and other benefits. The salaries the larger firms offer are mostly the same, so we need to distinguish ourselves in other ways." Lindsay Urquhart-Turton of Bespoke Careers noted that surveys her firm conducted on what motivates

young architects to accept—or change—jobs, revealed that "Salary is pretty much at or near the bottom" of their core concerns.

If this sounds like a "seller's market," it is, at least when it comes to larger firms trying to attract the highest-quality personnel. As a consequence, recruitment strategies are evolving to blend more into the overall branding of the firm itself. Instead of a simple "Job Opportunities" button on his firm's web site, Gary Handel of Handel Architects is creating a complete employment "portal" designed to showcase the firm's practice and culture to potential hires. Clients are encouraged to visit the portal as well. "We're proud of our culture and want to attract people who believe in what they

are doing and what we have to offer," Handel noted. Paul Petrunia, founder of Archinect, agreed, "Firms need to do a better job of letting potential candidates know about their work environment. Every day on our job boards we have 40-50 jobs. Advertising and promoting the culture at a firm is very important."

In spite of their substantial and growing efforts to attract talent, however, roundtable participants were realistic in their assessments of how long these new hires would remain with their firms. As one participant put it: "We know that for every 100 people we hire, only 10 will be with us after 10 years." It's not that they want to exploit the firms they work for, they simply want—and expect—to have a variety of experiences over their work lives. So how can firms accommodate this type of built-in churn? The answer: Do everything you can to retain them but, if they do decide to move on, make it a positive experience, keep in touch and let them know they're welcome to come back. ♦



RUGGIERO To be competitive, you need to put younger architects in visible, serious work. And offer them responsibility and the opportunity to take on a larger role.



BROWN Candidates may be attracted to firms because of their projects, but the reason they stay is much more than that: Firm brand, environment and culture all play a part.



MALIK We are selling more than a job. We spotlight lifestyle, work/play balance, overall work environment and other benefits.

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Architect:
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SECURITY DOORS



DRAINABLE HOUSEWRAP



Feedback Loop

With a frequent gap between predicted and actual performance, post-occupancy evaluations begin to catch on. *By Peter Fairley*

POST-OCCUPANCY EVALUATION, or POE, is a diverse practice that can feed back data into the design process on everything from energy and water consumption to workplace satisfaction and even occupants' sleep cycles. According to sustainability-minded architects, POE is a prerequisite to closing the all-too-frequent gap between predicted and actual performance.

"If we want to design high-performing buildings that use very little energy, it's imperative that we be able to predict the impact of our design decisions. We have to get to that point," says Shawn Préau, an associate at New Orleans-based Eskew+Dumez+Ripple.

Many architects recognize that tracking the performance of their designs is good practice, and say they are ready to face the results, be they flattering or not. Yet POEs remain far from standard practice. "We're putting all these technologies and strategies into buildings, but, most of the time, as architects, we're not benefiting from the feedback loop," says Ilana Judah, principal and director of sustainability at FXFOWLE.

A recent survey on the state of play of POEs affirms Judah's take. The survey, conducted by Skidmore, Owings & Merrill associate Julie Hiromoto, garnered responses from 29 U.S. and Canadian architecture firms. Most expressed a desire to perform POEs, but only 18 of 29 are actually conducting them. Most did so on less than 5 percent of projects completed in the previous year.

This gap between aspiration and implementation is not solely a North American issue. A 2012 report on POEs from the SCI-Network, an organization of European public agencies focused on best practices in construction procurement, found POE use was "very low."

In spite of the stats, architects who are involved in POEs say their value is becoming better recognized within the industry. And they see a number of developments that are raising the profile of the practice with their clients, including more stringent building codes, energy consumption reporting mandates, and design-build contracts that link a portion of the project team's compensation to the post-occupancy performance of their de-

signs. "There's more accountability than there used to be," says Judah. "The community of folks who believe in this is beginning to coalesce," agrees Janice Barnes, who leads the strategy group for Perkins+Will.

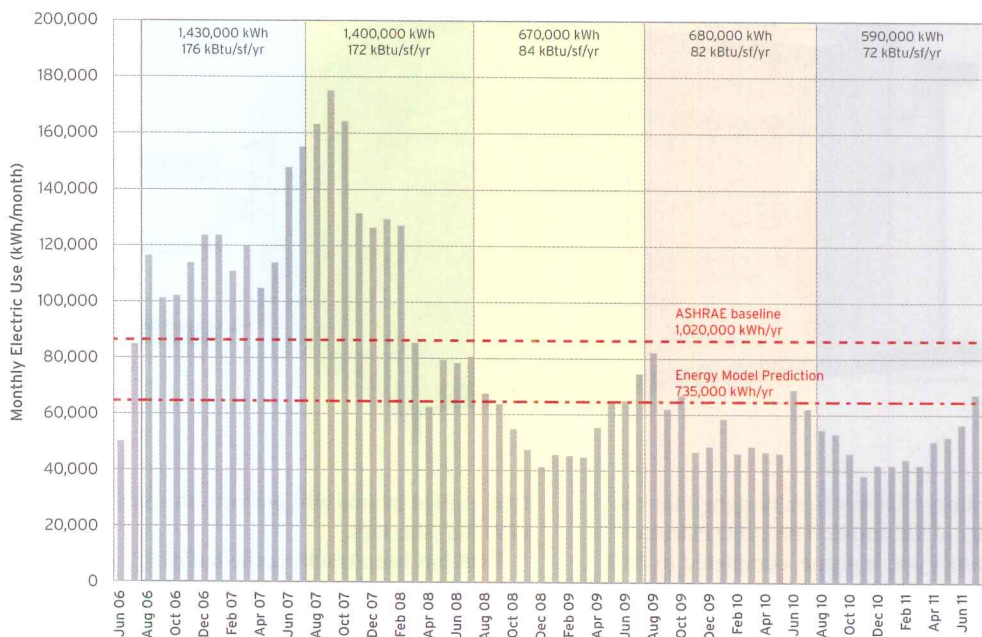
The value of getting feedback on projects hit home for Préau's firm after the opening of its first LEED-certified building: the Dr. Nancy Foster Florida Keys Environmental Center in Key West. The 30,000-square-foot multipurpose facility, occupied by the U.S. National Oceanic and Atmospheric Administration in 2006, was predicted to consume 735,000 kilowatt-hours per year—28 percent fewer than the ASHRAE baseline. In its first two years of operation, however, the LEED Silver building was consuming almost twice that amount.

Faulty settings in the building-management system were the culprit: two months after commissioning, a software upgrade wiped out the settings tuned by the commissioning agent. A local consultant's efforts to fix the problem fell short. Ultimately, humidity and mold issues convinced the owner to bring Eskew+Dumez+Ripple and the commissioning



WAKE-UP CALL Eskew+Dumez+Ripple decided to try to track the performance of all its LEED projects after energy use skyrocketed at its Dr. Nancy Foster Florida Keys Environmental Center in Key West. The problem, caused by a building-management system software glitch, has since been resolved.

ENERGY USE: DR. NANCY FOSTER FLORIDA KEYS ENVIRONMENTAL CENTER



agent back into the picture nearly two years later. The problems were then quickly resolved. Energy consumption immediately fell below what designers had originally predicted.

Eskew+Dumez+Ripple determined that from that point forward they would attempt to track energy consumption of all their LEED projects. They wanted to understand the variables affecting performance and get a jump on any issues that arose. "It's a lot of fun to make a baby. But for that baby to live a long and healthy life, there's a whole lot of care and feeding that needs to take place," says Préau.

Revisiting projects is about fully understanding the effectiveness of innovative design solutions, says Ed Clark, an associate with the Seattle office of ZGF Architects, a firm that also seeks to track all projects designed to meet industry certification standards such as LEED. To Clark, POE is a way of grappling with the seemingly "overwhelming" level of complexity creeping into building design. "It creates an opportunity to understand how to make the next project better," he says.



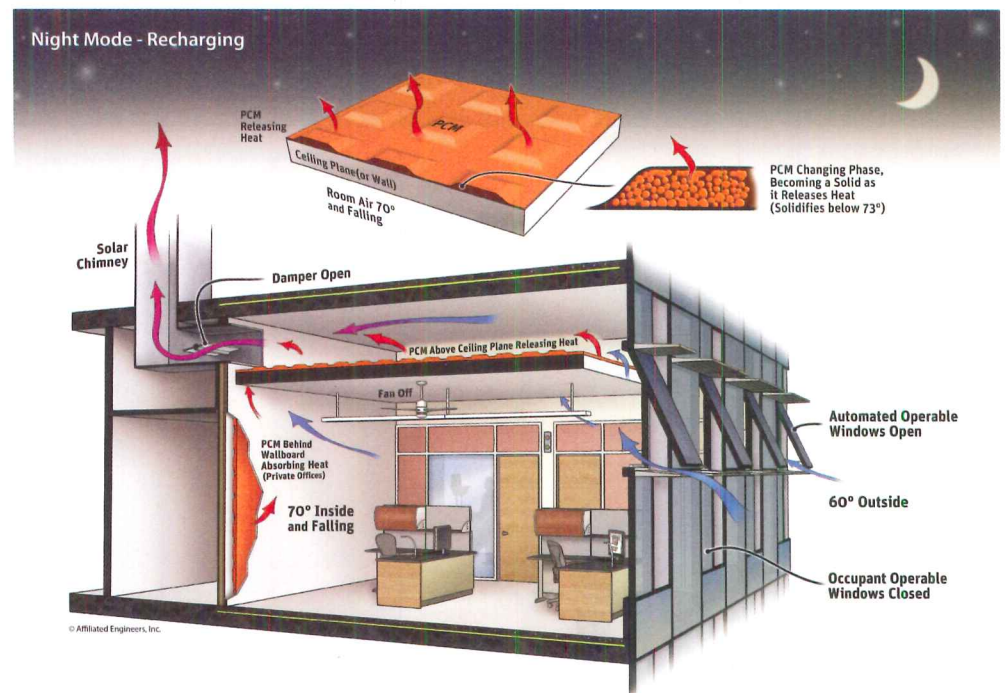
TECHNOLOGY UPGRADE A POE helped ZGF understand the effectiveness of a phase-change material (below) used at the University of Washington's Molecular Engineering & Sciences Building (above). For the project's second phase, which is now under construction, the firm has modified the ceiling design to boost the material's performance.

Clark cites ZGF's recent work on the Molecular Engineering & Sciences Building at the University of Washington in Seattle, a lab and office complex that was occupied in 2012, with a second phase now under construction. ZGF wanted feedback on its strategy to moderate temperature swings in the building's naturally ventilated offices. Most of the cooling happens at night, through flushing the space with fresh air, with a phase change material (PCM) in some wall and ceiling cavities absorbing heat throughout the day.

ZGF is tracking energy consumption on the complex's LEED Gold-certified phase I, and it placed data-loggers in wall cavities and dropped ceilings containing PCM to record temperature. ZGF also engaged the Center for the Built Environment (CBE) at the University of California Berkeley to conduct occupant comfort surveys.

The building met requirements for temperature consistency and occupant comfort (Clark says occupants of the fresh-air-cooled building comment on how well the "air-conditioning systems" perform). For phase II, ZGF is bumping up the benefit from the PCM by shifting from a uniform ceiling to clouds and replacing some acoustic tile with perforated panels.

Anica Landreneau, director of sustainable consulting for HOK, cites a similar scenario for close tracking of the Consolidated Forensic



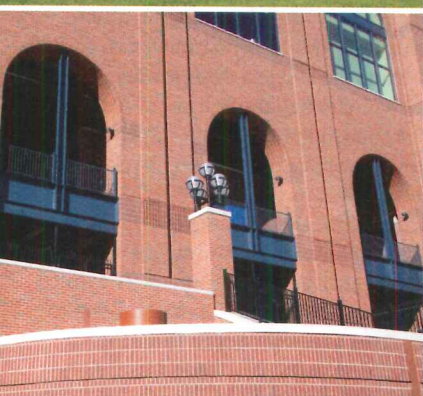
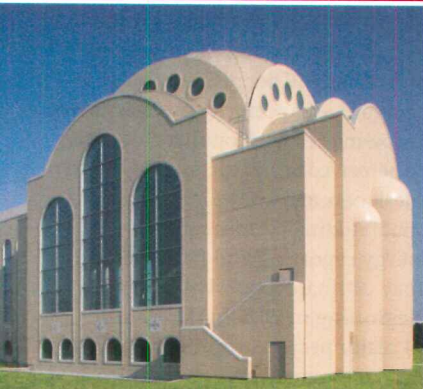
Laboratory that her firm designed for the District of Columbia. The LEED Platinum laboratory and morgue, completed in 2012, relies on chilled beams for cooling. POE, they determined, would be crucial to take that strategy forward. "A lot of clients are skeptical

that chilled beams will perform in that humid climate," she says.

HOK has been tracking the building's energy data, and performance is better than was modeled. Simulations predicted an energy use intensity (EUI) of 230.5 kBtu/sf/yr—half as

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much as a design with a more conventional climate-control strategy. Instead, the latest data HOK collected, from last year, pegged the building at 165.

HOK also conducted a comfort survey after 10 months of occupancy. It revealed an unanticipated issue: more daylight than occupants desired. Even though readings taken by HOK at the Consolidated Forensics building found low natural light levels (nowhere near the 25 footcandles required to earn a LEED daylighting credit), the laboratories were too bright for some workers who relocated from basement labs elsewhere. Interior operable shades controlled by the occupants solved the problem.

The SOM survey and anecdotal examples such as ZGF's and HOK's demonstrate that POEs encompass a diverse range of activities. Firms who embrace POEs are tracking a broad array of physical and psychosocial measures. They are conducting their own investigations, working with UC Berkeley's CBE, and collecting data from building owners and facility managers. Some POEs are completed within 8 hours, while others reflect weeks or months of work.

Whatever the duration, and no matter how comprehensive, few POEs are billed to clients. A POE was not specified in the architect's contract for either HOK's Consolidated Forensics project or ZGF's University of Washington designs, and that's par for the course, according to the SOM survey. Just one of 18 firms said clients routinely paid for POEs.

However, there are signs of change. Another three out of 18 firms reported that they were "sometimes" compensated for performing POEs. This is most often the case, say architects interviewed for this article, in work for institutional clients, and for office or medical-

interior projects where workplace assessment is employed to maximize human productivity.

Judah estimates that over half of FXFOWLE's institutional projects include some form of paid POE by her firm, the engineering firm of record, and/or a consultant. POE was a programmed element of FXFOWLE's interior redesign for the National Audubon Society headquarters in New York, completed in 2008, but was handled by the project's sustainability consultant, YR&G. For its interior for the Rockefeller Brothers Fund headquarters, completed in 2009, FXFOWLE performed surveys before and after occupancy that informed not only the interior design but also a revamp of the foundation's grant-making process.

FORENSIC INVESTIGATION Operable shades were added to labs at HOK's Consolidated Forensics building (above) in Washington, D.C., after the firm's comfort survey revealed higher daylight levels than occupants were accustomed to. POEs need not always be conducted by architects. At FXFOWLE's offices for the National Audubon Society in New York (below), the firm's sustainability consultant, YR&G, performed the POE.



Kelly Griffin, a principal with NBBJ, reports that major corporate clients are also paying for POEs to boost employee satisfaction. Pre-design surveys at existing offices inform designs intended to maximize employee productivity and retention, and POE tracks their impact. "More and more projects start with workplace assessment. Clients are seeing that buildings are not just places to pack people in, and they are being very deliberate," she says.

One barrier to widespread adoption is the concern among architects (and their lawyers) that interest in POEs will be misinterpreted as an implied guarantee of performance. Architects say there is growing recognition that this concern is more perceived than real, and that both clients and designers are ready for a more open dialogue about building performance.

Rising energy reporting and performance mandates may ultimately be what standardizes POEs. Beginning in 2016 in the UK, for example, all major projects commissioned by the central government must comply with a cradle-to-occupation "Soft Landings" framework to ensure that building handover is considered from the earliest design stages. To prepare for that, the Royal Institute of British Architects' standard Plan of Work requires "post handover monitoring and feedback."

In North America, meanwhile, POE is an explicit feature of the small but growing number of design-build projects that include specific performance incentives or guarantees. ZGF and Seattle-based Sellen Construction had targets to meet for the Federal Center South Building, completed in 2012 for the U.S. General Services Administration. Hitting the EUI, water-con-

Gates Hall, Cornell University | Architect: Morphosis Architects



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CIRCLE 204



ON TARGET ZGF's Federal Center South building in Seattle was completed in 2012 under a design-build contract that included financial incentives for hitting performance targets. The final 0.5 percent of the budget was released to the project team once it had been determined that the building met goals for energy use, water consumption, and comfort.

sumption, and comfort goals released the final 0.5 percent of the budget to the project team about one year after occupation.

Comprehensive POE efforts showed that the design's climate-control system, built around passive chilled beams and displacement ventilation, is beating expectations. The project targeted an EUI of 27.6—four times better than the regional average for office buildings—and is delivering an EUI of 25.7. Occupant feedback, meanwhile, provided a reminder that daylighting—especially valued in the Northwest, where dark winters fuel brisk sales of vitamin D—must be carefully configured.

Employees exposed to Fed Center South's transparent atrium complained of glare. Clark says relatively inflexible furniture (which was outside the scope of ZGF's design) exacerbated the issue, as users were unable to easily alter their point of view. Adding occupant-controlled roller shades at atrium-facing offices ultimately fixed the problem.

In this case, POE highlighted the importance of seemingly minor details. "It argues for tighter integration of furniture design, and more scrutiny of the daylight resource," says Clark. The lessons fed immediately into ZGF's practice, informing the design of a high-performance state office building in Olympia

whose skylights will feature a mix of transparent and translucent bands. The design-build contract for that building, secured last year in partnership with Sellen, includes incentives based on building performance at five years after occupancy.

Clark believes this model will become more common as building codes become more stringent, and he's convinced that the increased level of accountability will lift the level of the entire industry. "A very integrated process was required to meet the goals outlined by the GSA at Fed Center South. You learn a lot through that process, and it ripples through your portfolio. Everybody wins," he says.

Perkins+Will's Barnes maintains that firms that do more POEs have a competitive advantage, because they are better positioned to provide objective backing for design claims. But she predicts this advantage will prove short-lived as POE transitions from best practice to standard practice. She compares the current level of POE use to LEED's early days. "LEED was an advantage initially, but now it's just the way business is done. In the not-too-distant future, we'll get there with POEs." ■

Journalist Peter Fairley covers energy and its environmental implications.

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Learning Objectives

- 1 Define the term post-occupancy evaluation (POE).
- 2 Identify quantitative and qualitative factors that POEs can be used to study.
- 3 Discuss legal and practical barriers that prevent some architecture firms from performing POEs.
- 4 Discuss recent legislative and regulatory developments that are helping spur more interest in POEs.

AIA/CES Course #K1508A

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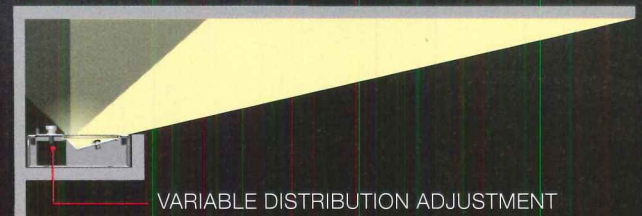
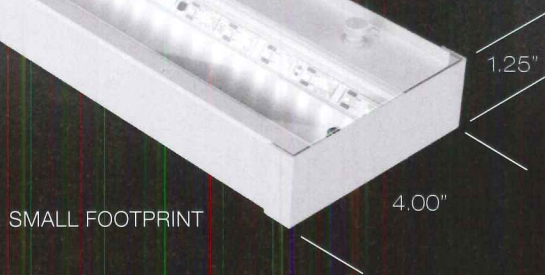
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CIRCLE 178

The Enlightened Workplace

- 126 Newell
Rubbermaid
Design Center
- 131 Al Jazeera Media
Network UK
- 134 Pacific Place
Lobby
- 139 Products

Three design teams tackle a trio of challenging commercial projects, demonstrating how the thoughtful integration of daylight and electric lighting schemes can elevate a variety of workplace environments—a corporate design center in Kalamazoo, Michigan; the headquarters of an international media network in London; and the lobby of an office building in San Francisco. Each offers a serene yet stimulating interior designed to foster employee well-being as well as productivity.

NEWELL RUBBERMAID DESIGN CENTER



Newell Rubbermaid Design Center

Kalamazoo, Michigan

Perkins+Will / Byce & Associates

By Linda C. Lentz

DEVELOPED TO appeal to a creative labor pool, the year-old Newell Rubbermaid Design Center lies within southwest Michigan's hub of industrial design, just a stone's throw from internationally acclaimed manufacturers Haworth, Herman Miller, and Steelcase.

When the Atlanta-based company set out to consolidate the product designers for all of its brands—which include such household names as Rubbermaid, Calphalon, Levolor, Sharpie, and Graco—it targeted this locale and joined forces with the state of Michigan, the city of Kalamazoo, Southwest Michigan First, and Western Michigan University (WMU). The new purpose-built facility is situated at WMU's Business Technology Research Park in Kalamazoo, adjacent to the university's department of engineering and applied science (a potential feeder for talented interns and employees).

Now Newell Rubbermaid's 100 or so designers collaborate across all brands in a luminous state-of-the-art building designed by the branding and interior design groups at Perkins+Will in conjunction with architect of record Byce & Associates. Tailored to foster innovation, the design center's pristine interior—complete with prototyping shops, graphics studios, and a “usability lab” for focus groups—has a flexible plan that revolves around a central 12-foot-wide circulation lane (or “main street”) and balances an abundance of daylight with a pleasing electric lighting scheme.

Time and budget were tight, so the architects modified a 40,000-square-foot prefabricated metal structure to accommodate the corporate program. They wrapped the facade with curtain walls punctuated by 14-foot-wide-by-12- or 15-foot-high windows. Shielded by external shades on the south elevation and etched along the bottom for privacy and to reduce glare, this generous fenestration allows plenty of daylight to penetrate deep into the building's interior. A line of eight prismatic skylights along its east-west spine further illuminates the core, filtered by a dropped wood-trellis ceiling that defines the Center's main artery.

Aiming to create an even wash of light, the design team suspended orderly rows of boxed, linear T5 pendants at a height of 15 feet, inserting them into the wood-slat structure above the “main street.” Controlled by daylight sensors around the perimeter, these slender luminaires provide a cool ambient light throughout the open workstations and common spaces on the north, and along a segregated collaborative-work area on the south wall.

Several enclosed rooms built within the space share this light, thanks to internal glazing. For example, small huddle rooms situated among the workstations have glass walls on two sides, and six immersion rooms—where project teams work on proprietary projects—receive sunlight captured through 12- to 15-foot-high clerestories across from the building's south-facing windows.

SUN SCREEN Daylight filters through a dropped trellis from skylights in the high ceiling, while circular fixtures illuminate the materials library behind reception.

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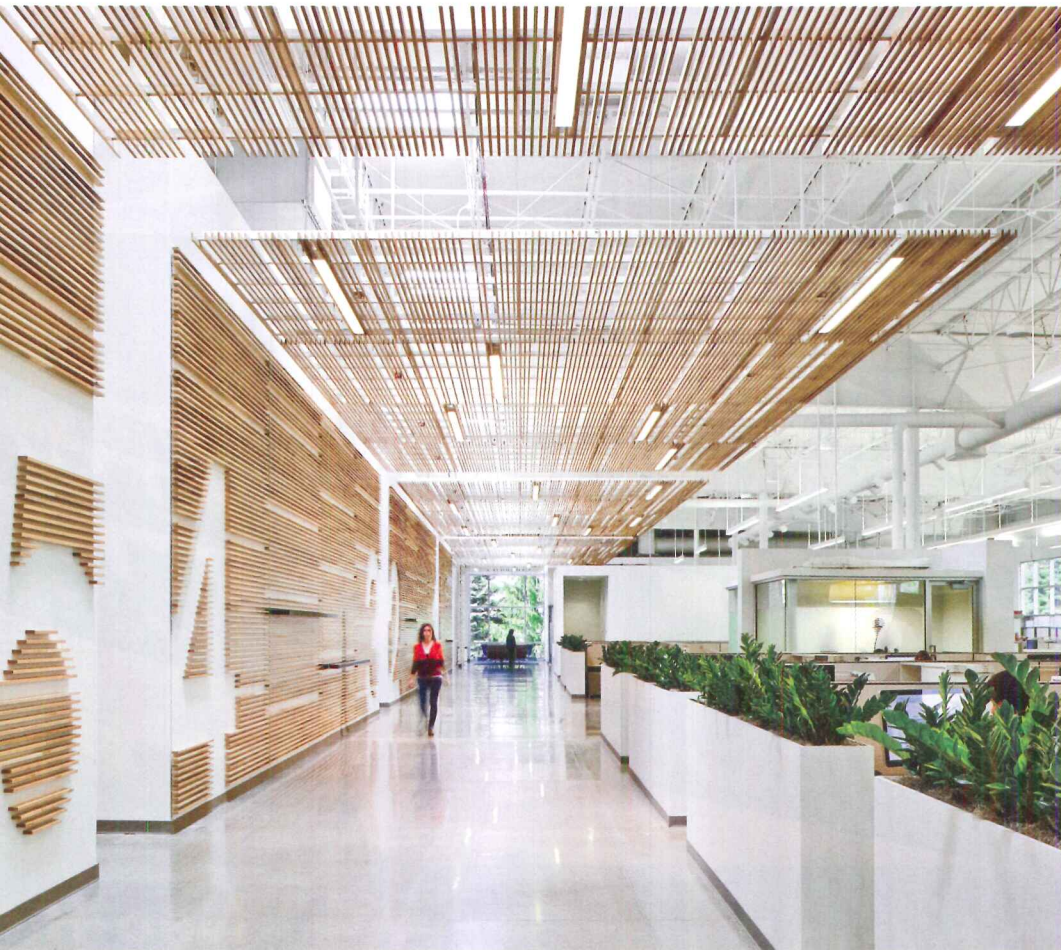
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“We wanted to have the lighting be as general as possible,” says David Sheehan, Perkins+Will senior interior designer, who fitted out the office with new and reused 20th-century furniture made by the Center’s notable neighbors. In keeping with the modern decor and creative vibe, the interior designers also placed robust circular pendants over tall worktables and in meeting rooms as accents. This way, Sheehan explains, “Lighting is used as a design element in the space as well as to provide light.” ■

credits

ARCHITECT: Perkins+Will – Eva Maddox, principal/branded environments; David Sheehan, senior interior designer

ARCHITECT OF RECORD/LIGHTING DESIGN: Byce & Associates – Michael Flynn, principal in charge; Fred Grunert, project architect

ENGINEERS: Byce & Associates (structural, civil, mechanical, electrical)

CONSULTANTS: Xibitz (custom wood ceiling, wall, tabletop)

GENERAL CONTRACTOR: AVB

CLIENT: Newell Rubbermaid

OWNER: South Michigan First

SIZE: 40,000 square feet

COST: withheld

COMPLETION DATE: May 2014

SOURCES

CURTAIN WALL: Tubelite

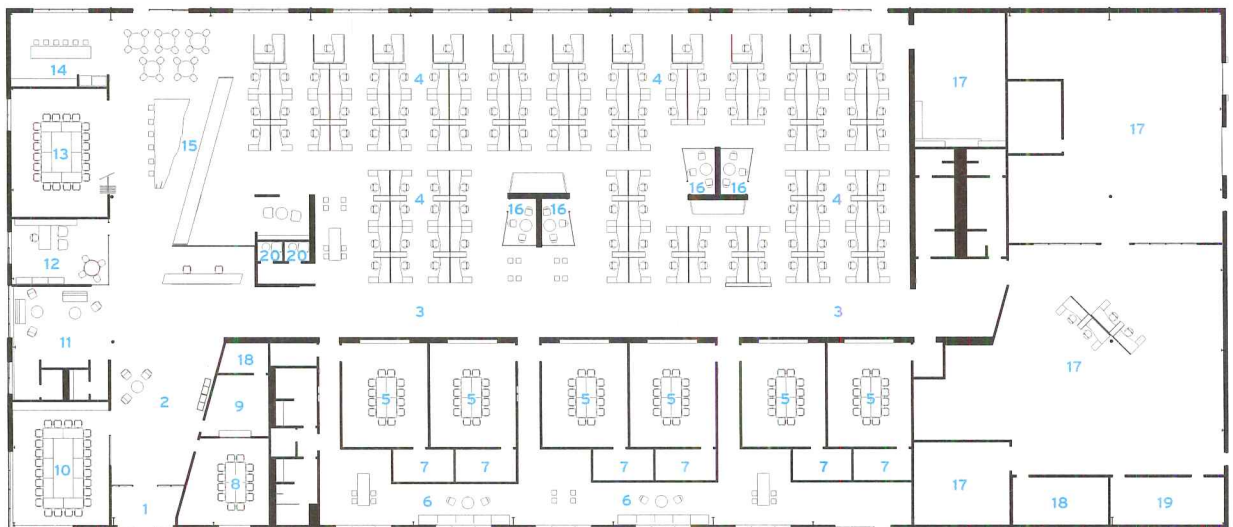
GLASS: Guardian; Oldcastle BuildingEnvelope

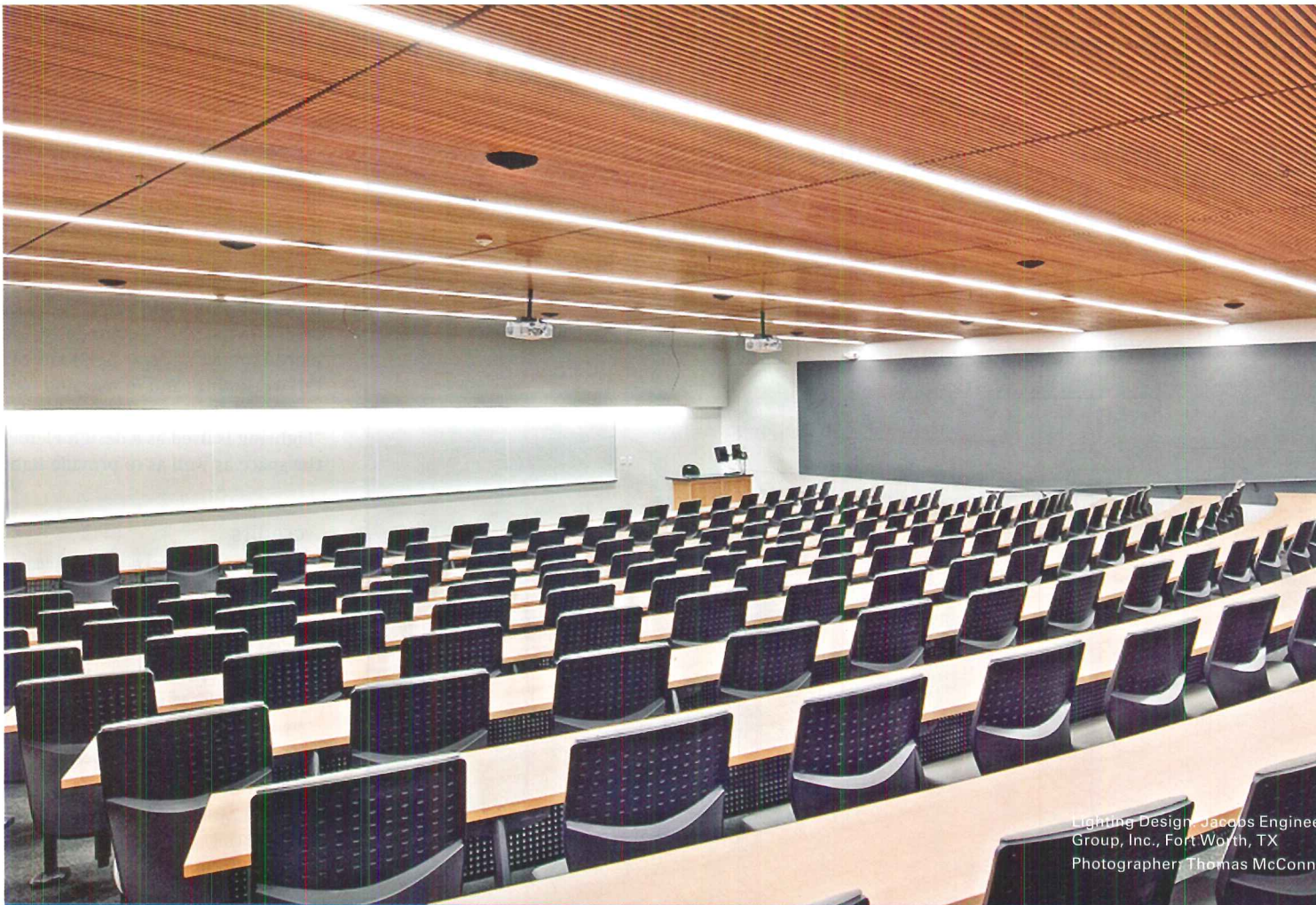
LIGHTING: Cooper (ambient and downlights); Leviton (controls)

- 1 ENTRANCE
- 2 LOBBY/RECEPTION
- 3 CENTRAL CORRIDOR
- 4 OPEN WORK-STATIONS
- 5 IMMERSION ROOMS
- 6 GROUP COLLABORATION
- 7 STORAGE
- 8 USABILITY LAB
- 9 OBSERVATION ROOM
- 10 CONFERENCE ROOM
- 11 GUEST LOUNGE
- 12 PRIVATE OFFICE
- 13 MULTIPURPOSE ROOM
- 14 KITCHEN/BREAK AREA
- 15 MATERIALS LIBRARY
- 16 HUDDLE ROOM
- 17 WORKSHOP/ PRODUCTION STUDIO
- 18 DATA ROOM
- 19 MECHANICAL
- 20 TELEPHONE ROOM

WOOD WORK FSC-certified ash slats—used to delineate room numbers on the immersion rooms and craft a dropped trellis ceiling—create a warm counterpoint to the polished-concrete floors and white color palette. The design team suspended a total of 210 linear fluorescent fixtures throughout open work areas and common spaces, inserting them into the 15-foot-high trellis above the center’s “main street.”

LEVEL ONE PLAN





Lighting Design: Jacobs Engineering Group, Inc., Fort Worth, TX
Photographer: Thomas McConn

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Al Jazeera Media Network

London

John McAslan + Partners

Veech x Veech

By Chris Foges

FROM AL JAZEERA'S London broadcast hub on the 16th floor of the Shard, staff and viewers enjoy panoramic skyline views. It was this vantage point that attracted the global media network to the Renzo Piano–designed tower, but its choice created challenges for architects John McAslan + Partners (JMP), which designed reception and workspaces, and Veech x Veech, responsible for the broadcast studio.

Television production involves diverse technical operations with stringent environmental requirements, and JMP had to accommodate these alongside conventional office space within the floor's compact 29,000-square-foot plan. A jigsaw puzzle of control rooms, edit suites, and voice-over booths surrounds the building's central core, wrapped in a sinuous wall of backlit semi-opaque blue glass. Meeting rooms and desks around the perimeter of the floor are bathed in daylight through full-height glazing.

The broadcast studio sits among them. Defined only by a curved backdrop to the news anchors' desk, it is lined by

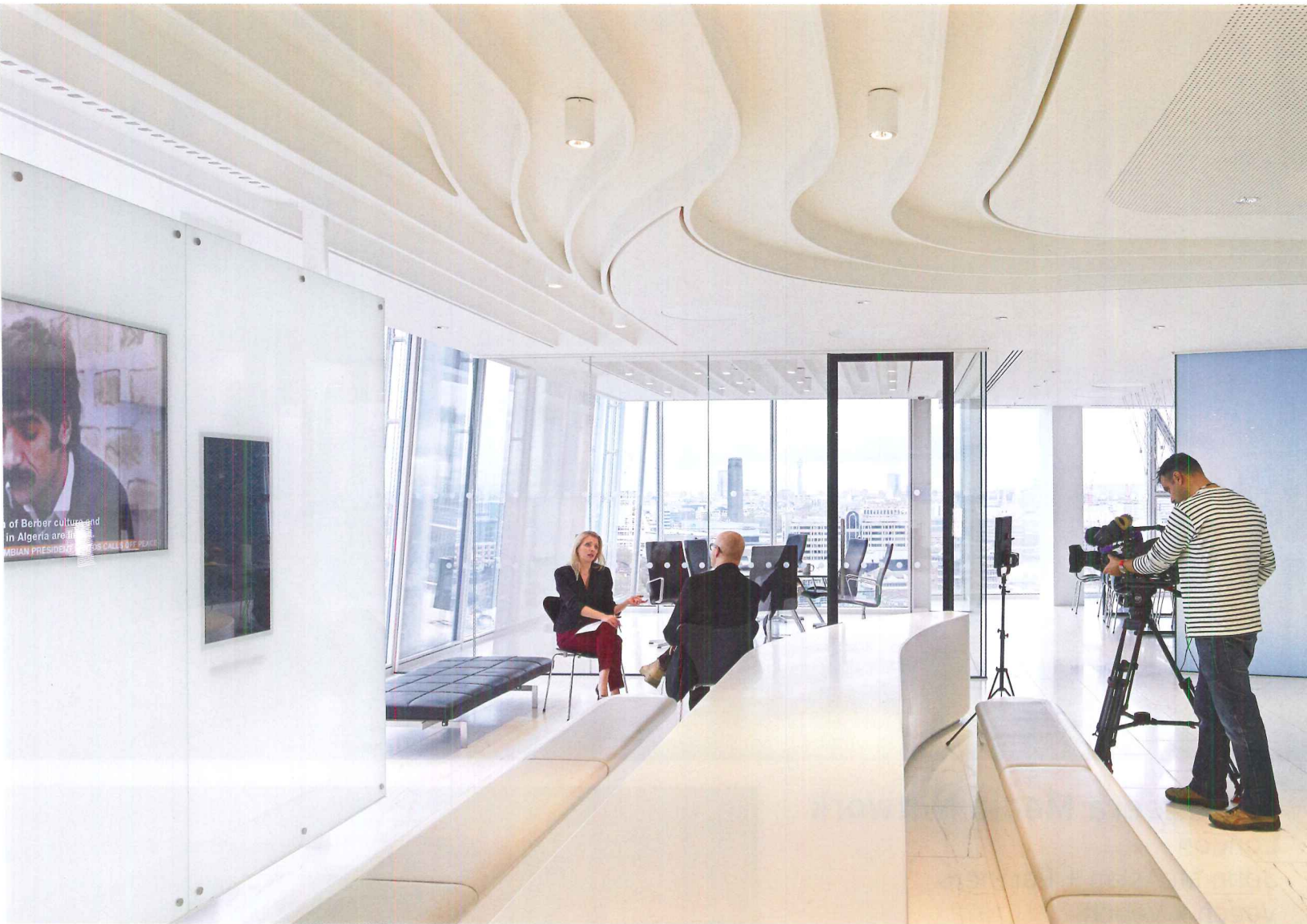


windows on one side and open to the adjacent newsroom and a looping circulation route. Conventional studios are “black boxes,” but Al Jazeera was determined to incorporate views from the tower in its programming. “We wanted to show that this is a real space in a real building looking out to a real city,” says designer Stuart A. Veech.

Electric studio lights are sufficiently powerful to achieve a natural-seeming exposure balance with the brightest skies, but daylight levels vary. “And change is the toughest thing to deal with in TV,” says Veech. To compensate, polarizing filters like those used to darken skies in still photography were applied to both windows and camera lenses. Their

LIGHT SQUEEZE

LEDs are cooler than typical studio lights (top), but heat from other equipment requires extensive air-handling between the beams while allowing for motorized fixtures to move 360 degrees. Laser scans of the space ensured accurate placement of equipment (above).



credits

ARCHITECTS: John McAslan + Partners – John McAslan, principal (office); Veech x Veech – Stuart S. Veech, Mascha Veech-Kosmatschof, managing partners (studio and newsroom)

CONSULTANTS: mo2 design (lighting)

GENERAL CONTRACTOR: Como (office); Studio Hamburg Atelierbetriebs (studio and newsroom)

CLIENT: Al Jazeera Media Network UK

OWNER: Turner & Townsend Project Management

SIZE: 29,000 square feet (gross)

COST: withheld

COMPLETION DATE: November 2014

SOURCES

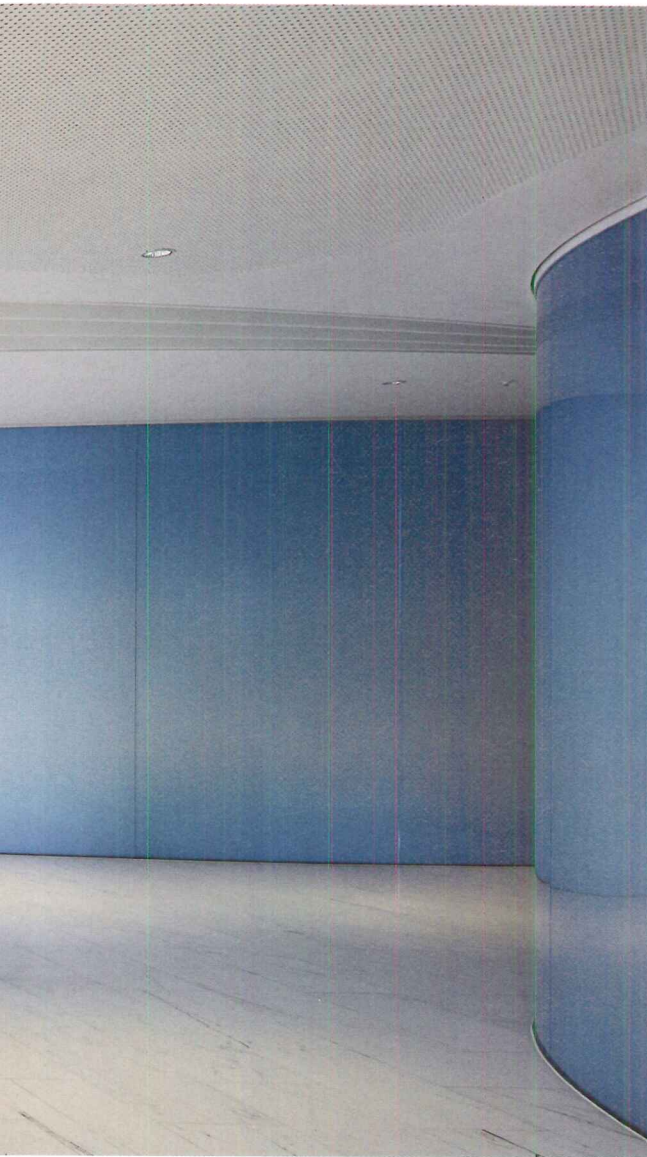
FLOORING: Armstrong, Milliken



- 1 ENTRANCE
- 2 RECEPTION/WAITING
- 3 OPEN WORKSPACE
- 4 NEWS STUDIO
- 5 NEWSROOM
- 6 MEETING ROOM
- 7 PRODUCTION STUDIO
- 8 EDIT
- 9 OFFICE

LEVEL 16





LUMINOUS ROUNDABOUT

In counterpoint to the faceted form of the Shard's tapering tower, the interior architecture adopts a language of gentle curves. From the reception area (left), a fluid tracery of ridges in the plaster ceiling guides visitors towards the broadcast studio and adjacent newsroom, where LED lightboxes in the ceiling mirror the curved forms of desks (below).

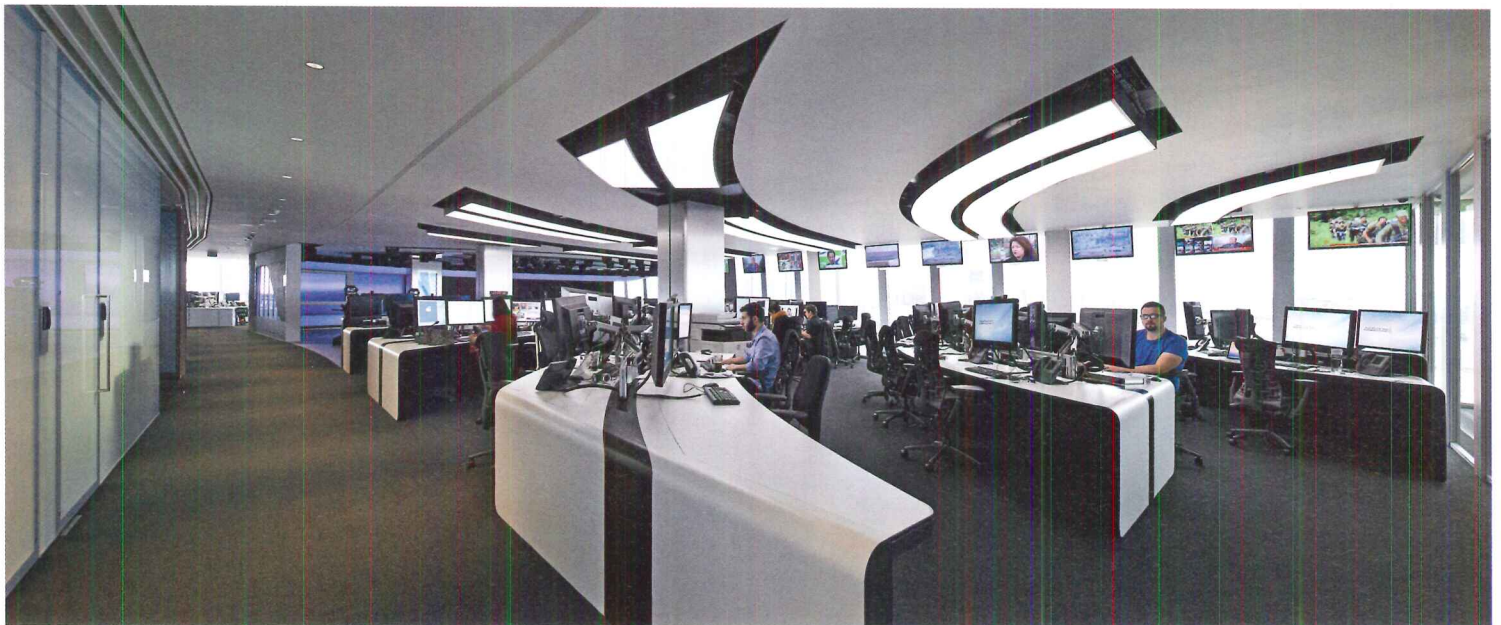
effect is almost imperceptible in the space, but allows control of exterior brightness as seen through the lens. At the push of a button, the camera's view of the sky outside can be lightened or darkened in response to variable conditions.

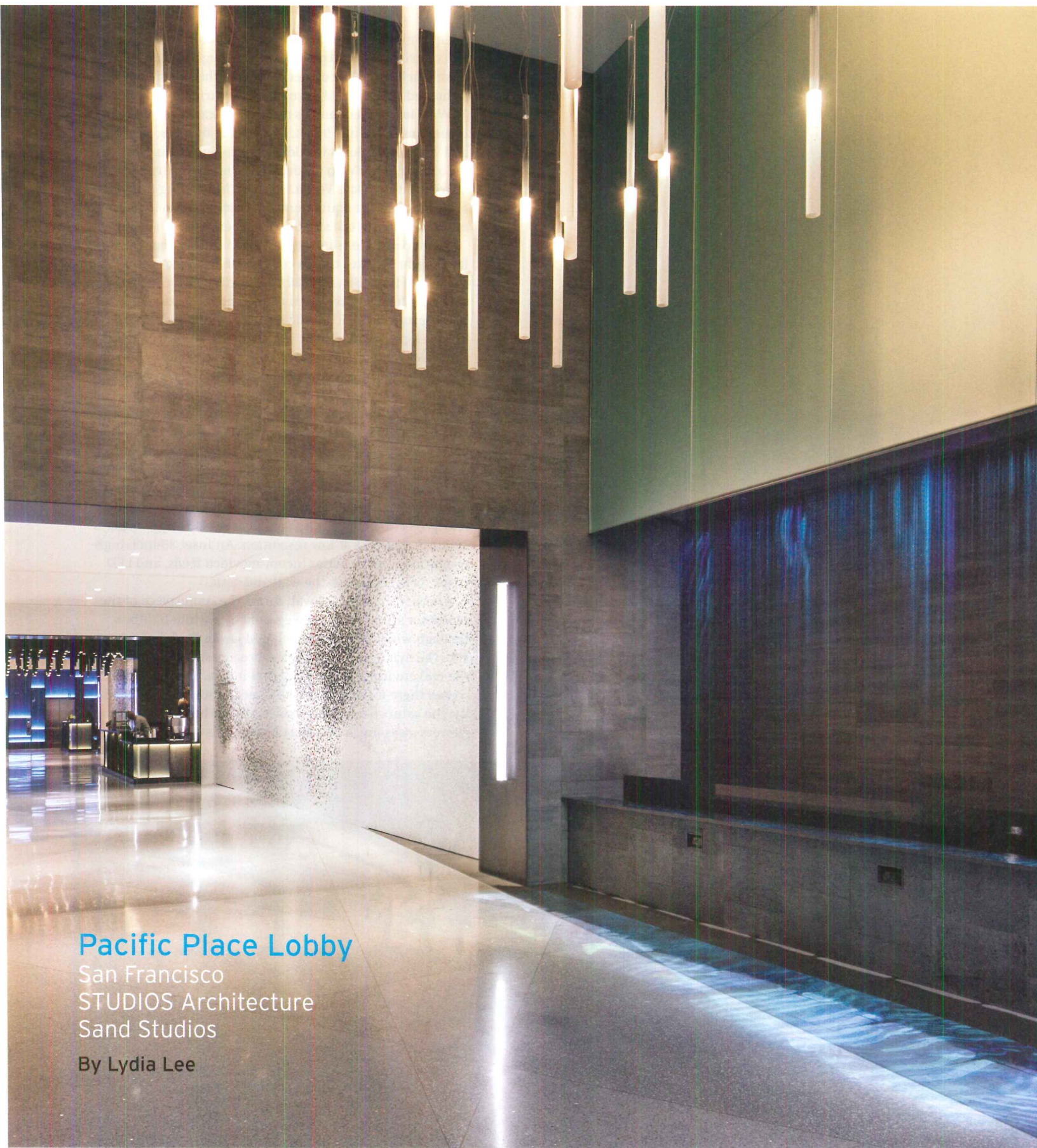
With low camera angles required to catch the view and a ceiling height of just 9 feet, all lighting fixtures, sprinklers and ventilation ducts would be visible on-screen. "You rarely see a ceiling on TV, so we decided to make it part of the on-air identity," says Veech. An elliptical ceiling mask conceals much of the equipment and also serves to increase the apparent scale of the small space when seen on screen.

Space restrictions in the congested ceiling zone demanded fewer light fixtures than a conventional studio system, without loss of flexibility. The 80 black cylindrical cans poking through the mask are often used to provide stage lighting for entertainment. The LED fixtures can provide focused or diffuse light, change color temperature, and vary the beam shape. Moreover, since each fixture has a remote-controlled moving head, the system can be shifted silently and instantaneously among preset positions, in response to the exigencies of live television. In the 45-seat newsroom, curved LED panels in the ceiling also provide sufficient illumination for broadcasting. "It's like heaven when they're all on full power," says Al Jazeera's global art director, Patrick Bedeau.

The backdrop to the anchors' desk is itself a multipart lighting fixture. Background imagery is fed to a grid of 12 rear-projection cubes, while an adjacent LED wall displays dynamic graphics at low resolution. An inset 85-inch high-resolution screen carries incoming video feeds, and LED strips form accents to the wall and desk.

Another illuminated wall forms the centerpiece of the reception area. Visitors are greeted by a white lightbox through which televisions relay Al Jazeera's global output. Like the dynamic collage of the broadcast studio, it merges the real environment with digital media. Though behind the scenes there is frenetic activity and great technical complexity, the calm coherence perceived by both visitors and viewers owes much to some clever tricks of light. ■





Pacific Place Lobby

San Francisco
STUDIOS Architecture
Sand Studios

By Lydia Lee

ATLANTA-BASED DEVELOPER

Jamestown wanted its Pacific Place office building, at 22 Fourth Street in downtown San Francisco, to appeal to young tech workers with a lobby similar to that of a hip hotel. The existing entrance was clearly problematic. It was extremely long and had a bland corporate vibe, as expressed by generic drywall and marble. So the offices of STUDIOS Architecture and boutique firm Sand Studios collaborated to visually condense the seemingly endless 165-foot-long expanse, using a variety of lighting schemes to define distinct spaces.

“The client wanted the reception area to be more visible and not feel like such a trudge to get all the way there,” explains Jerry Griffin, associate principal at the San Francisco office of STUDIOS. “The challenge was, if you can’t shorten it, how do you make it feel shorter?”

The two firms decided to reimagine the long passageway as a series of individual rooms, using lighting and texture to give them personality. “We wanted to bring the long, relentless space down to a tactile scale,” says Sand Studios principal Larissa Sand, who created the architectural elements and custom lighting, while STUDIOS addressed the shell.

The corridor naturally divided into five segments defined by its structural bays. The design team created three distinct spaces: a lushly planted vestibule, an intimate café, and a glowing reception area. At the entrance, the architects gave the facade a modern facelift, replacing an existing aluminum-mullioned curtain wall with point-supported glass. A series of steel-plate planters in varying lengths are stacked to create a floor-to-ceiling living wall. Gently illuminated with integrated LED lighting, these trough-like boxes extend outside through the glass and cantilever as much as 18 feet to give the building a distinctive street presence. Facing the living wall, a 24-foot-wide-by-10-foot-high indoor waterfall designed by Sand doubles as an unusual projection screen. Sand worked with Obscura Digital to project serene video of koi, whales, and more abstract footage. She also designed a chandelier composed of randomly spaced frosted-glass cylinders, intended to represent a cloud.



TUNNEL VISION To transform a deep, generic office lobby, the design team created a transparent entrance punctuated by an integrated living wall by Ambius, bridging indoors and out (above). The planters are lit by cool 4,000 Kelvin LEDs to better highlight the foliage. Across the way, a water feature shimmers via video projection (opposite), while the chandelier emits a warm sparkle with candle-like cylinders.

**MOOD SWINGS**

The lobby café (left) is a place where company employees and savvy locals congregate. The lighting here creates the illusion of a dropped ceiling, providing a greater sense of intimacy. For the reception area beyond, the designers avoided the oppressive quality of typical windowless spaces with recessed and cove lighting augmented by a dramatically lit wall and reception desk (below).

Separating the vestibule and the café, as well as the café and reception, are two transition areas, simply lit with recessed lights and wall washers in order to place the focus on the main spaces. The walls of these two passageways are decorated with abstract black-and-white murals (a series of blown-up images by photographer Richard Barnes, of migratory starlings, dubbed *Murmur*). “The idea was to alternate between expansion and contraction,” says Griffin.

To make the most of the long space, the design team created the cavellike café halfway along its length. Here a lighting installation by Sand, comprising more than 100 rough steel tubes, defines a lowered, curving ceiling. The lamping—programmed to go on and off in a pattern that mimics light reflecting off ocean waves—has a subtly dynamic quality. Sand also gave the space a strong sense of materiality, with a long banquette made of maple wood reclaimed from old barns, a back wall tiled in lava stone, and a counter clad in interspersed panels of textured gray glass and textured limestone.

Deep into the building, at the end of this long tunnel, the building’s occupants are greeted by a luminous backlit wall that frames four elevator doors. The wall was originally conceived as a simpler affair composed of point-supported blue glass, but Sand proposed a more visually interesting combination: a grid of cold-rolled steel is fitted with panels of blue glass that are individually illuminated from the bottom to create gradations of color. “The way the LED strip lighting was integrated into the design of the frame gives so much depth and texture to the wall, for very little expense,” says Sand. “It feels like the apse of a cathedral when you finally arrive here.” ■

**credits**

ARCHITECT: STUDIOS Architecture
– Jon Heimdahl, project architect;
Jerry Griffin, project manager;
Kristin Lacy, project designer

ENGINEERS: Tipping (structural)

CONSULTANTS: Sand Studios
(light fixtures; water feature; metal/
wood/glass design and fabrication)

GENERAL CONTRACTOR:
Plant Construction

CLIENT: Jamestown LP

SIZE: 3,700 square feet

COST: withheld

COMPLETION DATE:
November 2013

SOURCES

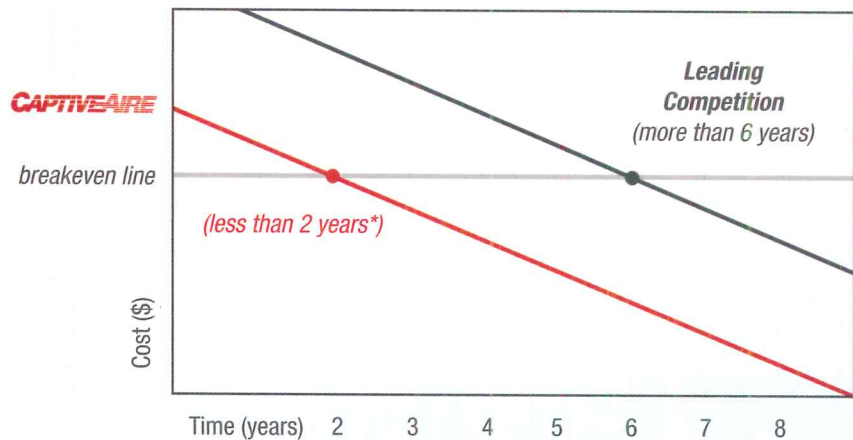
CURTAIN WALL: Oldcastle
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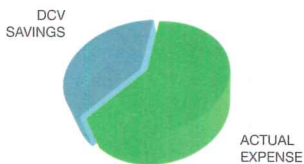
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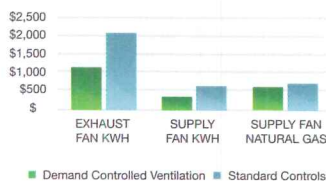
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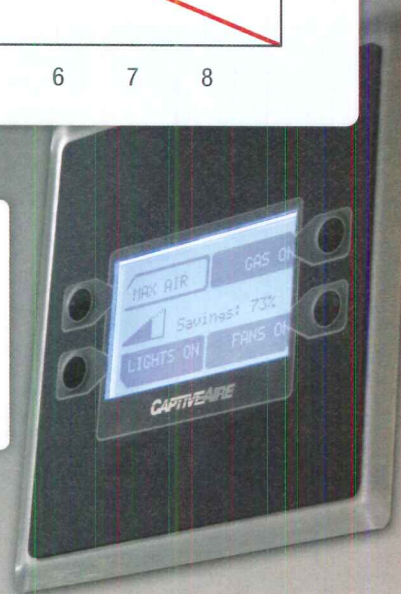
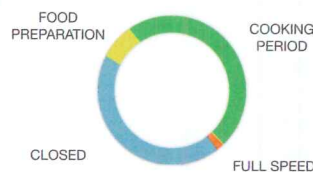
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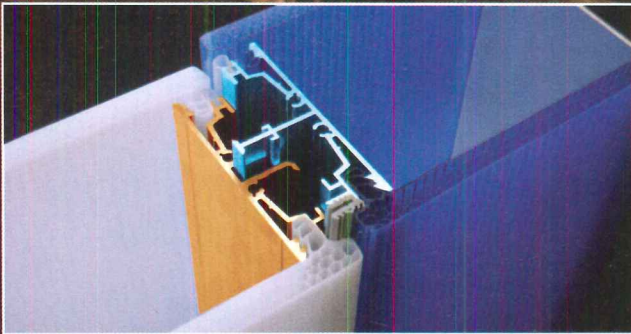


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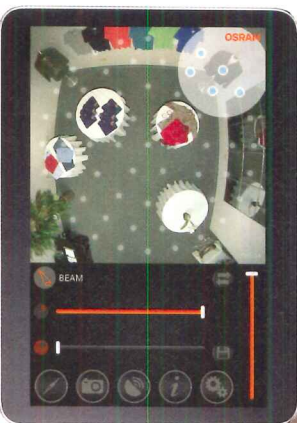
INNOVATIONS FEATURED AT THIS YEAR'S LIGHTFAIR INTERNATIONAL AND IMAGINATIVE NEW FIXTURES PROVE THE CURRENT LIGHTING MARKET IS BEAMING WITH CREATIVITY. BY SHEILA KIM



Grapes

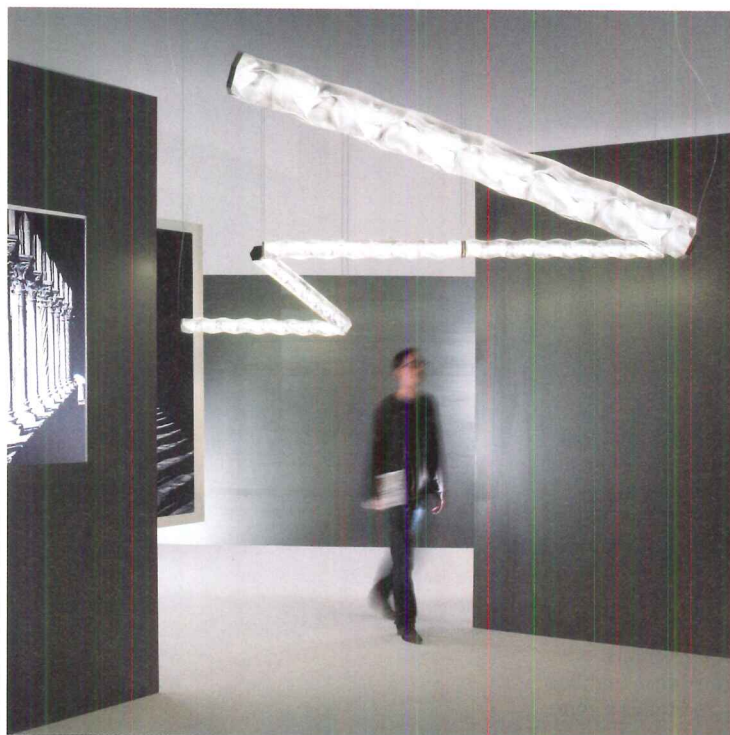
Used individually or in a cluster, Sonneman's Grapes are a sweet treat for the eyes. Each LED pendant consists of a metal and a glass hemisphere that meet at a wavelike seam. Available in three sizes ranging from 2½" to 3½" in diameter, they come in polished nickel with clear glass or satin nickel with white glass.

sonnemanwayofflight.com
CIRCLE 212



OmniPoint

Osram Sylvania has taken lighting control to new heights with the launch of its OmniPoint solution at this year's Lightfair. Capable of replacing multiple fixtures, the ceiling luminaire uses an array of LEDs that can be independently and wirelessly controlled to change beam spread, angle, shape, and intensity for spotlighting areas or producing ambient illumination. The accompanying app is compatible with both iOS and Android. osram-america.com CIRCLE 216



Hugo

A departure from the typical linear suspension fixture, the Slamp luminaire features a water-evoking pattern of sinuous lines that terminate at hexagonal metal end-caps. The tubular diffuser, constructed of the manufacturer's proprietary polycarbonate material, evenly distributes light outward a full 360° and measures 39½" long x 2½" high. Multiple units can be combined to create dramatic light compositions. The fixture's white LED lighting has a color temperature of 2,700K and an output of 3,000 lumens. slamp.it CIRCLE 213



Luminous Carpets

Philips and Tandus Centiva have joined forces to introduce light-transmissive carpet to North America, transforming the floor into a communication medium. Designers and architects can incorporate changeable LED content—from wayfinding signage to messages and alerts—into commercial carpet. philips.com CIRCLE 215

Find Me

Simple, cylindrical forms define this indoor spotlight collection from Flos. It comes in Suspended (right), Single Spot, and Double Spot versions. The latter two feature a 360° rotation and 70° swivel, and the single model can additionally be recessed. Each unit has an output of 560 lumens and comes in a white, black, or chrome finish, though decorative cylinder sleeves are also available in orange and violet. flos.com CIRCLE 214





Cylinder

An entire family of fixtures, the Cylinder series is a sleek and sophisticated collection hand-made and -finished in New York by Apparatus. The series includes an uplight, downlight, extended downlight, sconce, swing-arm sconce, and pendant reminiscent of pipe organ tubes. Each is constructed of raw brass that has been patinated, and takes a Type A R16 bulb.

apparatusstudio.com CIRCLE 217



MediaGlas

Thanks to a partnership between Galaxy Glass & Stone and Traxon Technologies, monolithic and laminated architectural glass can be used as a canvas for customizable LED-produced text, graphics, animations, or seas of color. The backlighting is programmed using Traxon's e:cue suite of control systems and software, while Galaxy works with specifiers to implement optical effects such as diffusion or retraction. The glass is available in 1/4" to 2" thicknesses. galaxycustom.com

CIRCLE 221



Eikon

Both industrial and warm in appearance, this pendant by Nordic studio Schneid combines a pleasing conical wood socket with a metal or silicone shade. Available in two different shapes, the shade comes in a range of pastel or neutral colors, as well as a newly introduced reflective gold-tone finish. Meanwhile, the wood can be specified in ash, oak, or bamboo. Additional shades can be purchased and easily swapped, since the socket attaches via magnets. schneid.org

CIRCLE 220



Helio Series

Niche Modern's Helio injects pops of color and whimsy into spaces by combining a fresh color palette with visually grabbing bulbs. It measures 5" in diameter x 9" high, and is composed of handblown transparent or semitransparent glass in hues ranging from sapphire to tangerine. Lamping options include Baby Plumen CFL, Philips SlimStyle LED, and vintage-style bulbs. nichemodern.com

CIRCLE 218



Arceos ARS

Ideal for parking garages, walkways, tunnels, and stairwells, this surface-mount fixture by Spaulding Lighting delivers 4,300, 5,750, or 8,596 lumens of uniform LED light. Its die-cast aluminum housing is offered in black, dark bronze, gray, white, platinum, red, or forest green, and can be fitted with occupancy sensors and wireless control modules. For best results, it should be mounted at heights between 8' and 18'.

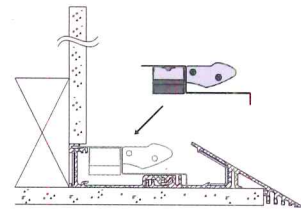
spauldinglighting.com CIRCLE 219



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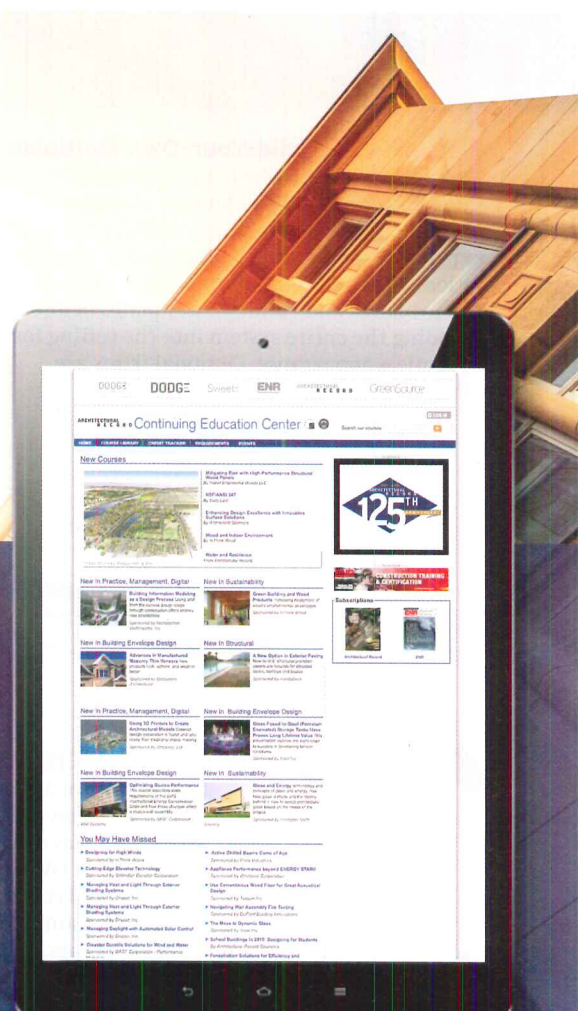
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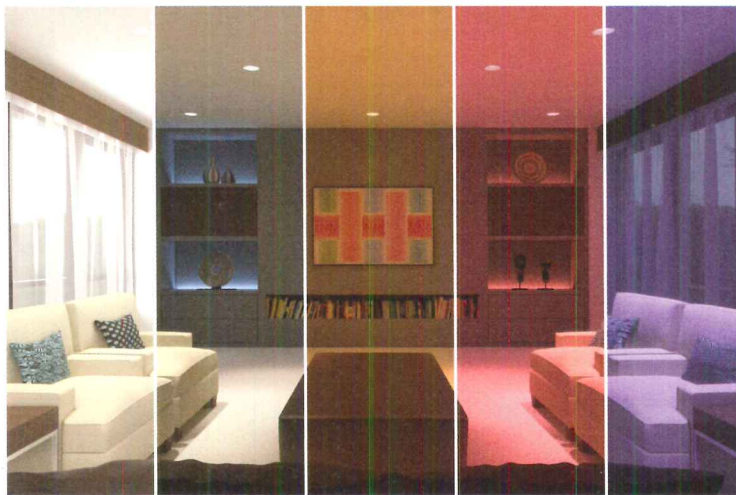
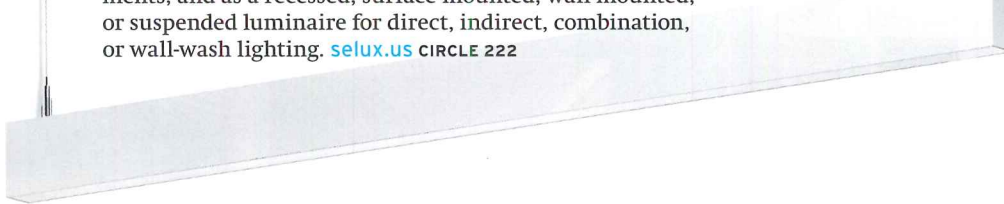


Element LED Build-Your-Own Multiples

Tech Lighting turns the humble downlight into a major decorative element. Designers attach Element spot modules within a recessed expandable-grid frame, in any desired configuration, and then conceal the open areas with frame blanks and metal plaster plates before mudding the entire system into the ceiling for a seamless appearance. Optional trims are offered in black, white, or satin nickel.

M36 LED My White

This crisp, linear fixture from Selux boasts white light that can be adjusted from 2,700K to 6,500K color temperature and dimmed using a DMX or DALI driver. It is constructed from powder-coated extruded low-copper aluminum with an impact-resistant acrylic lens. M36 is offered in 1' increments, and as a recessed, surface-mounted, wall-mounted, or suspended luminaire for direct, indirect, combination, or wall-wash lighting. selux.us CIRCLE 222



Infinite Color+

Delivering more than 1,375 lumens, these USAI engines illuminate interior spaces with white light that can be tuned from 2,000K to 12,000K, enabling a single light source to soothe, stimulate alertness, or follow circadian rhythms. Additionally, it produces a seemingly infinite range of colors for other occasions. Infinite Color+ is paired with recessed square or round downlight, adjustable, or wall-wash fixtures in trim or trimless designs. usailighting.com CIRCLE 223



New York City LED Streetlight

The winner of a New York City Department of Transportation competition, this modern streetlight was designed by Thomas Phifer and Partners and OVI, manufactured by Cooper Lighting, and is now installed at select sites. Its 84 LEDs consume only 96W to produce 9,200 lumens. cooperindustries.com CIRCLE 225



Nanoleaf Gem

As manufacturers continue to develop LED-based alternatives to the incandescent A lamp, some are getting creative with shape. Green-tech startup Nanoleaf unveiled Gem, which has a frosted-glass dodecahedron body that's meant to be exposed. It comes in a 470- or 800-lumen version. nanoleaf.me CIRCLE 224

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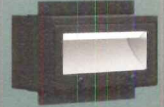


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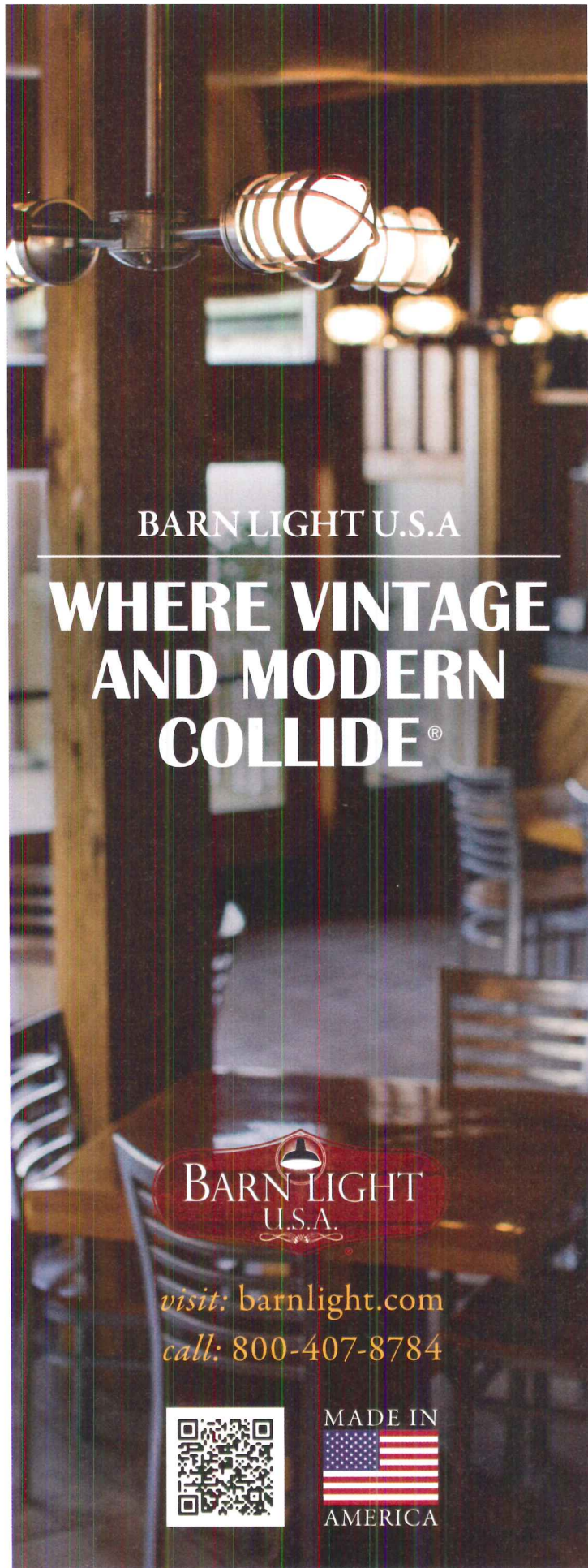


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Sculpting the Skyline

FROM ARCHITECTURAL RECORD
By Joann Gonchar, AIA

The article explores the architectural concepts and structural strategies behind Kuwait City's tallest building and discusses the construction methods used to build it.

LEARNING OBJECTIVES

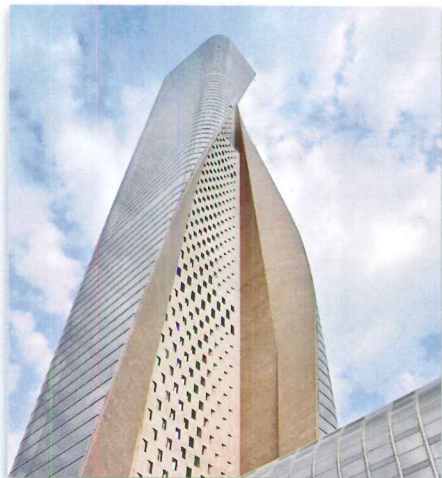
- 1 Explain how evaluation of programmatic requirements and environmental conditions helped designers generate the form of Kuwait City's Al Hamra Firdous Tower.
- 2 Describe the key structural elements of the tower and its foundations.
- 3 Explain the structural and construction challenges presented by the tower's geometry.
- 4 Describe how construction methods were adapted for the harsh desert environment.

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p149

Play Ball: High-Performance System Solutions for Stadiums and Arenas

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Taking Sustainable Washroom Design Beyond LEED

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Achieving Higher Quality in High-Density Residential: The Strengths of Structural Steel

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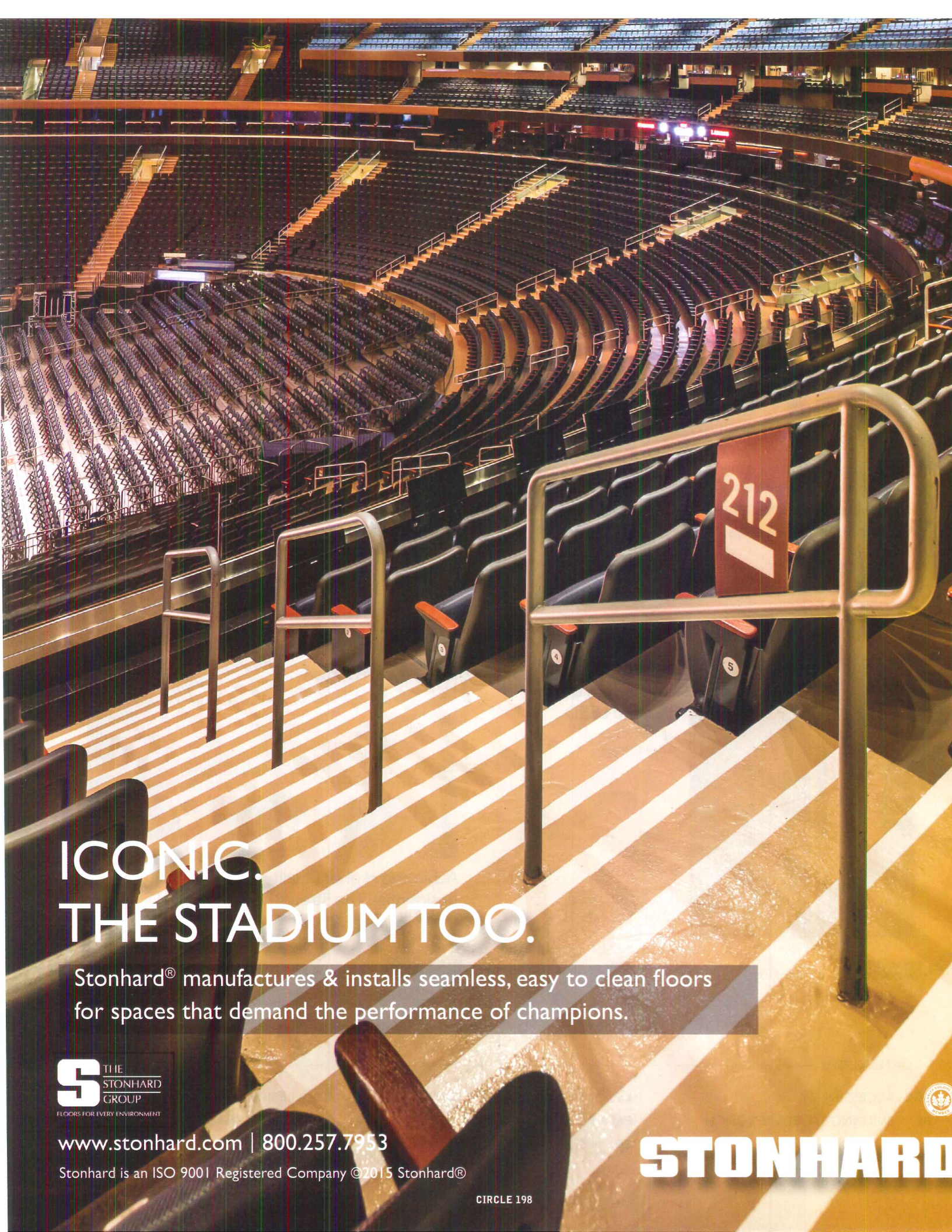
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STONHARD



Stadiums and arenas, such as the Autzen Stadium at the University of Oregon shown here, are becoming larger, more sophisticated, and more attuned to the current demands of people who experience these facilities.

Photo courtesy of NanaWall

Play Ball: High-Performance System Solutions for Stadiums and Arenas

Meeting the special design and performance needs of this demanding building type

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

America and the world seem to love stadiums and arenas. Whether it is due to loyalty to an alma mater or feeling part of a community championed by a professional sports team, these unique building types draw people, and lots of them. They also seek to be used for a wider variety of events than just sports, including entertainment, education, and special gatherings. Over the years, newly designed facilities have become larger and more sophisticated than in the past. No longer limited to outdoor seating areas using bleachers, users and owners demand more amenities and features that offer comfort and choices. The attending experience has become more important than the event or game itself as the ticket holders expect more from their surroundings—a level of experience more akin to deluxe hotels, clubs, and restaurants. Architects and other design professionals involved in projects for new or renovated stadiums and arenas are responding to these needs with well-designed and creatively executed spaces. But truly successful designs also need to respond to the practical needs of high performance required by the intense activity of large crowds on a regular basis.

GROWTH AND EVOLUTION

Part of the reason behind the growth in stadiums and arenas is certainly linked to the growing populations in urban areas where most of these facilities are located. A recently released report indicates that urbanization will see a 2.8 billion increase in city populations by the year 2050. Cities across the country are already seeing some of that growth and have been able to build stadiums in recent years in the downtown areas of cities such as Indianapolis, Dallas and New York. Plus stadiums and arenas are becoming supported with nearby mixed-use projects and expanded entertainment properties. This means that they are moving beyond the typical open seating areas and public spaces. Rather, they are becoming part of a vibrant, urban neighborhood that provides people with a unique social experience with options to suit their tastes and preferences. In essence, the spaces in and around the stadium or arena have become as competitive for attracting people as the events that it focuses on.

Part of the experience at events is interacting with others. But there is a difference between interacting with the whole crowd in an outdoor venue and joining with a specific group in a

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Learning Objectives

After reading this article, you will be able to:

1. Identify and recognize the trends behind the growth and evolution of stadium and arena design as places of public assembly.
2. Assess the health and safety performance aspects of walkways, stairs, and escalators as part of an overall pedestrian circulation system.
3. Explain the importance of proper attention to details for the performance of critical design components such as movable glass walls, heavy duty flooring and others.
4. Determine ways to apply the principles as presented into building projects demonstrated through case studies.

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Photo courtesy of Stonhard



The experiences of people in the seats within the larger facility, such as Madison Square Garden in New York, are driving the trends and evolution of stadiums and arenas of all types.

separated area such as a suite, box, or other enclosed area. The ability to carve out such spaces and to make them flexible is certainly a growing trend at stadiums and arenas. The experience becomes more focused socially on being part of a select group rather than part of a large throng. These separated areas may include enhanced or catered food and drink, more comfortable amenities, and glazing that separates the space from the main open area. In many of these situations, particularly in outdoor stadiums, there is also a growing trend to provide flexibility in the enclosure such that the glass is in place when needed for weather or comfort control, but able to be opened or removed in favorable conditions.

Efficient circulation routes and mobility of people is important in any building but in a high-density space like an arena or stadium, it is critical to keep the flow of people moving. It is also necessary to prevent congestion which could become unsafe in emergency situations or where it induces panic and harm. Accordingly, both horizontal and vertical pedestrian circulation has been receiving more attention in these venues. The accommodation of people of all ages and all levels of ambulatory abilities or disabilities requires both good master planning and attention to detail. It also requires an awareness of the various options available for both static and moving pedestrian routes such as stairs, corridors, escalators, elevators, and moving walks.

Directly related to the accommodation and movement of people, the choice of materials used for flooring, stairs, and other surfaces has

evolved for these large assembly spaces. A variety of durable, colorful floor surfaces has emerged that can not only withstand the rigors of high traffic areas, but they can also incorporate custom colors and designs. This plays directly into the spirit of such places where logos, mascot images, and other elements of pride can become part of the building and the experience of attending.

DESIGN CONSIDERATIONS

In light of the evolving nature of stadiums and arenas, and the continued need for protecting the health, safety and welfare of the people who use them, we will look at four areas that can enhance the overall design and user experience of such facilities.

Operable Glass Walls

In response to the desire to have flexibility in viewing conditions and the ability to open up or isolate areas, operable glass walls have become a part of stadium and arena design. In essence, an operable glass wall is defined as a system that uses door sized glass panels that can be readily opened or closed on demand. Like any other type of building fenestration, this system does not carry any structural load from the building, but is reliant on being appropriately attached to the building and operates within a structurally supported opening. In most settings, the intent is to allow a large, uninterrupted opening between two interior spaces or between an indoor and outdoor space. Operable glass walls can be full wall height, match standard door heights, or be used in shorter heights for continuous win-

dow style applications as well. The openings can range in width from as little as 9 feet wide up to as much as 300 feet or more. They are typically comprised of uniformly sized panels with a top and bottom track along which the doors either fold or slide.

Operable glass wall systems provide an innovative and unique design solution that brings wide-open connections, flexible space management, and natural daylight to all types and sizes of spaces. When the panels are closed, they offer the comfort and security of a fixed wall. When open, with the movable panels stored out of the way, adjacent spaces are freely connected to each other. Those seeking innovative design solutions in stadiums or arenas can use operable glass walls to bring spectators together and to provide unique event experiences. They can create exclusive and unique suite facades, suite space divisions, restaurant entrances, press booths, and attractive fan areas for sports and entertainment events. They can also expand the usability of these areas far beyond the days when main events are held by catering to smaller events. The multiple uses and configurations can create a continuous source of facility revenue by providing various types and sizes of events.

Sports facility owners in particular have recognized the advantages of operable glass walls in terms of their operations most notably by being able to charge more for use of these defined areas. They do that by commanding higher ticket prices or season ticket rates with suites that offer a unique experience for the fan, allowing the occupant the choice to open or close the wall panels with ease. When open, the fan experiences the crowd but when closed, the glass wall provides a transparent barrier with unobstructed viewing. For outdoor stadiums, they also provide greater fan comfort with protection from wind, cold air and noise. In the off-season, weather resistant opening glass walls protect interior spaces and furnishings from exposure and/or unauthorized entry.

Tyson Godfrey, principal with Hubbard Godfrey Architects worked on the design of a separated area called the Legends Club at the San Francisco Giants Stadium, AT&T Park. He points out "The Legends Club defines a new standard of luxury at AT&T Park. While sightlines to game day action were a priority, the suite was also conceived as a social and event space with maximum flexibility for one large group or two smaller ones in a variety of seating configurations." The use of operable glass walls allowed the design to be executed successfully.

Flooring Systems

Among the many flooring finishes available on the market, not all are suitable for use in

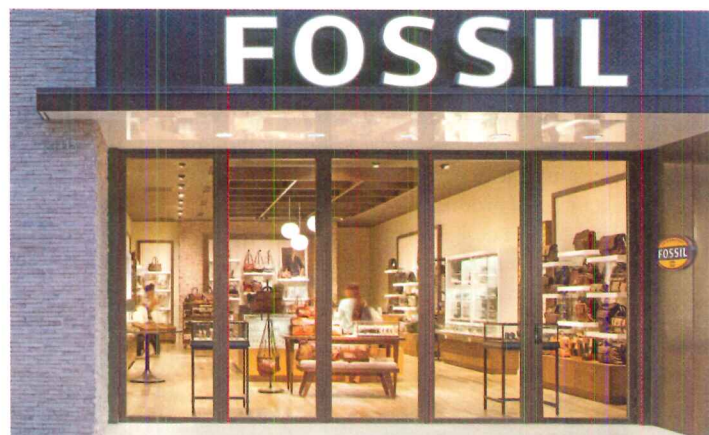
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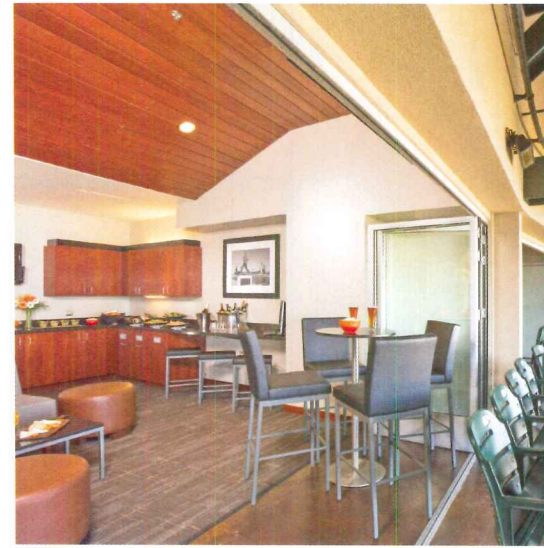
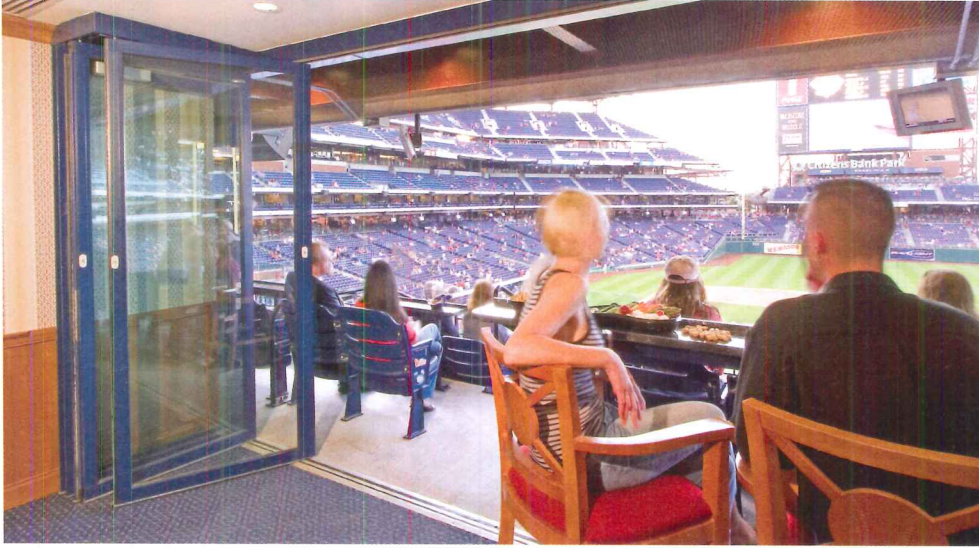
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The ability to separate off smaller spaces or open them up to the larger complex at will has become a sought after design feature in many sports venues such as Citizens Bank Park on the left and, the San Francisco Giants Stadium (A&T Park) on the right.

stadiums and arenas. From a design standpoint, flooring is one of the most visible and space defining characteristics of many spaces in terms of enhancing a color scheme, helping with way-finding, and contributing to the overall experience of the facility. For these reasons, plus the need to provide a durable, easy to clean surface, a popular choice is resinous flooring which is a seamless, poured in place system. Typically, these systems are high performance epoxy and urethane floor covering products. They have been proven to be long-wearing and easy to clean and are typically engineered to perform in both industrial and commercial environments without sacrificing design and innovative vision.

Seamless, poured in place flooring systems offer multiple design options. They are available in a range of product types that give owners, planners and designers options for both public areas and behind the scene spaces. In public areas such as stadium seating, enclosed suites, corridors, walkways, lobbies, eating areas,

Photo courtesy of Stonhard



The seamless resinous flooring used in this lobby and ticket area meets the design needs of the space by providing a clean, crisp, continuous appearance.

and entries they can provide colors to suit the location or differentiate one space from another. In addition there are both smooth and textured versions available that provide choices in their decorative appearance. It is even readily possible to include custom logos and sports designs in the flooring. As such they can provide flooring that can trigger an emotional response to those entering these facilities that is durable enough to last the life of stadium or arena where they are located. Colors, designs and branding also help enhance the overall experience of someone walking into smaller areas such as a private suite.

Certain heavy duty poured in place flooring systems are well suited for non-public areas such as kitchens, locker rooms and mechanical rooms. These epoxy and urethane based flooring systems can also be provided in different colors and with different final appearances including a flake finish, high gloss, or low gloss. While it is not common to find one product that works as well as resinous flooring in so many diverse settings, the nature of this type of product is to be durable, attractive, customizable, and easy to maintain allowing for fewer flooring products to be used throughout a single facility. Further, they help that facility deliver on expectations to meet the demands of high-level users while maintaining the appearance, function, and durability required in arenas and stadiums.

Designing for Circulation

Walking toward, into, and through an arena or stadium on the way to a seat, suite, or lounge, is part of the overall experience of the facility. However, it needs to be a safe one that allows people to keep moving, particularly when exiting whether because it is time to go or

because of an emergency. It also should be a pleasant one that doesn't impose unwarranted exertion on people by walking long distances or excessively climbing stairs. Recognizing that the pedestrian traffic in arenas or stadiums is extremely heavy, particularly at specific times, is the first step to designing adequate and appropriate circulation into the facility. Directly related, having the right equipment to move people such as escalators and moving walkways can improve and enhance the experience for all visitors. Fortunately, there is a full range of such equipment readily available that is designed to help owners move thousands of fans through the space and safely to or from their seats.

Coordinating the flow of people at entrances with their movement onto escalators can be the focus of such a circulation design study. For example entrances can be coordinated to act as "injectors" that will lead spectators to a series of escalators and elevators, transporting them to different concourse levels as may be appropriate. This can all be possible because of the use of multiple entry points and properly located escalators.

The process of moving along an escalator can also be an enhanced experience and a highlighted part of the design. AIA Gold Medalist Thom Mayne and his firm Morphosis Architects are known for developing architecture that shuns traditional form and creates bold, enlightening buildings. In their design of the Perot Museum of Nature and Science, a 54-foot escalator has been enclosed in a glass atrium that is smacked onto the south facade of the building. The escalator is one of the first in the world to protrude outside the main structure of a building allowing the enclosure to be visually cracked open on the southeast corner of the building bringing daylight inside.



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CIRCLE 206

Unexpected details like the protruding escalator define the architect's style but the unique building design required the manufacturer to work closely with the general contractor to develop an unusual installation path for the escalators. Timing and coordination were critical because the escalators had to be positioned before the building exterior was complete. In order to accomplish aligning and securing the pieces into place in a safe manner, many hours of planning and preparation were required. In the end, the building was described as "the boldest piece of modern architecture to hit Dallas" by The Dallas Morning News.

Safe Stair Design

While automated pedestrian circulation may be part of a facility design, fixed stairs will always be required and desirable. Such stairs can be incorporated into the overall design and circulatory flow of a stadium or arena and be a real design statement or be kept simple and understated as the situation may warrant. They also serve as a means of egress in the event of fire or other emergencies and are regulated in great detail by building codes and standards as a result. From a safety standpoint, they are one of the most common locations for people to trip, fall, and be injured. The importance of designing safe and code compliant stairs cannot be understated particularly since architects are sometimes held liable for damages to people injured on those stairs. Among the most significant safety details to be addressed are the proper design and specifications for treads and nosings installed on stairs. The challenge is often how to meet safety requirements in a manner that is appropriately consistent with the design of the rest of the building.

Stair nosings are a distinct part of a step that

Photo courtesy of ThyssenKrupp Elevator Americas



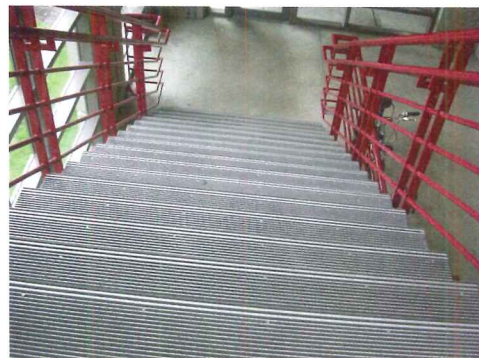
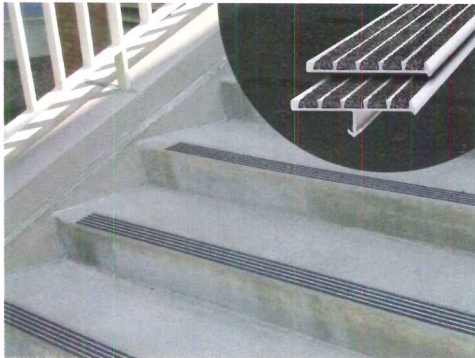
This glass enclosed escalator in Dallas, Texas quickly and efficiently moves people through the building but also provides daylight and a positive experience for the people using it.

building codes define as "the leading edge of stair treads". Nosings also apply to the leading edge of landings at the top of stairway flights. The codes address the size and depth of the nosing for different stair profiles and call for them to provide a degree of slip resistance along their surface. Generally a tread is differentiated from a nosing based on the stair industry standard - a nosing is defined as 4" or less in depth and a tread is defined as greater than 4" in depth (commonly the full depth of the stair tread.) In light of the above, it is common current practice to design and specify stair treads and nosings as distinct elements of the overall stair design. As such,

they can be added to the supporting material of concrete or steel that stadium and arena stairs are usually made from. Further, they can be specified for both new and retrofit / renovation installations.

For facilities with moderate to high levels of foot traffic, extruded aluminum nosings and treads are often selected for both interior and exterior locations. The aluminum extrusions are typically filled with abrasive material running from side to side along the width of the tread or nosing. When using this approach, the abrasive material is installed in channels in the extrusion thus forming alternating strips of exposed aluminum and abrasive running across the stair tread providing slip resistance. It is also possible to use "full abrasive" treads and nosings which have the abrasive material covering over the top of the extrusions so that only the abrasive material is seen. It is worth noting that numerous colors of abrasive material are available either to work with an overall design scheme or pick up on favorite team colors.

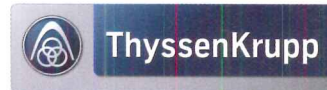
Photos courtesy of Wooster Products, Inc.



Stairs can be significant design elements in stadiums and arenas but also need to be designed for safety. Nosings are commonly added for increased slip resistance and are available in many different colors.

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Peter J. Arsenault, FAIA, NCARB, LEED AP, is an architect and green building consultant who has authored over 100 continuing education and technical publications as part of a nationwide practice. www.linkedin.com/in/pjaarch



PRODUCT REVIEW

Play Ball: High-Performance System Solutions for Stadiums and Arenas

NanaWall Systems



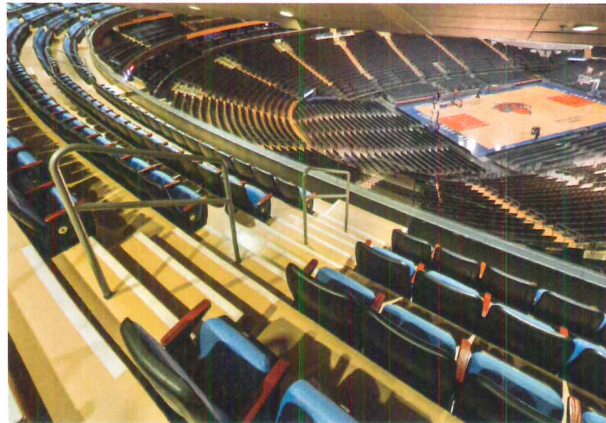
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Healing Environments: New Design Directions, New System Solutions

Current trends and innovative use of products help drive better healthcare design

Sponsored by Forms+Surfaces, Inpro, Pittsburgh Corning Glass Block, and Schluter Systems

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



Photo courtesy of Forms+Surfaces

Healthcare environments are intended for nurturing people and serving human needs. Too often in the past, the spaces that were built for those purposes used planning and design that focused on function and utility rather than the total interior environment. That is changing for the better and the heretofore stereotypical image of drab, institutional healthcare spaces is giving way to architects and designers who are increasingly creating beautiful, nurturing, and functional healthcare environments, even within tight timelines and budgets. Interior wall surfaces are coming to be seen as a design medium to introduce color, form, pattern, and art in the interest of humanizing the spaces. Natural daylight is being brought to more interior spaces without sacrificing privacy or durability. Patient bed areas are being treated in all respects to make them more pleasant and user-friendly. Bathroom and shower areas are treated as design components that can present themselves artfully and function optimally. Of course, all of these design elements need to meet the durability, sanitation, and cleaning requirements of healthcare facilities of all types and in fact they can. To meet these diverse goals, a full spectrum of integrated design, material, and

system solutions have become available from a range of product manufacturers. Understanding and incorporating these available options can provide huge benefits that save time, money and frustration while yielding superior results in terms of creative design, humanized aesthetics, and long-term performance.

SOME EMERGING HEALTHCARE TRENDS

The design of healthcare environments has always been influenced by many factors and has necessarily responded and evolved based on those factors. Several trends have been observed recently that are worth noting.

Influence of Art and Interior Design

Healthcare professionals are very familiar with the term “evidence based practice” where evidence refers to research studies and practice refers to what is done day to day. Those who keep up on the latest studies and lessons learned, can adjust their daily practices to match the proven outcomes found in the research. Design professionals can adopt this approach by being aware of relevant work that demonstrates how healthcare facility design impacts the people that use those facilities. One such area of research has repeat-

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Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the significance of art and natural light as part of the overall interior design of healthcare spaces.
2. Assess the health and safety performance aspects of healthcare interior surfaces as they relate to durability and sustainability.
3. Explain the importance of proper bathroom membrane preparation and installation techniques to enhance moisture control.
4. Determine ways to incorporate the principles presented into buildings as shown in case studies.

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The design of the immediate area around a patient bed area can have a significant impact on the healing and overall experience of that patient.

edly shown that integrating art, nature and beauty into hospital environments can have very beneficial results. These include a reduction in the length of patient stays by facilitating faster healing and creating a restorative space for patients, families and staff. As a result, artwork and images of nature are increasingly calzzed upon by those who recognize this in order to soften and personalize what can otherwise be seen as a sterile and/or stressful environment. Further, artwork and imagery is often incorporated as part of the building interior systems, meaning that it's become much more than simply hanging pictures on a wall. As appropriate to each facility, this type of integrated artwork can also be incorporated into way-finding elements, used to delineate space, define task-specific communities, or identify the functionality of specific areas.

Comfort in Patient Areas

Whether in-patient or out-patient facilities are being designed, a space focused around a hospital bed and supporting items is usually needed for each person that is being cared for. All of the above observations about artwork, color, and nature apply in these typically smaller, more personal spaces too as they may have the biggest impact on the patient experience. In addition, the use of appropriately colored or patterned materials that provide a sense of warmth, comfort, and calm can have a direct impact on a patient. Further, in multi-patient rooms or areas, privacy also comes into play not only in terms of visual privacy but noise control too. By providing materials and systems that provide better noise control rest and healing can be facilitated.

Natural Daylight

Bringing light into common and private areas of healthcare facilities usually means adding glass to exterior and sometimes interior walls. Fortunately, glass has many design and performance characteristics that have contributed to its use in healthcare buildings in increasing frequency. It is a durable, easy to clean material that can be configured in many different types, sizes, and shapes with varying degrees of light and vision transmittance. Also, with new technology, glass can be customized by adding images and color to create murals and way-finding signage allowing it to contribute to the overall artistic design of the facility. Hence, the use of light, color, and design can combine in a single wall, partition, or feature area to provide a myriad of benefits.

Bathroom Issues

All healthcare facilities pay particular attention to bathrooms for health, accessibility, and cleaning reasons. Increasing concern over hospital acquired infections has led to increased emphasis on eliminating bacteria from all areas of health care facilities. New methods for waterproofing shower areas help to keep them more hygienic, easier to clean and eliminate factors that support mold growth. Further, many existing facilities have a need to retrofit some of their bathrooms and shower areas to make them more accessible. Happily, new materials and installation methods provide design options that were not practical even a few years ago. These new materials and methods teamed with a systems approach to waterproofing can dramatically shorten construction time reduce total cost, and create much less need to change or remodel these areas in the future.

HEALTHCARE DESIGN CONSIDERATIONS

In recognizing the trends described, the obvious question becomes how to incorporate them into the design of a healthcare facility. We will look more closely at each of the following four topics with respect to making them part of an overall design solution.

Incorporating Artwork

Systems and materials used to incorporate artwork in healthcare settings must be beautiful, and offer the creative freedom required to meet a wide range of aesthetics. Manufacturers have recognized these needs and offer a variety of options to design professionals. Wall surface products using laminated glass for example have become available in a variety of types. Typically, these are comprised of a color graphic interlayer laminated between two lites of glass. Designers can draw on a wide range of standard interlayer colors, patterns, and photography, or they can incorporate their own custom variations. An especially popular choice for healthcare environments is high resolution artwork using this technology. At least one manufacturer has the ability to incorporate photographs, digital files, and other continuous tone imagery as the interlayer images. Those images can either be custom designed, provided by the owner or designer, or selected from the manufacturer's standard library of choices. The latter are an ideal solution when designers want to incorporate photographic imagery into a design, but don't have, or can't use, their own photography. They can instead select from a growing library of large-scale, high-resolution photos created using sophisticated image capturing equipment.

Photo courtesy of Forms+Surfaces



Edge lit, LED illuminated panels incorporate artwork and the ability to add lighting in spaces as needed.

0.0" 0.8" 1.7" 2.5" 3.3" 4.2" 5.0" 5.8" 6.7" 7.5" 8.3" 9.2"

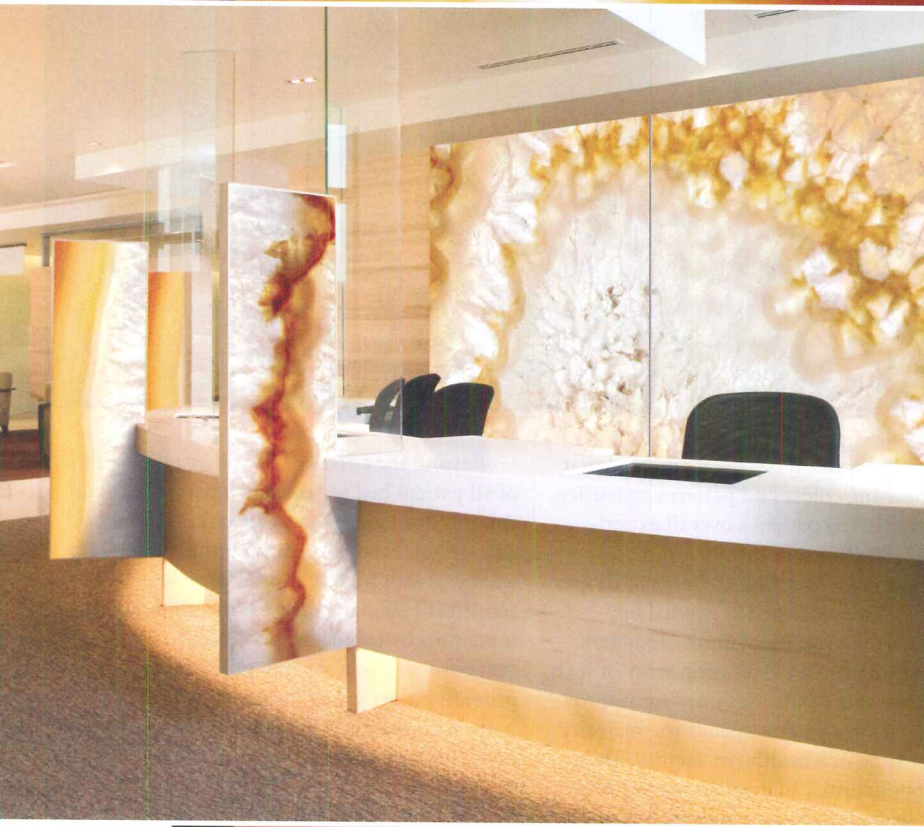


0.8"

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The design of patient bed areas can be notably improved by using warmer appearing materials including a wide array of privacy curtain fabrics a full range of colors and patterns.

An option for enhancing this artistic approach to surfaces is to add direct lighting to the panel. Engineered, edge-lit LED panels are available that allow seamless illumination of walls, columns, elevator interiors, and standalone panels and displays. Typically, these lighted panels combine cutting-edge lighting technology with specialty architectural glass and an engineered framing system to create a total illuminated panel. They can be used to create stunning effects in addition to being a great way to add illumination to healthcare settings. As such they can be treated as standalone artwork, as part of a way-finding package by providing subtle illumination to darkened corridors, or by adding “windows with a view” to areas without natural light. The illumination can even help a 2D photo appear to be more three dimensional.

Of course, for artwork of any type to stand out, it needs to be placed against an appropriate back drop. That can be standard wall materials or manufactured wall cladding panels designed for a complete, integrated, panelized, design solution. Such a system can be used to create a cohesive look across hospital walls, elevator interiors, columns, and other vertical surfaces that are accented or complemented by the artistic additions described above.

Improving Patient Areas

The healthcare industry is moving steadily toward an enhanced patient experience guided by the use of feedback received in post-discharge

surveys. Beyond walls, it has been reported that the use of pleasing colors and patterns in fabrics can play a role in the patient’s overall experience. This is significant because most patient areas are screened with fabric curtains or drapes that can be opened or closed as needed for privacy. Based on a variety of input, designers can now choose from an increasing array of such fabrics that are specifically designed for improving the area where a patient spends the majority of his or her time in a healthcare facility. There is also the opportunity to create more customized spaces by using a ceiling mounted curtain track that is bendable to suit differing design situations.

While the visual and textural elements of such enclosures is readily discernable, the more subtle aspect of sound control is also important. In the past, many fabric enclosures used an unfinished aluminum track to hang curtains with the process of opening and closing them creating a fair bit of unwanted noise. In the grand scheme of things, that may not seem like a big deal, but tell that to a patient who is trying to sleep or who is already a bit overwhelmed by the other, increasing levels of background noises of a healthcare environment. Instead, by using innovative track products that combine flexible, recycled aluminum and durable polymers, the noise generated by opening and closing curtains has been shown to actually decrease on the order of 10 to 20 decibels - enough to make a real and discernable difference.

Beyond the curtains, the other notable aspect of all patient bed areas is the head wall. Often this has been relegated to an array of medical gas, electric, and electronic connections against whatever wall surface is used elsewhere. A significant change in appearance and design is possible by using a wood grained covering that covers all or a portion of the head wall providing a genuinely “warmer” and more natural appearance, even if the material itself is not actually wood.

Incorporating Glass

Using glass to help spread light into and through healthcare spaces can be done in a variety of ways. Often, the default assumption is to use windows or glass panels. However, there has been a resurgence of interest in using glass blocks, which are versatile design elements and are quite well suited for healthcare facilities. They can provide light transmission in either clear or obscure patterns which allow for the control of visual privacy accordingly. Their thickness and make up also provide noise resistance which we have already seen is important in healthcare environments. Since glass block is very durable, inert, and relatively maintenance free, it can be used in both interior and exterior applications. In exterior walls, it can be selected to be energy efficient by providing favorable insulation and solar heat gain values. It also provides enhanced resistance to impact, fire, sound transmission, graffiti and weather.

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CIRCLE 194

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Glass block is a particularly appropriate alternative to sheet glass in healthcare settings where light, color, and art are desired.

For interior applications, glass block can go beyond privacy separations and light transmission. In the spirit of adding color, art, and design to interiors, glass block is also available with artistic color and patterns with capabilities to add customized images and colors. Glass block has always had a dynamic relationship with light, but with this option, color and images can become vibrant. Custom designs are possible and available as individual accent glass blocks or as full or partial wall murals. Typically, stacked color accents and murals are done on standard 8 inch x 8 inch x 4 inch glass blocks that can be installed like traditional units. Each glass block is crafted individually and intended to be mixed with other clear or designed blocks to form the overall wall or window design. And since the application of color or images does not affect the fire rating of the glass block it is suitable for applications where fire-rating is required - the color/image simply becomes part of the glass block. It is also safe for use in wet areas, including pools and shower enclosures. From an overall design perspective, custom colored and patterned glass block can add a new dimension to healthcare designs while providing all of the standard features and benefits of traditional glass blocks.

Improving Bathroom Design

The issues associated with good bathroom design are tied not only to overcoming an

institutional appearance, but at the same time addressing the need to be handicapped accessible, avoid opportunities for mold, and other hazards. Fortunately, there are now easier and more cost-effective ways to build bathrooms and shower areas in health care facilities that are fully accessible and durable without promoting

Photo courtesy of Schluter Systems



Accessible showers that use a variety of enhancements and drains offer more flexibility in design and construction along with easier usage.



mold growth. One thing that can be most important for the overall design and operational success of a bathroom is to use a complete, coordinated system to create a new or remodeled bathroom so that all of the individual parts work together and complement each other. In particular, this can create rooms and shower areas that are patient friendly and cost effective. By allowing for faster and more affordable universal design this system approach to showers in particular helps create spaces and rooms that can be used by anyone, whether wheelchair bound or ambulatory. If all bathrooms in a facility are fully accessible, then it is much easier to assign patients to rooms. This design approach can foster greater independence and eliminate frustration from trying to use a space in a different way than intended.

Individual products that can be incorporated as part of an overall system into the design of bathroom showers include waterproof interior wall panels, pre-formed shower trays and ramps, linear drains, and cove shaped profiles. The preformed trays and ramps can be used to create barrier free spaces for universal use. In the case of retrofit projects this approach often reduces the amount of selective demolition that needs to be done thus helping to eliminate downtime between steps in the construction process. Coordinated linear drains allow for shower floors with a single slope so they are easier to use by both wheelchair bound and ambulatory patients. There are also more options for the location of the drain which means more flexibility in design and construction.

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Peter J. Arsenault, FAIA, NCARB, LEED AP, is an architect and green building consultant who has authored over 100 continuing education and technical publications as part of a nationwide practice. www.linkedin.com/in/pjaarch



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Capturing the full benefits of 'green' in washroom partition and accessory materials selections

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It is, actually, all about the washrooms. The impression left by this room makes a profound impact on the overall assessment of the building itself.

Photo courtesy of The ASI Group

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

Most people expect privacy in the bathroom. Paradoxically, most bathrooms outside of private homes are designed for multiple, simultaneous occupants (*The Atlantic*, April 2014). Anyone who has experienced the duress of using an overcrowded, poorly maintained, or uncomfortable public toilet values a thoughtful washroom design. Despite its often taboo and certainly private nature, using public washrooms is a daily reality. The impression, poor or positive, left by a washroom often colors an occupant's perspective of his or her entire business visit, at times influencing their overarching opinion of how much the building owner cares about their customers, visitors or employees. More often than not, this opinion or assessment carries over about the building design, and by association the architect or designing firm.

The demands placed on a high-profile, high-traffic, and heavily used facility require extra care in planning from its architect. An architect must think about it in these terms: What if 100% of a building occupant's opinion of the architect can be shaped by less than 1% of what an architect specifies?

Among the most important design criteria are public health, privacy, safety, and the welfare issues that govern these spaces. A well-crafted public washroom should be clean and dry, well ventilated, easy to maintain, have a carefully planned layout and be disability friendly. Good planning creates a safe, clean, and comfortable public environment.

What are unifying elements that resonate in public washroom design? The "10 Best Public Bathrooms," as rated by *Business Insider* in 2012, received accolades because their decor evokes a certain era, they have unique and thematic design elements, or even a \$40,000 hand-blown glass chandelier (Vanity Night Club, Las Vegas).

However, set the individual highlights aside, and one notes washroom designs that universally promote thorough up-keep and user accommodation. The photos reveal clean and attractive spaces. These descriptors convey the ultimate goal in washroom design. The path to realizing this vision, and for securing it for both the client and building manager, is paved by sustainability.

However, this is not simply sustainability as recognized by certifications and program worksheets, but rather it is the durable concept of sustainability as defined by maintainability and design sensibility. This entails a washroom design that is environmentally conscious, offers the longest possible lifecycle of use, employs materials that are environmentally friendly, and one that comprehends first costs in lifecycle costs.

THERE IS NO SUSTAINABILITY WITHOUT MAINTAINABILITY OR DESIGN SENSIBILITY

Sustainability is not just about scoring Leadership in Energy and Environmental Design (LEED)[®] points. It reaches beyond accomplishing certifications. It is about building projects that have longer lifecycles, thereby preventing products from ending up in a landfill prematurely. Longer lifecycles come from choosing the right products (not just materials however) for the right applications. Making this decision—charting a sustainable project lifetime—means anticipating all the effects of the washroom's environment, hard use, heavy abuse, or superficial maintenance. This requires evaluating the many dimensions of partitions and accessories beyond basic LEED Criteria, including: additional green features, maintainability, durability, initial and total lifecycle cost, and aesthetics. Understanding the full range of available product options leads to better material and component selection for the client. It also has implications for the life of the building.

While there are a number of critical sustainability issues in washroom design, the concept of maintenance takes priority.

One of the least understood basics of sustainable design is maintainability. Things must be taken care of in order to enable them to provide a long, useful life. Things that aren't taken care of, or are hard to take care of, are neglected, deteriorate, and are thrown out. The most environmentally appropriate product, placed in the wrong setting, will suffer an abbreviated lifecycle, negatively impacting the client's bottom line and adding unnecessarily to a landfill. Even with the most vandal-resistant fixtures, an unsupervised or poorly cared for facility will eventually become sub-standard. Facility engineers and cleaners play an important role, and their efforts will result in well-maintained washrooms.

Selecting appropriate materials by gauging what practical maintenance looks like and by estimating real conditions is vital to maximizing the successful life of a product in place.

Unfortunately, maintenance is a factor not often considered as part of the design professional's responsibility. Nevertheless,

to create a truly sustainable project, cleaning maintenance and system maintenance must both be understood and communicated to the project's owner. Maintenance should take first priority, not last. That means that they must be anticipated from the standpoint of the design itself. Design professionals must become familiar with maintenance procedures and appropriate care of materials if they are to protect their designs and create truly sustainable projects.

In a sustainable washroom, the ability to maintain products and systems must be designed into and accommodated by the layout. In this way, design sensibility and maintenance complement each other. A washroom's design helps or hinders its sustainability. By creating facilities that are accessible, can be readily cleaned, and spaces which can withstand predicted use, a designer will not only facilitate required maintenance, but also will ensure that the project elements work together to maximize the serviceable life of the design. Making sure a space can be easily accessed and easily cleaned is a pivotal checkpoint for washroom design.

Materials and systems must be maintained to be sustainable. It is essential, therefore, to understand how to select materials and systems to ensure proper maintenance.

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Learning Objectives

After reading this article, you should be able to:

1. Discuss why achieving true sustainability in a washroom requires evaluation of more than just LEED points when specifying partitions and accessories.
2. Explain how the materials specified for washroom partitions and accessories can affect overall washroom sustainability.
3. Talk about the characteristics of the most common materials used, and better understand the tradeoffs in durability, aesthetics, maintenance, user safety, and total lifecycle cost.
4. Understand that some widely held perceptions and assumptions about common washroom materials are misguided.

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ANALYZING PARTITION MATERIALS FOR LIFECYCLE IMPLICATIONS, MAINTENANCE, AND APPLICATION SUITABILITY

Carefully selected, durable materials minimize maintenance and prevent premature deterioration and misuse. The selection of appropriate products and systems will have a significant impact on the lifecycle and sustainability of the project. Material selection considerably impacts the ability to successfully maintain facilities. While sustainability involves much more than just materials, materials are a key element of sustainable design.

Each commonly used partition material has benefits and limitations when it comes to maintenance, durability, and design. Cost is often a controlling factor in material selection. Factors such as wet area suitability, ease of maintenance, warranty, style, and source area, also play a part in the final decision. Weighing costs against maintenance is particularly necessary in product selection. Long-term maintainability may mean higher initial costs, but prove the most cost-effective over the long-term. However, in a project that anticipates remodeling every 3 to 5 years,

selecting a more expensive product may not make sense. Lower cost materials can be successful and sustainable if they receive consistent maintenance. Although higher cost materials can minimize certain levels of maintenance, they still need to be taken care of.

Lifecycle cost analysis is useful for guiding these decisions. By understanding the full range of materials available, the designer can better adapt the washroom design and pick aesthetic notes for maximum life and service.

Powder Coated Steel Partitions

Powder coated steel partitions are made from galvanized steel sheets. The powder coated finish is electrostatically applied over galvanized steel, which protects against corrosion and provides a proper base for the finish. The finish is resistant to wear, fading, staining, scratching and scuffing. It is easily cleaned with mild soap and wiped dry.

The face sheets are held rigid and permanently in place by an interlocking strip welded at each corner. The core is cellular honeycomb which provides strong construction and maximum sound attenuation. (First Cost: Inexpensive)

Photo courtesy of The ASI Group



The appropriate selection of materials for the application has a definite impact on overall sustainability.

Benefits

- Maximum durability. Powder coating adds to the corrosion resistant qualities of galvanized steel.
- Average resistance to vandalism. Paint could be scratched off with sharp objects. Metal could be dented or incised with force.
- Economical.
- Resists graffiti, corrosion, fading, scuffs and stain.

Application concerns

- Internal core is a honeycomb cardboard and may be damaged with sustained exposure to moisture.
- Warranty from major manufacturers is 3 years.
- Ease of maintenance: Must surface clean with a mild soap. Should not be hosed down.

Style implications

- Allows good choice of colors.
- Powder coating allows blending the partitions with the remaining color choices in a washroom.

LEED Version 3.0 Certifications

- May qualify under Recycled Materials (MR 4.1, 4.2)
- Both adhesives and paint may qualify under Absence of Volatile Organic Compounds (VOCs) etc. (EQ 4.1, 4.2, 4.4)

Stainless Steel Partitions

Stainless steel partitions are made from Type 304 stainless steel, which is mounted to a honeycomb core and finished with a satin or textured finish. Stainless steel partitions are traditionally fabricated utilizing 304 stainless steel. This grade of stainless is the standard for the washroom industry. There is a trend by some secondary manufacturers to supply lesser grades of stainless with lower nickel and chromium levels. These lower content levels directly affect the corrosion resistance of the material and will lessen the lifecycle of any partition that is supplied in this manner. It may be wise for designers or building owners to ask for certification of 304 stainless steel when choosing this material. Construction of these partitions is similar to that of powder coated products as the core is honeycomb in this application. (First Cost: Expensive)

Benefits

- Resistant to rust and corrosion.
- Vandalism resistance is high. However, metal could be dented or incised with force.
- Striking appearance that works with any color scheme.

Application concerns

- Internal core is a honeycomb cardboard and may be damaged with sustained exposure to moisture.
- Warranty from major manufacturers is 5 years.

- Ease of maintenance: Must surface clean with a mild soap. Should not be hosed down.

Style implications

- Some maintenance is necessary to achieve maximum aesthetic appeal.
- An elegant look that accentuates the design aesthetic in any application.
- Great complement when other stainless steel washroom accessories are also used.
- Adds a level of elegance no matter what other products are used in a washroom.

LEED Version 3.0 Certifications

- May qualify under Recycled Materials (MR 4.1, 4.2)
- Adhesive may qualify under Absence of Volatile Organic Compounds (VOCs) etc. (EQ 4.1, 4.2, 4.4)

Solid Plastic Partitions (HDPE)

Solid plastic partitions, sometimes referred to as High-Density Polyethylene (HDPE), are made from a polymer, which is composed of extruded polymer resin. (First Cost: Moderate)

Benefits

- Variety of colors and textures to chose from.
- Medium price option.
- Ideal for heavy-use situations, such as schools, aquatic facilities, locker rooms and sports arenas.
- Impervious to water. Resists moisture and steam, making it a practical choice for shower and locker room areas.
- Hygienic.
- Easy to clean. May be washed down by machine, or cleaned with soap and water.
- Resists moisture, scratches, dents, chipping, rust, oil and bacteria.
- Vandalism resistance is high. Cannot be dented; scratches are repairable; and is resistant to graffiti.
- Never needs painting.
- Can have anti-microbial and other additives for specific applications.
- Can be made with 100% post-consumer recycled content (at a higher cost).
- Warranty ranges from major manufacturers start at 15 years.

Application concerns

- Color may not be altered once manufactured or later in the lifecycle of the building.

Style implications

- Color choices available: coloring plastic is a matter of formula, some manufacturers extrude their own sheet and may be able to match almost any color, dependent on lead time.

- Since HDPE partitions can be made with a “sandwich” of two colors this material lends itself for engraving logos and letters into the stalls.

LEED Version 3.0 Certifications

- May qualify under Recycled Materials (MR 4.1, 4.2)

Plastic Laminate Partitions

Plastic laminate partitions are made from particleboard and finished in a resistant plastic laminate. This material allows this partition board to be designed both horizontally and vertically. (First Cost: Inexpensive)

More material choice can equate to having a better chance of satisfying the functional and design need for any building or application, which in turn can translate to longer product lifecycles.

Benefits

- Low cost.
- Wide range of colors.
- Resists corrosion, rust, and penetration of dirt and grease.
- Popular choice for retail and foodservice washrooms.

Application concerns

- Water resistance is low. Core is typically made of particleboard, which could expand, warp, and delaminate over time if subjected to high humidity.
- Easy to clean, but must be surface cleaned only with mild soap and water, taking care not to soak the material.
- Vandalism resistance is low. Pilasters may have an optional steel core to help increase strength of installation.
- Overall sustainability is rated as low. Not for use in a high-traffic environment or in an area where exposure to the elements or humidity may be a factor.

Style implications

- Many laminate choices allow for a customized look.

LEED Version 3.0 Certifications

- May qualify under Recycled Materials (MR 4.2)
- Dependent on Ship To location, may qualify under Regional Materials (MR 5.1)
- Adhesive may qualify under Absence of

Volatile Organic Compounds (VOCs) etc. (EQ 4.2, 4.4)

- May qualify under FSC Certified Wood (MR 7.0)
- May be GREENGUARD certified, depending on manufacturer

Solid Phenolic Core Partitions

Solid phenolic core partitions, both color thru and black core, are made from many layers of decorative papers which are saturated with phenolic resin. This forms the base, which is then laminated with heat. In black core phenolic, black kraft paper is used to build

the layers of the material, then two colored pieces are added to either side, giving the final partition whatever color is chosen. Color thru phenolic is constructed using the same colored paper on the inside as on the outside. In doing so, however, the color options are more limited. (First Cost: Expensive to Very Expensive)

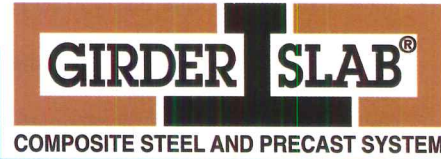
Benefits

- Hundreds of colors to choose from.
- Used in heavy traffic areas, including schools, stadiums, and theme parks.
- Impervious to water; recommended for areas of high humidity; ideal for shower and locker rooms and aquatic facilities.
- Excellent choice for areas with a high incidence of vandalism. Very difficult to scratch; will not dent, highly impact resistant, and graffiti resistant.

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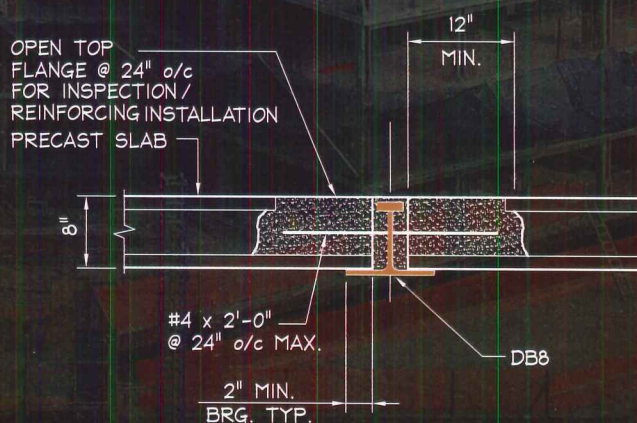
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The Girder-Slab® System in combination with a structural steel frame offers a complete steel and concrete superstructure. It is ideal for use in mid to high-rise residential structures such as hotels, student housing, apartments, senior housing and condominiums. The Girder-Slab System greatly improves construction operations and the ability to meet critical deadlines. Unlike cast-in-place concrete structures, the Girder-Slab System uses off site prefabricated components that are quickly erected on site by one trade even in cold weather (Ironworkers).



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Image courtesy of Neil Denari Architects

Achieving Higher Quality in High-Density Residential: The Strengths of Structural Steel

Maximize space, versatility, and quality in mid-rise and high-rise apartments and condominiums

Sponsored by American Institute of Steel Construction

Forward-thinking architects are developing designs that maximize usable area, provide versatility, and create high-quality long-lasting buildings using structural steel systems. Structural steel framing has recognized benefits in apartment and condominium design, effectively addressing the challenges of limited program space, speed of construction and future adaptability to changing needs. It is an ideal solution for mid-rise and high-rise structures where economy can

be gained through repetition of the structural members. The most successful projects are a result of a collaborative team effort. As the building structure is always on the critical path, the benefit of designing with structural steel is a reduced overall construction schedule with effective planning.

THE STRENGTHS OF STRUCTURAL STEEL

Structural steel has historically found great efficiency in the design of office buildings,

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Learning Objectives

After reading this article, you should be able to:

1. Compare the advantages of structural steel framing to other building materials.
2. Explore system concepts that allow the architect greater flexibility in programming and design of apartments and condominiums.
3. Determine economical methods of design.
4. Analyze faster methods of construction in using structural steel framing.

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Strength of structural steel	Benefits
Lighter weight structure	Reduce foundation loads, reduce costs
Longer spans	Fewer columns, more usable space
Faster erection	Shorter schedule, earlier revenue generation
Higher quality	Durable, more precise, tighter tolerances
Versatile material	Flexible for unit conversion, adaptive reuse
High resistance to deformation	Longer lasting, ideal for high seismic
Prefabrication	Faster, reduce on-site labor, ease of construction

warehouses, and most other non-residential building types. Apartment and condominium projects constructed using conventional or innovative steel systems are now being recognized for high performance and quality. These buildings take full advantage of the following benefits of using structural steel:

Highly sustainable. Steel is the most recycled material in the world.¹ The recycled content of structural steel beams and columns produced in the United States averages 90 percent. A striking 98 percent of structural steel is recovered at end-of-life for reuse or recycling. The structural steel industry continues to reduce its low greenhouse gas emissions and energy intensity. Results of these efforts are evident in recent findings on greenhouse gases, which show the iron and steel industry reduced carbon emissions by 37 percent and energy intensity by 32 percent between 1990 and 2013 on a per ton basis.²

More usable space. Longer spans and smaller columns allow for more usable floor area and fewer structural intrusions in open spaces. Two key selling factors in apartments and condominiums are open views and maximum free space. For example, in a 10-story residential building with 30-foot structural bays, 13 inch by 13 inch steel columns would translate to approximately 18 inch by 18 inch concrete columns for the equivalent loads. Steel columns have a reduced structural footprint compared to concrete, allowing for the greatest flexibility in furniture layout and more unobstructed views.

Fast erection and assembly. Structural steel is fabricated and erected in nearly all weather conditions with no formwork requirements, which significantly reduces the time for construction. An excellent choice for fast-track construction, structural steel framing meets owner needs to bring apartments and condominiums to market on time. A shorter schedule allows owners to reduce financing costs and generate revenue earlier.

Durable and long-lasting. The combination of a high-strength, low-weight material and resistance to rot and insects are prime elements contributing to the durability of structural steel. Apartment and condominium buildings utilizing structural steel framing inherently have a long life span due to the long-term performance of the material. Structural steel can be recaptured from demolition sites and reused multiple times prior to being recycled. The framing components may be disassembled and salvaged, a cleaner process than the demolition of concrete buildings which leads to more dust and pollution in the air.

Versatile. Structural steel framing handles changes to load and occupancy requirements with ease, extending the functional life of buildings. Additional reinforcement is



BUILDING SUSTAINABLE COMMUNITIES

The American Brewery Lofts in Boston, Massachusetts, was originally a timber structure that housed a former beer brewing company. Elkus Manfredi Architects designed a renovation of the existing structure to house 34 residential units and expanded the building to include 45 units over a two-story parking structure. To accommodate the changes, the existing timber frame structure was strengthened with architecturally exposed structural steel. Lofty ceilings were created up to 23 feet high, supported by an open and airy frame of structural steel beams and columns.

Urban infill is growing in popularity as people move towards cities. Adaptive reuse projects complement city growth with respect to this movement. An ideal solution for building reuse, structural steel requires little disruption to healthy communities to revitalize existing structures. It is a high-quality material which performs well over the test of time. Steel strengthens existing structures with ease, allowing for changes in loads, vertical expansion, and conversions from different occupancies.

Images courtesy of Stantec Architecture



THIN FLOOR SYSTEM: GLASSHOUSE

In 2014, the GlassHouse project broke ground in Winnipeg, Canada, using the Deltabeam thin floor system developed by the Peikko® Group. Designed locally by the international practice Stantec Architecture, this high-end 21-story residential building promises floor-to-ceiling glass in a cool modern aesthetic for 196 condominium units. To meet the need for speed, the project team implemented a thin floor structural steel system to advance the erection process in the most economical way. The modified beams, known as Deltabeams, have been UL tested to achieve 2-hour, 3-hour, and 4-hour ratings without the need for additional fire protection on the beam itself. The underside of each exposed beam is painted black in contrast with the exposed hollow core plank ceilings, stark white walls, and warm walnut flooring. Steel columns are architecturally

exposed and coated with a black intumescent paint to meet the required fire protection. The typical floor-to-floor height is 9 feet 10 inches separated by thin 10-inch horizontal bands on the facade. Architect and Senior Associate Michael Banman along with Fletcher Noonan, design leads of GlassHouse at Stantec, are well-versed in the Deltabeam system. Banman elaborates, "In our practice, it is vital to consider concept, construction, and structure simultaneously, holistically. The organization, clarity, repetition, and rhythm of the exposed structural steel and of the construction assembly facilitate the construction schedule. This in turn lowers construction costs and reduces the cost of owning while providing a more sophisticated space in which to dwell." The steel is tracking on schedule and the building is set for completion in 2016.

simple and straightforward with steel and can be designed to support changes of use, increased loads, additional floors, and longer spans. An ideal system for unit conversion or adaptive reuse, the versatility of structural steel highlights the benefits for apartment and condominium designs.

Aesthetic options. Structural steel offers a wide range of shapes and sizes that allow a multitude of options for building cladding and expression. Recognized for its slenderness and grace, steel can be shaped into tight curves and broad arches, and utilized for long cantilevers. Steel may be exposed architecturally and should be protected from fire and corrosion where required. Methods of fire protection range from intumescent coating to cementitious spray-proofing, while design for corrosion

includes options such as galvanizing or painting depending on the exposed condition.

Strong seismic performance. A ductile material such as steel is excellent for high-density residential buildings in seismic zones, where safety is critical for large numbers of occupants. Structural steel systems offer the highest level of safety in seismic design. Seismic design is required in approximately half of the geographic area of the United States. The lightweight nature of steel reduces the seismic base shear by about one-third compared to an all-concrete structure, which results in a significant reduction in foundation loads.

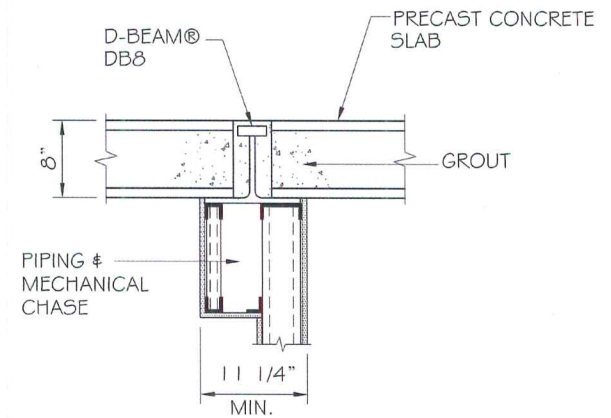
ESTABLISHING DESIGN GOALS

In the apartment and condominium market, real estate trends are a key factor in influencing

the program needs and design of a building. As part of a market that caters to a variety of end users, high-density residential buildings increasingly require a fast track project design and construction schedule. Structural steel is similar to a kit of parts in which all the components come to the site ready for assembly and erection in nearly all weather conditions. Time is saved and labor costs are reduced with prefabricated structural components. The earlier an owner can occupy a building, the shorter the time required for construction loans with the added benefit of earlier revenue generation.

In addition, architects should not feel limited by the span and depth of the structural system. The programs for apartments and condominiums involve a wide range of unit mixes, room areas, and ceiling heights.

Images courtesy of Girder-Slab® Technologies, LLC



THIN FLOOR SYSTEM: TROY BOSTON

Troy Boston is a 378-unit apartment complex located in Boston's South End at 275 Albany Street designed by ADD Inc., now with Stantec. The project team is pursuing LEED Gold certification for the dense urban development. Two residential towers at 12 and 20 stories anchor the corner of a tight site, wrapped with a podium comprised of outdoor rooftop amenities, three levels of parking, and ground-level retail space. The project team performed an analysis to compare costs and schedule for multiple structural options: a conventional steel-framed system, a cast-in-place concrete system, and a thin floor system known as the Girder-Slab® system. All three systems were competitively bid solutions. Senior Associate Principal, Jon Lannan, AIA, of ADD Inc., noted "getting this building open before the competing neighbors" was a high priority for the developers, especially in the growing Boston market. Weather related issues during construction had to be nearly eliminated to maintain the critical path. The Girder-Slab® system was ultimately chosen as it held the advantage of fast erection which led to a shorter schedule, resulting in a more economical solution. Designed to accommodate bay sizes of 25 feet by 30 feet, the thin

floor system can achieve floor-to-floor heights as low as 8 feet 10 inches when using 8-inch hollow core planks. The design team of Troy Boston achieved the desired clear ceiling heights of 9 feet 2 inches by setting the floor-to-floor heights at 9 feet 10 inches.

The 330,000-square-foot project is on schedule to complete the structural framework within 10 months. The underside of the hollow core planks is exposed and the modified beams, D-beams®, are treated with spray-applied fire protection. By achieving low floor heights, material costs are reduced in addition to saving building energy usage. Flexibility of space planning was also desired to lay out the floor plans with a dense unit mix of studios, one-bedroom, and two-bedroom apartments. To create larger bays with fewer columns, the structural team at Odeh Engineers designed the beams to span longer than 25 feet with the implementation of tree columns that were integrated within partitions. The thin floor system ultimately represents a simple design that allows for low floor-to-floor heights within a fast schedule. According to Lannan, "[We] would happily use Girder-Slab® again."

Understanding the marketplace underscores the value gained when designing with structural steel systems to optimize space and flexibility, and allow faster building completion.

Plan for flexibility. The market trends of today may be vastly different from those 50 or just 15 years from now. Program design often requires a future plan for converting micro units to conventional units, or for modifying apartments into condominiums. Structural steel framing can handle subsequent changes in load requirements and can be reconfigured if needed, including new penetrations in floor deck systems without any need for the extensive time required for scanning to locate rebar or post-tensioning cables. Buildings often outlast current program needs and structural steel systems make them more adaptable over time.

Reduce the structural footprint. Steel columns take up less floor area than concrete columns, are higher in strength, and significantly lighter in weight. Thin floor systems, long-span deck, open-web joists, staggered trusses, and conventional beams with composite deck all offer solutions that can be used to reduce building weight overall. Cost savings are also achieved with decreased foundation loads. Providing larger clear space with maximum design efficiency leads to greater design flexibility and higher demands for occupancy to the owner's benefit.

Maintain precision and quality. Since fabrication occurs off site, steel framing is

created with tolerances typically measured in sixteenths and eighths of an inch, where competing systems have field construction with tolerances measured in whole inches. The fears of dealing with poor craftsmanship and creep with cast-in-place concrete, or creaky floors and shrinkage in wood-frame construction, can be eliminated by utilizing structural steel systems.

SOLUTIONS IN STEEL

Understanding the overall concepts of each structural steel system can strengthen decisions made during the design process and allow for productive discussion and collaboration with the project team. The choice of structural system is not just based on material costs, but also accounts for the methods of construction, amount of on-site labor, and complexity

of design. Systems that are efficient in design often prove to be economical in the construction phase.

Thin Floor Systems

Architects are frequently faced with solving the owner's desire to maximize the number of residential stories in a limited building height allowance. Specialized steel beam and precast hollow-core plank systems can help the building industry to address this need. Reducing the floor plate thickness in a building provides many benefits: lower floor-to-floor heights, savings on overall building energy, and a lighter structural weight, to name a few. Steel systems are available that allow the top and bottom planes to include both the structural floor and the structural beams in an 8-inch or 10-inch-deep system. Lightweight floor systems as slim

LONG SPAN DECK: 100 NORFOLK ST

100 Norfolk Street, in New York City, is a 12-story luxury condominium building designed by ODA New York that began construction in 2014. Located on a narrow urban site, the form extends over an adjacent grocery store to create larger floors. A series of cantilevers become more apparent as the building rises in height, expressing the braced framing used for lateral support. Long-span deck was ultimately selected to maintain a lightweight building to reduce critical loads on the foundation. The Deep-Dek® Composite Versa-Floor system maintains a low-profile floor plate just barely visible behind the glassy exterior. Interior spaces take advantage of generous ceiling heights, clear long spans, and panoramic views of the skyline. Many of the 38 units, ranging from studios to three-bedroom units, have already sold well in advance of the building completion.



Image courtesy of ODA New York

Photo by DeSimone Consulting Engineers



SAVE SPACE WITH STEEL PLATE SHEAR WALLS

When space is tight and concrete shear walls are demanding large amounts of floor area, steel plate shear walls can play a major role in the design of a building. Steel plate shear walls (SPSW) are thin plates located between columns that save valuable floor space in lieu of using thick concrete shear walls. These steel shear walls are commonly used in slender buildings that require great stiffness with limited floor area usage. Prefabricated steel panels are installed on site with minimal field work, increasing the speed of construction rapidly compared to cast-in-place concrete shear walls. Reducing the time for installation is a key time saving factor, which can significantly reduce associated labor costs. A study performed by structural engineers Sellie and Hooper concluded that an approximate 2 percent gross area savings was achieved by implementing steel plate shear walls instead of a typical concrete shear wall.³

as 8 inches span 30 feet without the need for beams projecting below the slab. The equivalent flat plate system in an all-concrete solution requires rebar and formwork, adding to the on-site labor requirements. Wood framing typically requires deep joists to meet the average spans for mid-rise and high-rise apartments and condominiums. Buildings implementing a structural steel thin floor system have saved enough overall height in some applications to add additional floors and maximize the building total square footage.

In an efficient and economical thin floor system scenario, steel beams support precast hollow-core planks. Grout fill is used to lock the beam and plank together and create composite action on-site. The underside of the plank is commonly used as a finished ceiling that is smooth and regular. Savings in both time and material are achieved by exposing the underside of the structure. Compared to an all-concrete framing solution, a structural steel system utilizing a thin-floor system is 50 percent lighter in weight. Reducing the loads supported by foundations leads to reduced project costs. The thin floor system allows for a rapid speed of erection due to the prefabrication of plank and steel. Reduction in on-site labor and the elimination of formwork are major benefits in saving time and costs. Other trades are able to access floors faster to complete their work, condensing the overall construction schedule. In a market where speed governs, architects must factor in the time for building completion in their overall design services to meet the owner's schedule. A number of buildings have implemented specialized thin floor systems in North America.

Long-Span Composite Deck

Composite metal deck economically spans 8 to 10 feet between beams. An effective design solution is to implement long-span deck with structural steel framing to avoid intermediate framing on spans much shorter than a typical apartment or condominium unit. High-strength long-span steel deck is used with concrete cover to create spans of 28 feet and greater. The depth of the floor system is typically 10 to 12 inches for spans up to 35 feet, but can be designed to be slimmer. Shoring is required to support the long span deck at approximately 10-foot intervals while the metal deck replaces formwork for the poured concrete. Long-span composite deck systems may be prefabricated in large bay sizes, allowing for modular methods of construction, which often are of benefit in fast-track construction projects. Unprotected long-span deck achieves 1-hour and 2-hour UL-approved ratings when provided with concrete cover of a specified design thickness. Deck may be left exposed or finished with gypsum

Image courtesy of Neil Denari Architects

IN-WALL BEAM: HIGHLINE 23

Highline 23, in New York, is a perfect example of a condominium building which had multiple space constraints. Designed by Neil M. Denari Architects with DeSimone Consulting Engineers, the 14-story luxury residential tower is built upon a narrow 40 by 49-foot site area. The floor area increases as the building grows taller. Large trusses are used to support the longer spans and also define the building aesthetic. The project utilized the in-wall beam framing method and steel plate shear walls to create more efficient space and to construct the building economically.

board depending on the desired aesthetic. This system, when finished with a gypsum board ceiling, is lighter in weight than a typical all-concrete solution while still meeting necessary performance criteria for sound control, impact isolation, and floor vibration.

In-Wall Beam

It is natural for architecture and structure to require extensive collaboration prior to completion of the design. In apartment and condominium buildings, the room sizes are set on modules that guide, or are governed by, the column spacing of the structure. The long-span capability of structural steel framing allows for the architectural layout to effectively inform the spacing of the structural grid.

In-wall beam framing is a classic example of a system in which the framing is developed to align with the partition layout of the interior. Wide flange beams are designed to span the distances required to reduce intermediate framing in room interiors. The modules of beam-free space allow for higher floor-to-ceiling heights while room partitions enclose the beams that support the floor system. Composite deck as thin as 5¼ inch total thickness is able to achieve a 2-hour rating with unprotected deck, benefitting a low floor-to-floor solution. With an in-wall beam framing system, the program layout and design comes first followed by support from the steel structure.

Conventional Solutions

Conventional methods of steel beam and column framing are commonly known for use in nonresidential building types such as offices and schools. Structural steel framing is once again proving to be beneficial in high-density residential projects as the speed of erection allows for building completion faster than all-concrete framing solutions. Similar to the in-wall beam framing system, conventional



beam layout can span long distances. High floor-to-ceiling heights, common in luxury apartment and condominium design, do not have to sacrifice floor space by using heavy, massive concrete columns. Ceilings may be exposed to lofty structure or finished to house recessed lighting. New buildings take advantage of the speed and versatility of

steel framed construction while maintaining the high quality and strength only found in structural steel.

Staggered Truss

The structural concept for the staggered truss system was developed with flexibility in mind, as column-free and beam-free spaces 30 feet

by 60 feet or larger are possible. Story height trusses are typically spaced 60 feet apart, running along the short dimension of the building and alternating on column grid lines on every other floor. With the alternating, or staggering, structure, the building contains fewer structural elements which enhances the speed of construction and reduces loads on the foundation compared to an all-concrete frame. Trusses allow for horizontal penetrations as needed for mechanical, plumbing, electrical and fire protection. Precast hollow core plank flooring is commonly used and allows for floor-to-floor heights as low as 8 feet 9 inches. Repetitive truss designs are economical and efficient for the structural system, easily accomplished with the same floor-to-floor heights and stacked unit layouts. Hanging the second floor from the level above allows for a ground floor free of interior columns. Ideal for buildings greater than five stories, the speed of construction is known for saving time in the project schedule and as a benefit to owners desiring early occupancy.

A common design challenge is addressing an efficient parking grid that is coordinated with residential floor plates above. Transferring

CONVENTIONAL SOLUTIONS: THE CANOPY LOFTS

The Canopy Lofts rise seven stories in the historic haymarket district of Lincoln, Nebraska. Designed to entice the young professional market, 70 apartments provide 9-foot clear ceilings in the living spaces with 11-foot-4 inch floor-to-floor heights. The ground floor is made up of retail spaces with six floors of one-, two-, three-, and four-bedroom apartments above. Symbolically representative of the railway system which used to run across the site, architecturally exposed structural steel is a common theme throughout the development. The units contain a mixture of exposed beams, coated with a dark gray intumescent paint, and finished ceilings with recessed lighting. According to the co-developer and co-owner of the property, Chief Industries, Inc., fast erection with an all-weather system of construction was highly desirable to bring the building to market on time. "We wanted the best out there," states Roger Bullington of Chief Industries, Inc. From an owner's perspective, a long-lasting building of high quality makes the project a valuable investment and serves the community well. Due to the visible speed of construction of the Canopy Lofts, other local buildings in development have reconsidered using traditional concrete framing and revised their designs to incorporate structural steel.



Photo by Kessler Photography

Macallen Building Condominiums, Boston, Massachusetts. The exterior fins represent the locations of story height staggered trusses that span across each floor.

CONTINUING EDUCATION



Image courtesy of Stantec Architecture in association with Office DA

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ConXTech® is a solution for fast erection with modular connections that are lowered, locked into place, and then bolted. The construction sequence takes less than half the time required for alternative conventional systems.

PREFABRICATED LOAD-BEARING WALL PANELS

2040 Market Street in Philadelphia, completed in 2012, utilized modular load-bearing Integrity Wall™ Panels and lightweight Ecospan composite joist floors to convert a vacant office building into apartments over a ground level retail space. The load-bearing wall system combines 4-inch hollow structural steel shapes (HSS) in the form of prefabricated panels that are designed to fit within interior partitions. The lightweight nature of open web steel joists and their cost effectiveness make them a viable solution for projects with a limited construction budget. Floor joists designed for high-density residential construction are typically spaced at a minimum 24 inches on center, supported by beams or bearing walls which transfer loads to columns. A 12-inch joist with a 2.5-inch concrete slab on metal deck can span approximately 30 feet in average conditions. Columns are smaller when supporting lighter weight, allowing for greater usable floor space. Reduced loads on the building foundation translate to greater cost savings. The lightness of the structural system for 2040 Market Street allowed eight additional floors to be built on top of the existing building. The floor plate was also expanded to maximize the usability of the site area.

structure to accommodate residential unit modules above a parking grid often comes at a cost. The staggered truss system eliminates the need for structural transfer levels, which often take up critical space, and works well in mixed-use building types that include parking, high-density residential and hotel occupancies.

There is a long history of buildings which take advantage of the vast amount of clear floor space offered by the staggered truss framing system. Towers on the Park consists of a nine-story and 20-story building and was one of the first large apartment buildings in New York City to use the staggered truss system in 1986. A luxury vacation complex of five- to seven-story buildings, the

Seascape Point Condominiums in Osage Beach, Missouri, was completed in 2006 along Lake of the Ozarks. In 2007, the Macallen Building Condominiums offered 140 luxury units in the Boston market with distinct floor plans that were integrated with the staggered truss system. The Summer House apartments will be a 22-story building comprised of 226 units, five levels of parking, and ground level retail and restaurant space in downtown Stamford, Connecticut.

PREFABRICATION AND MODULAR CONSTRUCTION

Prefabricated and modular systems using efficient construction techniques have been

developed to speed up building construction. Reducing the amount of labor spent on site begins with choosing the right systems during the design phase.

Modular framing systems. Architects gain economy in design through repetitive floor layouts on stacked floor plates. It is often commonplace in apartment and condominium design to take advantage of repetition by creating typical details, fewer drawings, and a building which owners can easily market with standard rates to future occupants. Repetitive, modular design is most efficient with modular production. Compared to concrete- and wood-framed structures, modular steel framing has achieved cost savings due to its lightweight advantage, reduced material costs, and speed of erection.

Modular connections. Another innovative approach is a modular system based on prefabricated moment connections. With structural steel, the speed of erection can be further increased by simplifying the assembly process in the field. While mainly used in high seismic areas, these modular moment connections may also be applied in zones not governed by seismic activity. A bolted configuration is less labor intensive and more economical than the welding process. The process in the field is a simple assembly from a kit of parts. This method of framing is 35 to 45 percent faster than wood frame residential

MODULAR FRAMING SYSTEMS

Architect Jorge de Quesada teamed with OLM structural engineers to develop Pueblo Building Technologies™ (PBT). The system is made up of repetitive, modular bays of structural steel framing. Designs using this system have been implemented on buildings ranging from four to eight stories in areas governed by stringent seismic requirements. Steel frames fit within interior partitions and support concrete-filled metal deck floors on open web steel joists. Clear spans range up to 24 feet, which fit well with modern apartment and condominium layouts. Braced frames and beams are coordinated to fit within interior partitions. Mechanical, Electrical, Plumbing and Fire Protection systems run through the open web joists, which are typically 10 to 12 inches in depth.

construction and is also recognized for speed superior to concrete construction.

STRONG DESIGN LASTS LONG

Structural steel systems exhibit a lasting quality which allows for infinite possibilities in the design of apartment and condominium buildings for the present and future. Each site, program, and design intent of a building is unique. Determining the best structural solution for a project takes into account multiple aspects of a project. The material strengths and weaknesses, availability of resources, construction schedule, and sequence of operations are all vital to determining the best structural system. The construction schedule and labor typically are the longest and most costly portions of the building process. Architects must plan for efficient structural systems which reduce time and labor in the field as well as bring the owner value in the short term and long term. Advances in structural steel systems are depicted in the endless span options, speed of erection, innovative technologies, and ability to endure the tests of time and adapt easily to future uses. For the apartment and condominium market, structural steel has great advantages over other material solutions.

Structural steel systems overview

SOLUTION	FLOOR DEPTH	SPANS	ADVANTAGE
Thin floor systems <ul style="list-style-type: none"> • The Girder-Slab® System • Deltabeam by the Peikko® Group 	8" or 10"	25' or 30' or greater	<ul style="list-style-type: none"> - Low floor-to-floor - No dropped beams - Fast construction - Lighter foundation loads
Long-span composite deck <ul style="list-style-type: none"> • Deep Dek® Composite by CSI Versa-Floor 	10" to 12"	28' or 35' or greater	<ul style="list-style-type: none"> - Long spans - Fast construction - Lighter foundation loads
In-wall beam	8" or 10"	per design	<ul style="list-style-type: none"> - Design governs - Fast construction - Lighter foundation loads
Steel plate shear walls	n/a	per design	<ul style="list-style-type: none"> - Saves critical floor area
Conventional	per design	per design	<ul style="list-style-type: none"> - Faster construction - Lighter foundation loads
Staggered truss	8" or 10" (when used with hollow core plank)	30' or 60' or greater	<ul style="list-style-type: none"> - No transfer levels - Low floor-to-floor - Fast construction - Lighter foundation loads - Column-free interior on ground floor
Prefabricated panels <ul style="list-style-type: none"> • Integrity Wall™ 	14" or 16"	24' or 30'	<ul style="list-style-type: none"> - Economical - Fast construction - Lighter foundation loads
Modular framing and connections <ul style="list-style-type: none"> • Pueblo Building Technologies™ • ConXTech® 	n/a	n/a	<ul style="list-style-type: none"> - Economical - Fast construction - Seismic

ENDNOTES

1. World Steel Recycling in Figures 2009-2013, Bureau of International Recycling (BR), 2014
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THERE'S ALWAYS A SOLUTION IN STEEL.



Ethan Bedingfield
Architectural Nexus, Inc.

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 for Woodbury Corporation, 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, the retail level and 4 office on a new 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, SE, PE, 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 savings around \$70,000 because of it and it only changed a few steel member sizes. 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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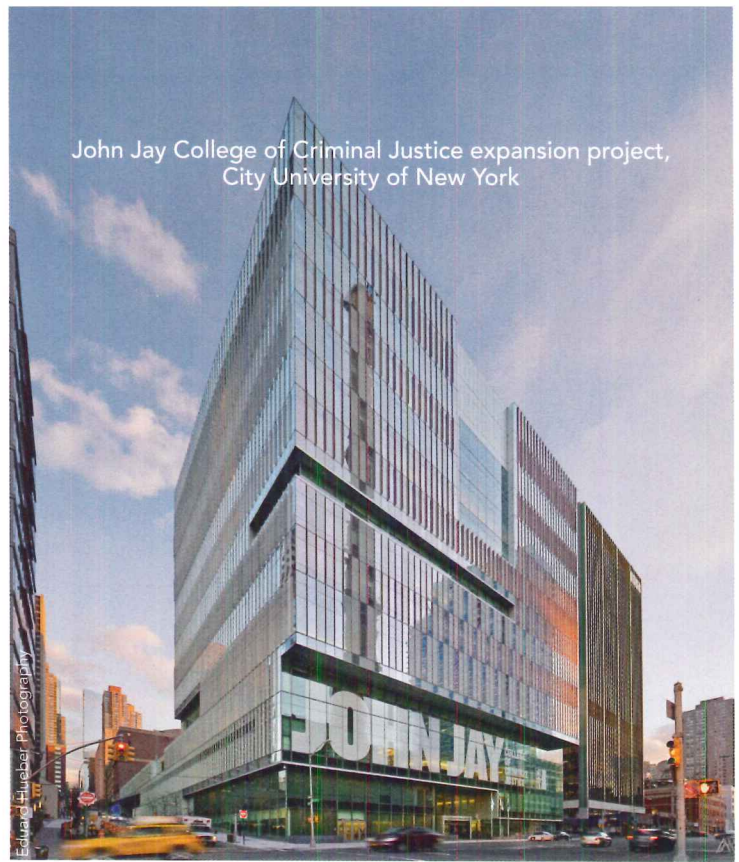
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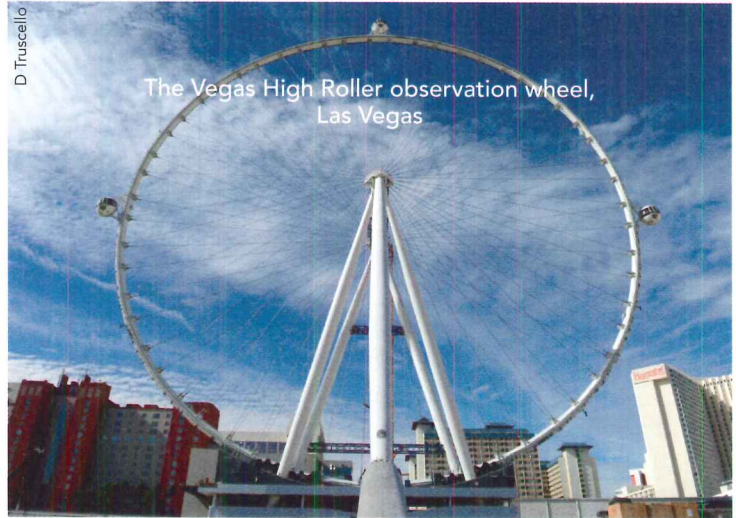
How to Enter AISC's 2016 IDEAS² Awards Competition

The American Institute of Steel Construction (AISC) offers insight on not only how to enter AISC's Innovative Design in Engineering and Architecture with Structural Steel (IDEAS²) Awards Competition, but more importantly, how to win the IDEAS² Award—the U.S. steel industry's highest honor bestowed upon building projects for excellence in the design of steel-frame buildings.

Photos in this ad are all AISC 2015 IDEAS² Awards recipients.



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The Vegas High Roller observation wheel, Las Vegas



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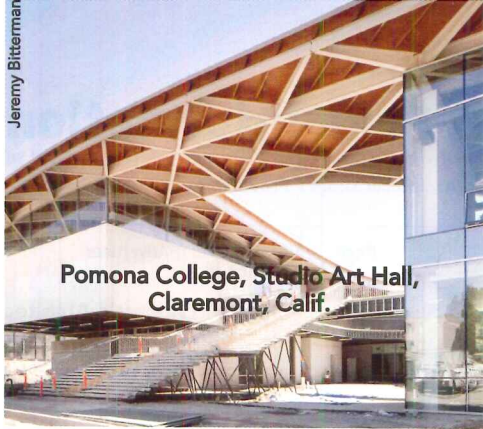


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Space Evolution
Observatory
Biosphere 2,
Tucson, Ariz.

Erk Hinote



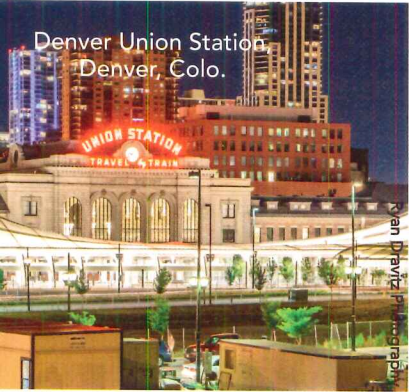
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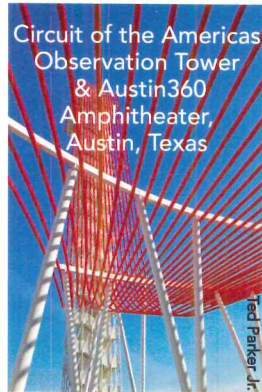
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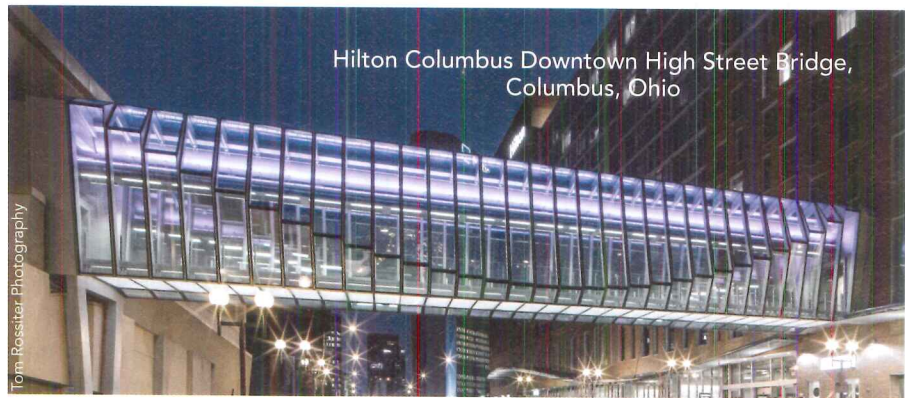
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- **Abide by the competition's rules and regulations**—Building projects submitted for the 2016 IDEAS² Awards must have completion dates between January 1, 2013 and December 31, 2015; building projects must be located in the U.S; a significant portion of the framing system of a building project must be wide-flange shapes or hollow structural sections (HSS).
- **Focus on how your project speaks to excellence in designing with structural steel**—The criteria for judging the entries is based on the project's utilization of structural steel from both an architectural and structural engineering perspective.

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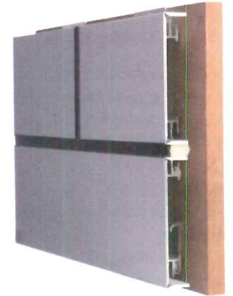
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CIRCLE 171



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dates&events

New and Upcoming Exhibitions

HACLab Pittsburgh: Imagining the Modern Pittsburgh

September 12, 2015–May 2, 2016

The city of Pittsburgh underwent an ambitious program of urban revitalization in the 1950s and '60s. *HACLab Pittsburgh: Imagining the Modern* untangles the city's complicated relationship with modern architecture and urban planning at that time. In this experimental presentation at Carnegie Museum of Art's Heinz Architectural Center, the architects-in-residence, named "over,under," unearth layers of history and a range of perspectives through abundant archival materials, an active architecture studio on-site, and a salon-style discussion space. For more information, visit cmao.org.

Frank Gehry

Los Angeles

September 13, 2015–March 20, 2016

Frank Gehry's buildings have altered architecture's relationship to the city, both socially and aesthetically, and his pioneering work 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. Visit lacma.org.

David Adjaye: Architecture for Social Change

Chicago

September 19, 2015–January 3, 2016

With more than 50 projects constructed across the world, David Adjaye is rapidly emerging as a major figure in architecture and design. This first-ever retrospective, at the Art Institute of Chicago, spans from furniture and housing to public buildings and master plans; it features drawings, sketches, models, and building mock-ups. The exhibition also immerses viewers in Adjaye's distinct approach and visual language through a dynamic installation conceived by his eponymous studio. Visit artic.edu.

Ongoing Exhibitions

Le Corbusier

Paris

Through August 3, 2015

The Centre Pompidou is devoting a retrospective to the work of Charles-Édouard Jeanneret,

known as "Le Corbusier." A visionary architect, urban planner, and theorist of modernity, and also a painter and sculptor, Le Corbusier made a profound impression on the 20th century by dramatically changing the scope of architectural design. The Centre Pompidou invites audiences to explore the impact of this major figure in modernity through the idea of human proportions and spatial composition (how the human body defines all aspects of architecture). For more information, visit centrepompidou.fr.

Folly 2015: Torqueing Spheres

Long Island City, New York

Through August 30, 2015

The Architectural League and Socrates Sculpture Park present the winning proposal—now built and on display—for the 2015 Folly Program, an annual juried competition targeted to early-career architects and designers. Cambridge and Philadelphia-based firm IK Studio won this year's competition with their proposal, *Torqueing Spheres*, which transforms a series of intertwining sculpted forms into a meandering curved folly that encourages social interaction. *Torqueing Spheres* combines a simple concept—a straight line—with complex spherical pods that become deep, self-supporting chambers to create experiences for both the collective and the individual. At the Socrates Sculpture Park. For more information, visit archleague.org.

COSMO

Long Island City, New York

Through September 7, 2015

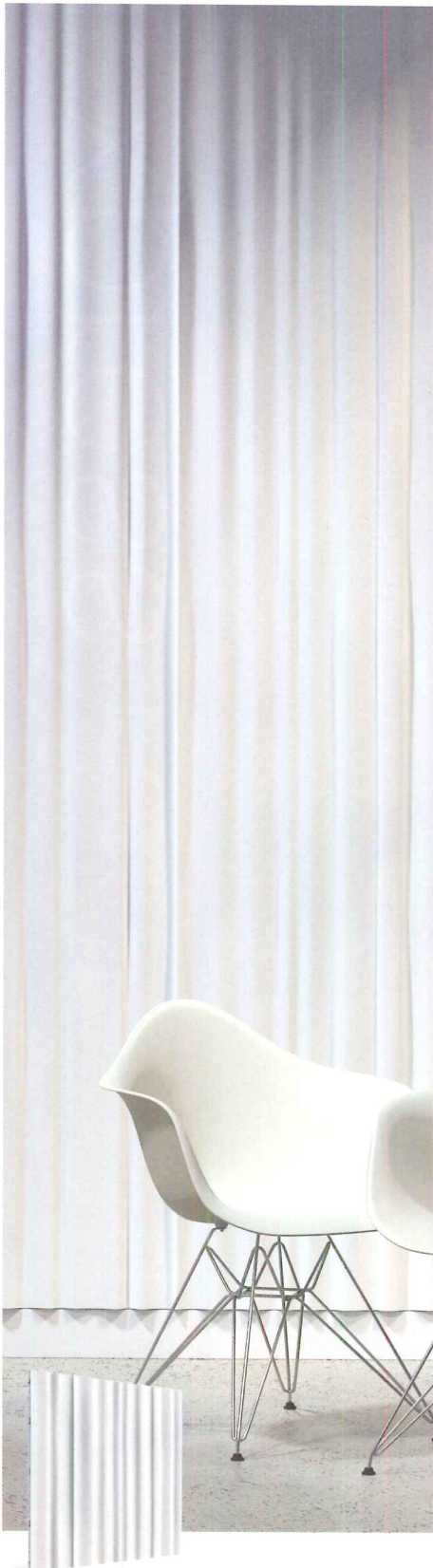
The Museum of Modern Art and MoMA PS1 have announced Andrés Jaque / Office for Political Innovation as the winner of their annual Young Architects Program (YAP) in New York. The winning project, COSMO, is this year's unique construction on view at MoMA PS1 in Long Island City. COSMO is a movable artifact, made out of customized irrigation components, that makes visible and enjoyable the hidden urbanism of pipes surrounding us. Based on an advanced environmental design, COSMO is an assemblage of ecosystems engineered to filter and purify 3,000 gallons of water to eliminate suspended particles and nitrates, balancing the PH and increasing the level of dissolved oxygen. For more information, visit momaps1.org.

Saving Place: 50 Years of New York City Landmarks

New York City

Through September 13, 2015

The Museum of the City of New York presents an exhibition exploring the roots and impact



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of landmark preservation. The movement developed over many years but was galvanized by large historic losses in the early 1960s, most notably the demolition of Pennsylvania Station in 1963. Through original documents, drawings, paintings, photographs, building artifacts, and more, the exhibition surveys how landmarking has been an engine of New York's growth and success. Visit mcny.org.

Pathmakers: Women in Art, Craft and Design, Midcentury and Today

New York City
Through September 27, 2015

This Museum of Arts and Design exhibition considers women's significant contributions to Modernism in postwar visual culture. In the 1950s and '60s—an era when painting, sculpture, and architecture were dominated by men—women had considerable impact on alternative creative disciplines like textiles, ceramics, and metals. Featuring more than 100 works, *Pathmakers: Women in Art, Craft and Design, Midcentury and Today* focuses on the achievements of a core cadre of women that includes Ruth Asawa, Edith Heath, Sheila Hicks, Karen Karnes, Dorothy Liebes, Alice Kagawa Parrott, Toshiko Takaezu, Lenore Tawney, and Eva Zeisel. At the Museum of Arts and Design. Visit madmuseum.org.

Snøhetta—World Architecture
Copenhagen

Through September 27, 2015
Snøhetta was founded in the 1980s, when a group of both building and landscape architects joined forces to form a community that embraced their two fields, to foster cohesion through joint creations. Snøhetta is known primarily for building the Oslo Opera House, which is characteristic of their work: connecting with the contextual landscape and natural features and also democratic in intent, with an accessible roof where all can relax and look at the adjacent fjord. Their holistic and social-democratic approach has shown appeal in Seoul and New York; soon Copenhagen will get its own Snøhetta building. At the Danish Architecture Centre. For more information, visit dac.dk.


Lectures, Conferences, and Symposia

2015: The Inaugural Chicago Architecture Biennial
Chicago

October 3, 2015—January 3, 2016
The Chicago Architecture Biennial provides a platform for groundbreaking architectural projects and spatial experiments that demonstrate how creativity and innovation can radically transform our lived experience. Through its constellation of exhibitions, full-scale installations, and program of events, it will invite the public to engage with and think about architecture in new and unexpected ways, and to take part in a global discussion about the future of the field. At five different locations in Chicago. For more information, visit chicagoarchitecturebiennial.org.



Architectural Record Innovation Conference
New York City

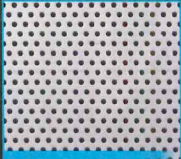
October 7, 2015
Innovative architecture requires expanding the boundaries of the discipline by spurring creativity through design and technology. At this year's conference, ARCHITECTURAL RECORD brings together key figures who have generated a range of imaginative solutions for the built world of today and tomorrow. From architects practicing outside the discipline to principals of large firms to materials experts and graphic



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Canopies & Columns



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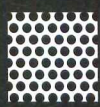



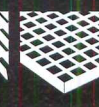
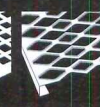
Project: The Summit in Grand Prairie, TX
 Architect: Brinkley Sargent Architects
 Product: Perforated Metal
 [Canopies & Column Panels]

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designers, the event's participants represent different approaches to original problem-solving in a rapidly changing world. At the Time-Life Building. For more information, visit construction.com/events/2015.

DesignPhiladelphia Festival 2015

Philadelphia

October 8–16, 2015

This annual festival showcases the work of more than 400 practicing architects, designers, and creative professionals to demonstrate Philadelphia's reemergence as a 21st-century city shaped by design, technology, and collaborative business practices. Over the course of nine days, universities, cultural institutions, civic associations, city agencies, retailers, manufacturers, and startups across the city will participate in more than 130 events. Visit 2015.designphiladelphia.org.

Competitions

ChiDesign

Registration Deadline: August 7

ChiDesign is an open international ideas competition, adjudicated by a distinguished jury of designers and education professionals. Competitors will propose a facility that in-

cludes the new headquarters, visitor center, and exhibition spaces of the Chicago Architecture Foundation; a new headquarters for the Council on Tall Buildings and Urban Habitat (CTBUH); a design and allied-arts high school; and flexible learning spaces for out-of-school-time youth programs. For more information, visit architecture.org/chidesign

2015 Burnham Prize Competition

Submission Deadline: August 24, 2015

Inspired by the title of the inaugural Chicago Architecture Biennial—The State of the Art of Architecture—the Chicago Architectural Club's 2015 Burnham Prize challenges participants to develop a single image that explores the question "What is the state of the art of architecture today?" This is a speculative-ideas competition: there is no set architectural program, and the interpretation of artifact as image is left to the discretion of the entrant. For more information, visit chicagoarchitecturalclub.org.

Eleven Magazine Competition: Cambodia's Tonle Sap Lake

Submission deadline: September 11, 2015

The aim of this competition is to design a structure, or series of structures, within

Cambodia's Tonle Sap Lake, located just south of the Angkor temples and the city of Siem Reap. It is the largest freshwater basin in Southeast Asia, and has had UNESCO Biosphere Reserve status since 1997. The designed structures must be mobile so that they can service floating villages; each participant is free to interpret what this might mean. For more information, visit eleven-magazine.com.

The Negro Building Remembrance Competition

Submission deadline: November 1, 2015

The Negro Building Remembrance Competition aims to bring the Negro Building, a forgotten landmark of the 1895 Cotton States and International Exposition in Atlanta, into public memory. The competition invites architects, landscape architects, artists, playwrights, poets, musicians, and writers from every discipline—as individuals, teams, students, or professionals—to propose imaginative, bold, and provocative ways to honor the Negro Building. For more information, visit negrobldgcompetition.com.

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

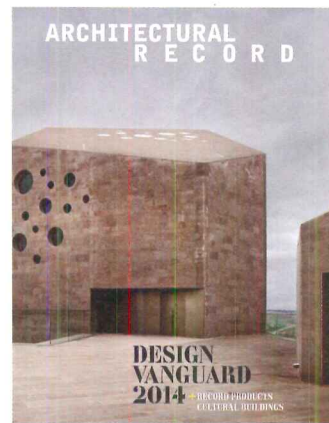
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2015 CALL FOR ENTRIES Design Vanguard



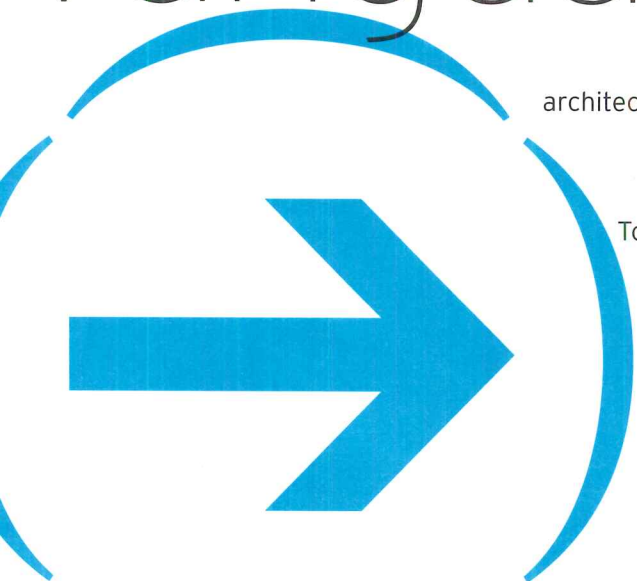
The editors of ARCHITECTURAL RECORD are looking for the best emerging architecture firms from around the world to feature in our **Design Vanguard** coverage. Although we do not have an age limit, we try to select architects who have had their own practices for no more than 10 years.

To enter the competition, send a low-resolution PDF (no larger than 10 MB) with a portfolio containing five to eight projects (both built and unbuilt), CVs of your firm's partners, a short statement of your firm's design philosophy, and the date your firm was founded.

For more details and to download the entry form, go to <http://archrecord.com/call4entries>

Submit your portfolio by August 10, 2015. Send it to ARCallForEntries@construction.com

(put *Design Vanguard* in the subject line). There is no fee to enter.



2015 CALL FOR ENTRIES Record Products


The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2015 Record Products** competition. Manufacturers and designers are welcome to submit new building products to be judged by a panel of architects and specifiers.

Winning entries—the best and most innovative offerings—will be featured in the December 2015 issue.

For more details and to download the entry form, visit <http://archrecord.com/call4entries>. E-mail questions to ARCallForEntries@construction.com. (Please indicate *Record Products* as the subject of the e-mail.) **Submissions are due September 2, 2015.**



PROJECT FATA MORGANA
LOCATION NEW YORK
ARTIST TERESITA FERNÁNDEZ



NAMED FOR the visual phenomenon of a mirage suspended just above the horizon, the installation *Fata Morgana* by Brooklyn-based artist Teresita Fernández hovers above New York's Madison Square Park. Designed in collaboration with SITU Fabrication and commissioned by Mad. Sq. Art, the 500-foot-long canopy comprises a galvanized-steel frame supporting 250 separate panels, 8 to 12 feet in diameter, made from reflective sheets of aluminum-polyethylene composite. The panels' horizontal orientation and CNC-router-cut organic pattern "really push the material," says SITU partner Wes Rozen, noting aluminum composite's more typical facade application. Staggered across three different planes, the pieces cast lacy shadows and reflect golden patches onto the ground. Fernández says, "*Fata Morgana* becomes a ghostlike, sculptural, luminous mirage that both distorts the landscape and radiates." The installation will remain above the pedestrian walkways through the winter. *Miriam Sitz*