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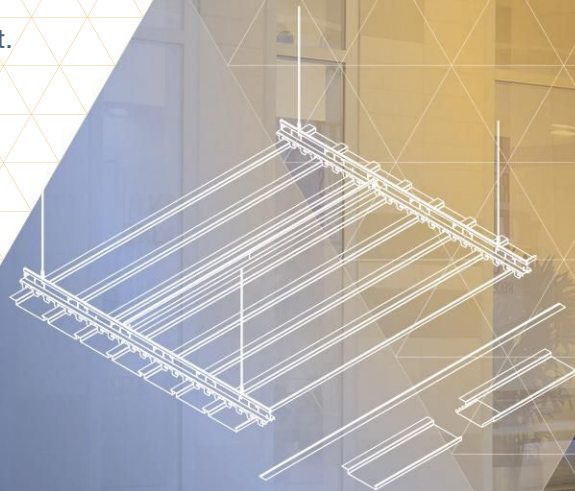
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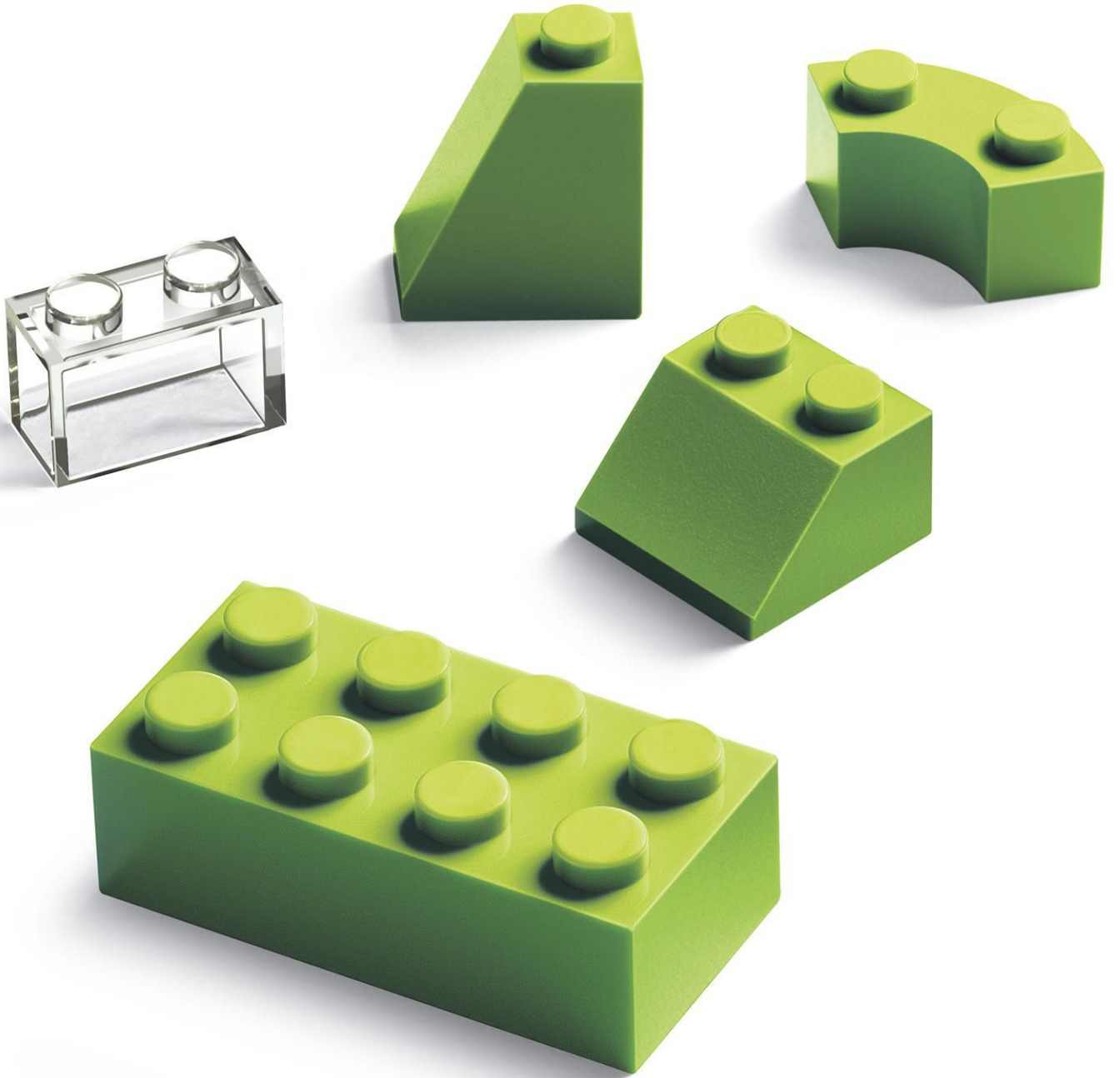


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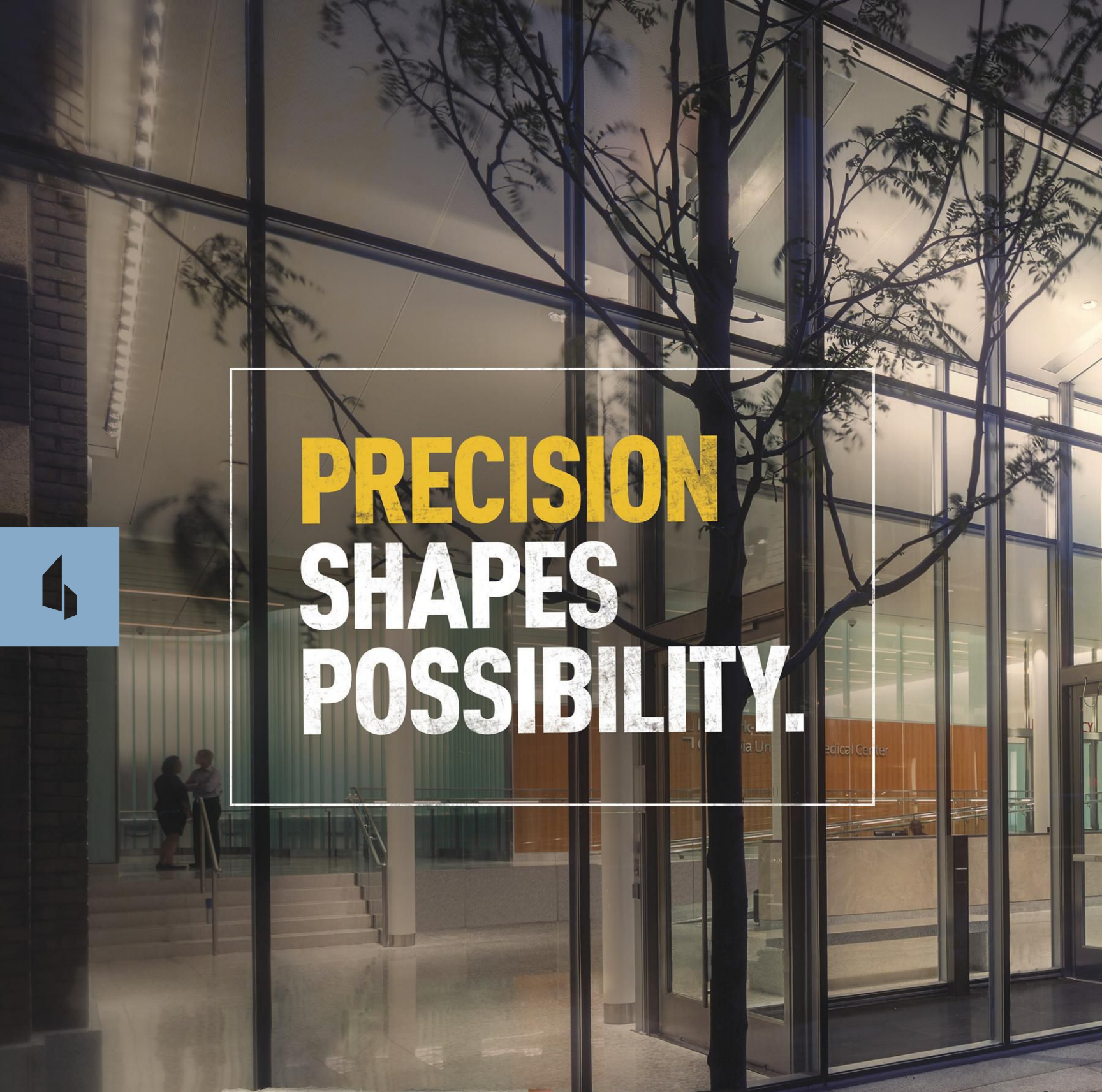


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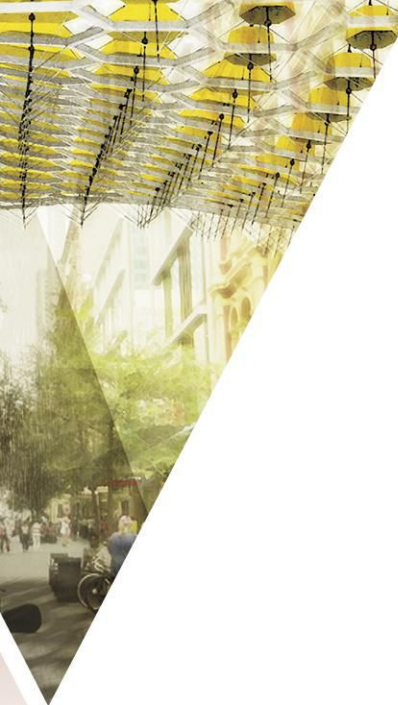
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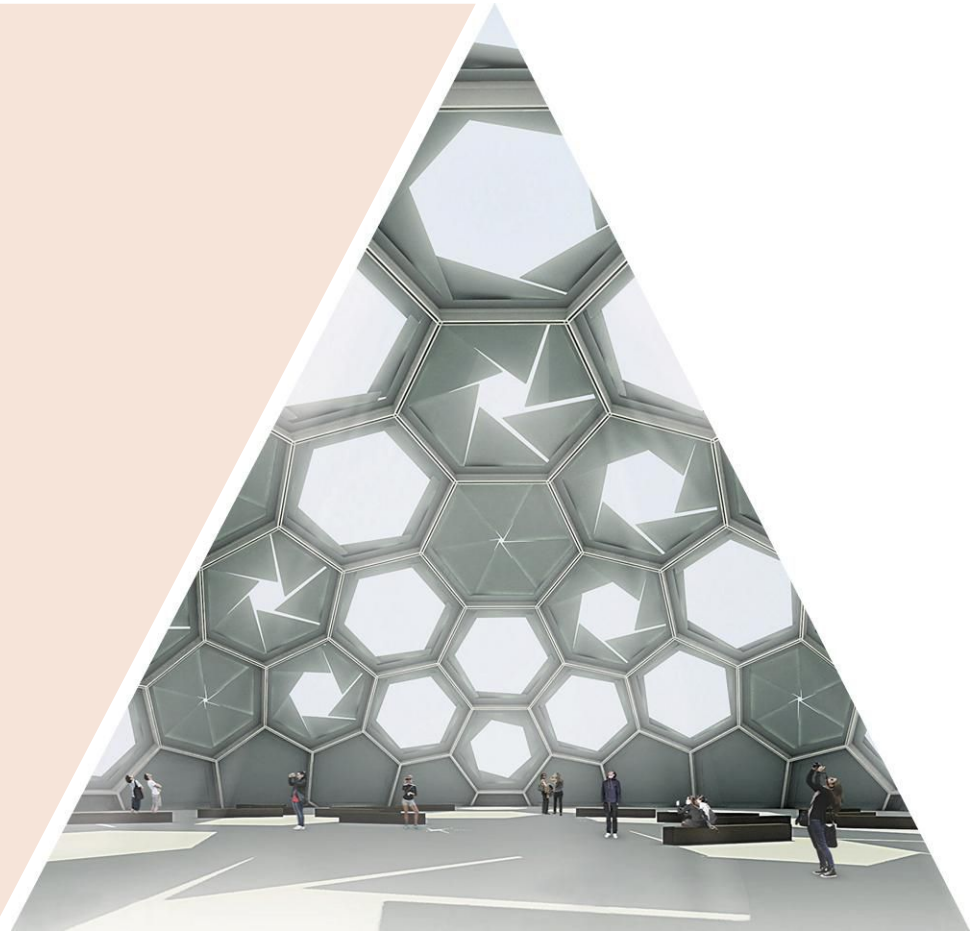
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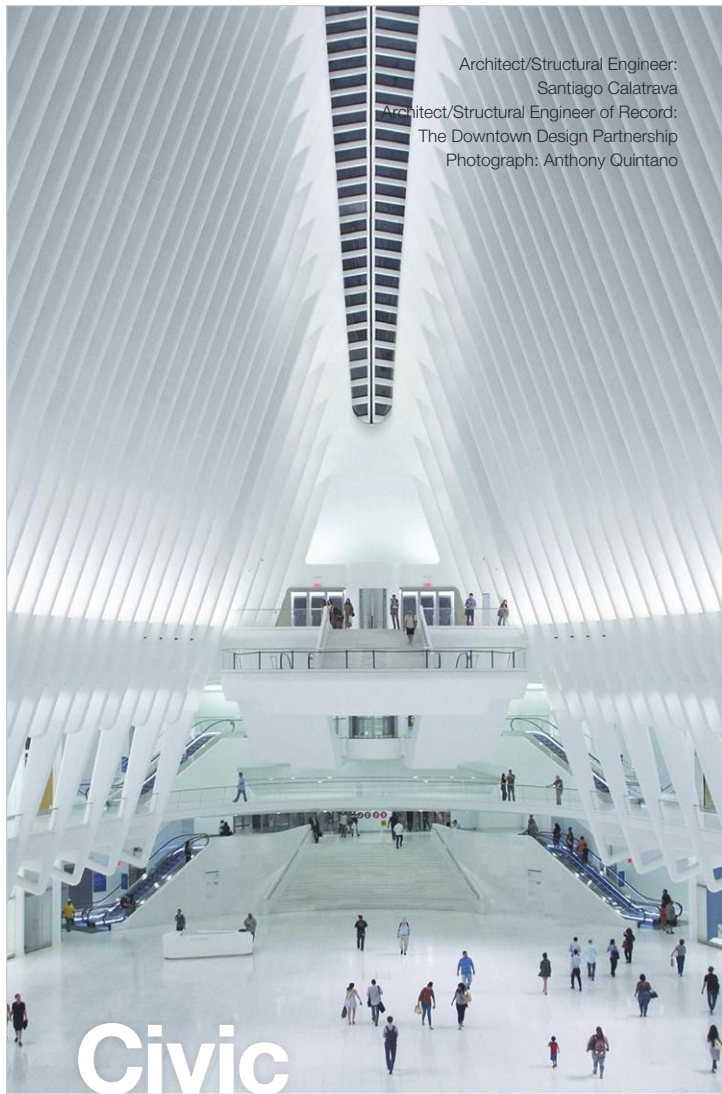
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Civic Duty

New Yorkers watched in awe as ironworkers erected each of the **World Trade Center Transportation Hub's** steel ribs into place. Now, 250,000 commuters marvel at the 12,500 tons of structural steel arching overhead as they pass underneath each day. The vision of international architect **Santiago Calatrava** and his team, the Hub's central Oculus connects New Yorkers not only with the places to which they need to go—but with the skilled labor needed for such a vision to be realized. Read more about it in **Metals in Construction** online.

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Shape Up

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COVER: FUNDACIÓN SANTA FE DE BOGOTÁ EXPANSION, BY EL EQUIPO MAZZANTI. PHOTO BY ALEJANDRO ARANGO.

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A RENDERING OF LUMEN BY JENNY E. SABIN

SPOTLIGHT ON NEWS

SERPENTINE PAVILION

Diébédo Francis Kéré brings his characteristic sense of light and life to the lawn of Kensington Gardens in London with his design for the 2017 Serpentine Pavilion. Read all about the temporary structure, which will remain in place through the beginning of October.

MOMA PS1 YOUNG ARCHITECT PROGRAM PAVILION

Click through photos of Lumen, Jenny E. Sabin's winning installation, which was unveiled at the end of June and will be on view in the MoMA PS1 courtyard in New York through the summer.



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HIGHLIGHTS

VIDEO: SWEDISH EDMONDS

Take a walk around and through NBBJ's hospital in Edmonds, Washington, which highlights the history of the city and site by incorporating art and innovative materials.

STOP MOTION: FUNDACIÓN SANTA FE

See animated photos of a model of the brick screen that El Equipo Mazzanti designed for their hospital in Bogotá.

VIRTUAL REALITY: NEW NORTH ZEALAND HOSPITAL

Learn more about the technology that will allow contractors and staff to better understand the design of New North Zealand Hospital by Herzog & de Meuron and Vilhelm Lauritzen Architects.



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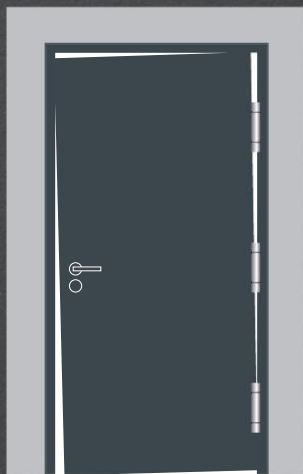
AERIAL VIEW OF NEW NORTH ZEALAND HOSPITAL

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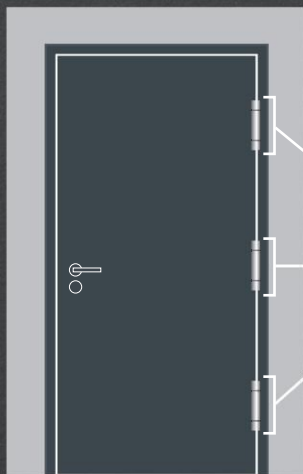
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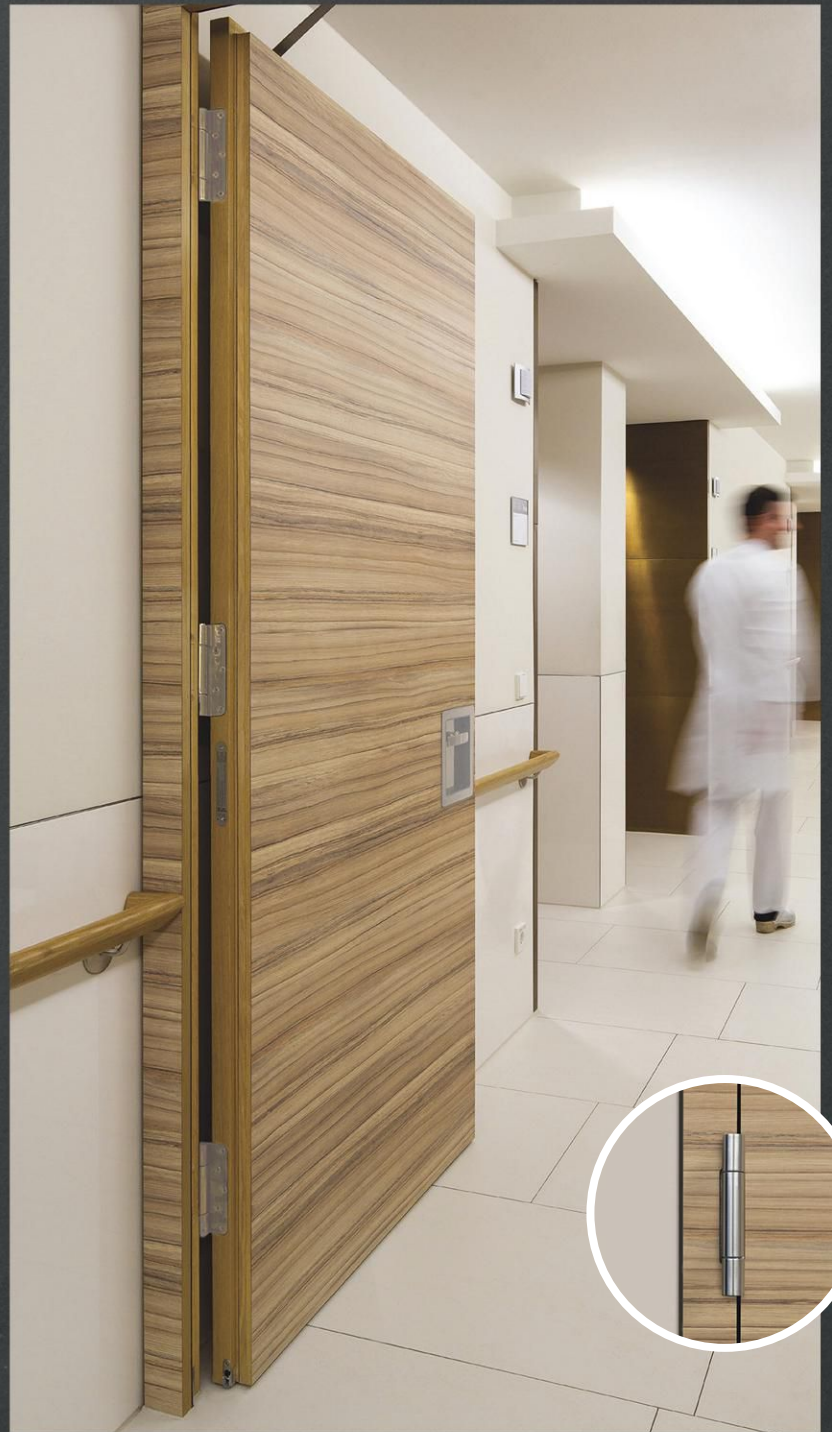
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A BIG WIN FOR THE COMMUNITY

Casa Querétaro, located in Chicago's Pilsen community has been a dream 20 years in the making.

The site, a brownfield redevelopment was originally occupied by old, dilapidated structures. The Resurrection Project (TRP), working with city officials and members of the community eventually had the structures torn down. Unfortunately, the empty lot became a dumping ground for garbage and a magnet for violence and criminal activity.

Fast forward 20 years and Casa Querétaro is a new affordable housing option and a standing symbol of green architecture. The story of Casa Querétaro is a perfect example of how architecture can positively impact lives and foster the growth of healthy communities.

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What It Means to be Modern

Contemporary architecture should engage the moment without forgetting history.

FOR AN architect born in the 19th century, Frank Lloyd Wright was modern in ways that still seem surprising. That's the big takeaway from the new show at the Museum of Modern Art in New York, celebrating the architect's birth in 1867, *Frank Lloyd Wright at 150: Unpacking the Archive* (page 54). Drawing on the tens of thousands of documents, drawings, and models in the archive that MoMA and Columbia University's Avery Library acquired together five years ago, this exhibition focuses on the lesser-known Wright—as the architect of an innovative, though never built, school for black children; a low-cost, do-it-yourself system for building affordable houses; a futuristic urban plan for dealing with automobile traffic at grade, while pedestrians strolled on skywalks. And of course, there was his elegantly tapering scheme for the Mile-High skyscraper—an outlandish notion while he was alive but on its way to reality today: Kingdom Tower, by Adrian Smith + Gordon Gill Architecture, under construction in Jeddah, is more than half a mile high, designed to a height of 1 kilometer, and its form owes more than a nod to that earlier fantasy.

Wright was working overtime to be up-to-the-minute—appearing on the new medium of television in his twilight years and repackaging his legacy, according to Kathryn Smith in her book *Wright On Exhibit: Frank Lloyd Wright's Architectural Exhibitions* (page 59). With the advent of modernism in the U.S., he wanted to be perceived as ahead of the pack. He even had early polychrome renderings, which had an old-fashioned look, redrawn as black-and-white perspectives for a 1930 exhibition to show “he had anticipated the radical forms of European modernism by decades,” says Smith.

Engaging the moment is what serious contemporary architects try to do. Jacques Herzog and Pierre de Meuron, founders of one of the most inventive firms working globally today, have teamed up with Chinese dissident artist Ai Weiwei to create an exhibition in New York called *Hansel & Gretel*, a comment on the ubiquity of surveillance in our world (page 51). However, the show may be more a whiz-bang exploitation of special effects, using digital facial-recognition technology, than a penetrating take on privacy and security.

Surveillance has been around forever, as the exhibition points out, going back at least to the ancient Egyptians. And while Herzog and de Meuron are responding to current political and technological phenomena in *Hansel & Gretel*, they are also architects who are deeply entwined with history and the passage of time. Nowhere is that more obvious than in the venue for the show itself, the Park Avenue Armory, where they have been the architects for a multiphase, \$210 million restoration. Their approach has been to peel away some later modifications to the mammoth 1880 Gothic Revival brick pile but leave others intact to reflect



layers of history (RECORD, February 2012, page 50). Buildings, like technologies, evolve and come to express not only the time in which they were constructed but also register evidence of later occupants and changing uses. In this issue, we celebrate America's birthday with a diverse selection of new and adapted buildings across the country that meld past and present (page 77).

We also examine health-care facilities—a building type that stretches back to the ancient world but one that in our time has often been afflicted by architecture so coldly utilitarian as to be dehumanizing. In the pages ahead, we explore hospitals, a clinic, and a hospice that thoughtfully employ rich materials, color, daylight, greenery, and surprising forms to create places where people can rest, heal, or peacefully end their days.

The words of Ezra Pound to “Make It New!” became a *cri de coeur* for Modernists in the early 20th century—but the poet meant to reinvent traditional forms, not entirely discard them, something that the modern master Frank Lloyd Wright knew very well.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief



*Children's Hospital of Michigan, Troy, Michigan
Architect: Harley Ellis Devereaux (HED)*



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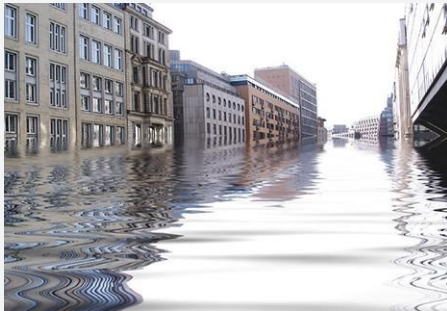
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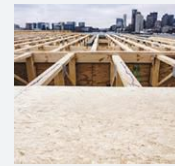


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perspective

Public space is now really the front line in trying to cope with violent extremism.

—AIA president **Thomas Vonier**, discussing ways in which design can prevent vehicular terrorist attacks, such as those in London, on NPR's Here & Now.



Norman Foster (above) inaugurated his eponymous foundation in Madrid last month. The organization is housed in a palace (left), which includes a Foster-designed glass pavilion (sketch below) that houses some of the architect's collection.

Norman Foster Foundation Hosts Inaugural Forum, Dedicates Building

BY DAVID COHN

NORMAN FOSTER celebrated his 82nd birthday on June 1 in grand style, inviting 1,750 students and guests from around the world to the Royal Opera Theater of Madrid for a forum titled “The Future is Now.” The event featured speakers from different fields of design and policymaking, such as philanthropist Michael Bloomberg, MIT’s Nicholas Negroponte, the artist Olafur Eliasson, and Apple designer Jonathan Ive. The forum also celebrated the inauguration of the Norman Foster Foundation, which the architect has installed in a Beaux-Arts palace dating to 1912 in Madrid’s embassy district.

Foster is often in the city with his Spanish-born wife, Elena, and he explained to **RECORD** that both personal and professional consider-

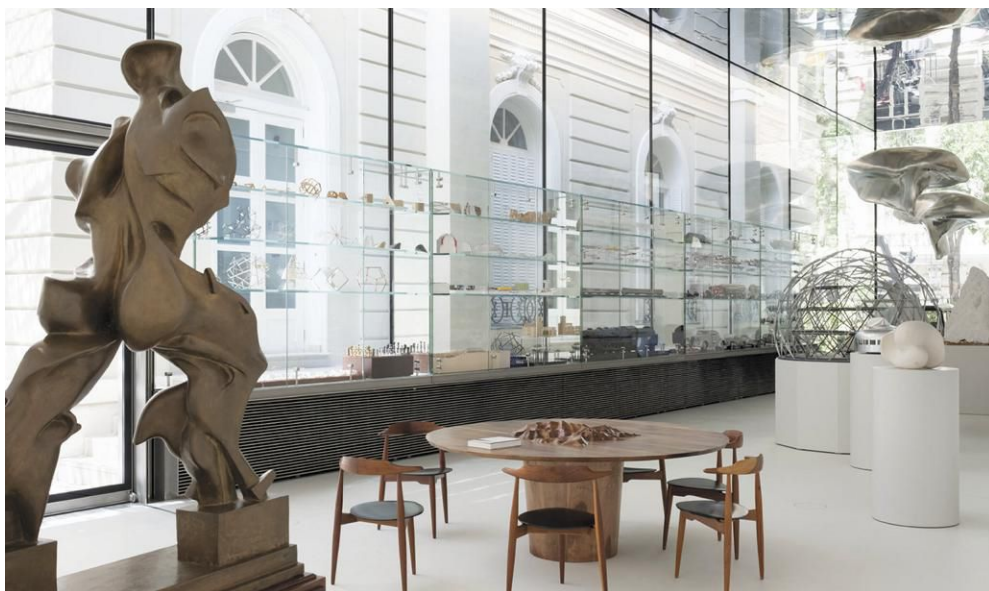
ations influenced his decision to locate his foundation here. “We came across this incredible building at a critical point in our search,” he recalled, “and then we started to realize all the advantages Madrid offers.”

The Foundation houses the Pritzker Prize-winning architect’s personal and professional archives. But as the forum underscored, he has also conceived it as a research and educational institute to promote the kind of integrated, cross-disciplinary thinking that he sees as



essential to taking on the challenges of the future. For example, he cites bringing agriculture into cities. “Urban sewage, in terms of agriculture, is water and fertilizer,” he said.

The Foundation is bringing together private sponsors, universities, and other players for research projects such as the droneport (REC-



ORD, July 2016, page 24), which Foster presented, together with Jonathan Ledgard, at the Venice Biennale last year. At the forum, Ledgard explained how droneports—made from handmade bricks—will become the first civic centers for many African towns.

The Foundation will give scholarships to

three students at the Bartlett School of Architecture in London in coming years. With Rolex, it will launch a series of two-day “think tanks” in Madrid for students and specialists in different disciplines, “to have younger generations engage the issues of urbanism, planet change, and pollution,” Foster explained.

The Foundation includes a pavilion (left) housing objects from Foster's *wunderkammer*-like collection, including Umberto Boccioni's Futurist sculpture, *Unique Forms of Continuity in Space*, and models by the architect's mentor, Buckminster Fuller.

The Foundation headquarters (open by appointment only) is a kind of John Soane Museum for the 21st century, its rooms stuffed with large-scale models of Foster projects—one room for the skyscrapers, another for airports, and so on—as well as art by Constantin Brancusi, Futurist Umberto Boccioni, Ai Weiwei, Maya Lin, and Robert Longo. The archive contains nearly 75,000 architectural records, including papers and materials pertinent to Foster's work from the '50s to the present.

A Foster-designed glass pavilion in the courtyard, shaded with a pergola by Spanish artist Cristina Iglesias, gathers much of what has inspired him, including models of all the planes he has piloted, a section of the Berlin wall, original examples of Buckminster Fuller's tensegrity structures, models of trucks and trains, and a working original of Le Corbusier's Voisin car. It's where the visitor can discover the spirit of the boy that made the man. ■

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Design Community Reacts to Paris Agreement Withdrawal

BY MIRIAM SITZ

ON JUNE 1, President Donald Trump fulfilled a campaign promise to withdraw from the Paris Agreement. The POTUS cited “onerous energy restrictions” and “draconian financial and economic burdens” of the international climate accord, which aims to mitigate global warming. He went on to affirm that under his administration, the country “will be environmentally friendly, but we’re not going to put our businesses out of work and we’re not going to lose our jobs.”

The announcement set off a flurry of responses from governments and organizations around the world—including many in the design community. The American Institute of Architects (AIA) president Thomas Vonier expressed concern that the withdrawal would “put us behind our major global competitors” in a statement issued that afternoon. Vonier’s words were quickly endorsed by the Royal Architectural Institute of Canada and the International Union of Architects. The U.S. Green Building Council (USGBC) president and CEO Mahesh Ramanujam said he was “deeply disappointed” with the news, while Royal Institute of British Architects president Jane Duncan condemned the move as “one of the most regressive decisions of our time.”

The Paris Agreement originated at COP21, the 21st Conference of the Parties to the United Nations Framework Convention on Climate Change, and went into effect on November 4, 2016. Signatories cannot leave the deal for four years, meaning the U.S. is committed through November 2020—the end of Trump’s current term. Still, many in the profession, including Vonier, argue that the announcement alone is



damaging. “U.S. architects have truly been at the forefront of international efforts to address energy and climate issues,” he told RECORD. “The decision to withdraw signals retreat; that hurts the image of the United States and, along with it, its architects.”

But concern has been tempered with optimism, stemming from confidence in the private sector, local governments, and design professionals to “lead the charge toward action,” says the USGBC’s Ramanujam. “The principles of the Paris Agreement will move forward, and we hope the administration will see the benefits of engagement over time.”

Collectively, the design community has been promoting sustainability for years, with initiatives like the 2030 Challenge and the AIA 2030 Commitment (for carbon-neutral buildings), as well as longstanding certification programs like LEED. Shortly after Trump’s inauguration, the Chicago-based group Architects Advocate published an open letter to the President, signed by more than 120 firms in Illinois, on climate change and energy use. And just days after news of the Paris Agreement withdrawal, an online letter

Speaking in the Rose Garden on June 1, Trump called the Paris Agreement “very unfair” to the U.S. (above). An installation of icebergs by artist Olafur Eliasson and geologist Minik Rosing melted away during the December 2015 COP21 climate talks in Paris (bottom).

called “We Are Still In” drew signatures from more than 1,200 politicians, academics, and major corporations—including many from architecture, engineering, and construction—still committed to the accord’s principles.

Firms are also taking action on an individual basis. For example, Atelier Ten, which consults on building systems and lighting and environmental design, signed the “We Are Still In” letter and joined Architects Advocate, but also conducts an annual carbon audit and pays for their offsets as a company. Texas design firm Lake | Flato recently implemented a program that allows employees to apply for paid time “grants” to conduct research that advances sustainable design, while structural engineering company Thornton Tomasetti has established a “Green Champion” program, giving employees leadership roles in helping their offices meet sustainable operations standards.

As KieranTimberlake partner (and Obama appointee to the National Institute of Building Sciences) James Timberlake says, “The more architects come together on these issues, as a community and within our own firms, the more attention we can attract from our congressional representatives and, eventually, the administration.” ■



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Record Hosts 19th Innovation Conference, in San Francisco

BY BETH BROOME AND JOANN GONCHAR, AIA

ON JUNE 7, architects and others gathered at San Francisco's Mission Bay Conference Center for ARCHITECTURAL RECORD's 19th Innovation Conference, the fourth held on the West Coast. Addressing the theme "The Future of Architecture and the Public Realm," speakers presented their work and discussed the built environment in the context of global urbanization.

Kicking off the day, Gensler's Andy Cohen and FORM's Greg Lynn shone light on the possibilities for autonomous vehicles, proposing varying directions for the technology and implications for buildings and cities. Diller Scofidio + Renfro's Elizabeth Diller talked about several of her firm's projects, as well as some of their unintended consequences, such as the extreme gentrification that occurred around New York's High Line. OMA New York's Shohei Shigematsu also presented projects

that engage the urban fabric, urging attendees to invent by "observing change, capturing it, and pushing typologies forward."

Chicago-based Amanda Williams brought a new perspective to the event. With a background in architecture, the artist is known for her work "Color(ed) Theory" in which she painted soon-to-be-demolished houses on the city's South Side—landscapes that are, as she said, "invisible in plain sight." Concluding the conference, Thom Mayne questioned the fundamental premise of the day's conversation, critiquing the state of the American civic

realm. "Forget public space," he said. "There is no collective culture." Notwithstanding, RECORD continues its Innovation Conference series and will hold its next event on the same theme in New York on October 19. ■



Speakers at Record's Innovation Conference included (clockwise, from above) Thom Mayne, Shohei Shigematsu, and Amanda Williams.

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Dr. Eve Edelstein

BY ANNA FIXSEN

THERE IS no question that design can have significant effects on our well-being—whether encouraging us to take stairs or exposing us to uplifting views of nature. Less obvious is how these decisions can influence us on a neurological level. Enter Dr. Eve Edelstein, an in-house researcher and “neuro-architect” based in Perkins + Will’s San Francisco office. Edelstein, who holds degrees in neuroscience, architecture, and anthropology, leads the firm’s Human Experience Lab, one of 10 specialized in-house research groups. There she conducts research and works with universities to introduce scientific evidence into designing everything from workplaces to health-care facilities. Edelstein is also a co-founder of Clinicians for Design, an international consortium of scientists and design professionals. Edelstein spoke with **RECORD** from London, where she was addressing a conference.



What kind of research is your lab focusing on at the moment?

I focus each year on two or three strategic issues. My Ph.D. was in hearing sciences, so I focus currently on the problems that are associated with the challenges of acoustics. That actually comes up as one of the top complaints in almost every design. It’s become popular to introduce white noise to increase privacy, and we have a good deal of research to show that can work. However, the other essential thing to happen in health-care design is working toward accurate speech intelligibility: if you cannot hear the doctor’s orders, or you cannot hear a patient, medical errors can occur.

What about lighting?

It’s very similar to the question of sound. There are multiple layers on which we can make adaptations. So there’s daylighting for health and well-being. We know it measurably makes a difference—to our circadian rhythms, our mental state, our cognitive ability, our activity, as well as our health. And you also have to have darkness, and that often isn’t designed into a hospital. Right now, we have a one-size-fits-all approach to lighting. So we can think about

different lighting solutions within the same space, and then the lighting around the individual. Is the patient trying sleep or read? Is a surgeon trying to do work, or is a caregiver trying to draw blood? And that argues for adaptable lighting, controlled by the individual.

Do you have any current examples of how your research has translated into an architectural solution?

Yes. We’ve got a building being raised from the ground right now, the University of Cincinnati Gardner Neuroscience Institute. And we’ve made a great many changes to embody some of the principles from neuroscience and from cognitive science. Examples include consideration of the type of screens that wrap the facade. We’re thinking about energy performance and privacy, but also the specular effects of looking through a screen; there’s some evidence of specular grids’ being disturbing to some neurological patients. Similarly, we are considering mobility disorders of neurological patients, so we’re designing to allow for regular places to rest and easier movement. All of these

dramatically change the plan of the building. **Are there technologies you’re particularly excited about?**

One of the fun things about being one of 10 labs at Perkins + Will is that I have this network of people I can turn to. I also collaborate with universities, like the University of California San Diego, where we have put projects as large as a 2.4 million-square-foot hospital campus into a virtual simulation. We’ve used it along with brainwave caps so that we can track the brainwaves that occur as people are moving through a virtual mock-up.

Are there design solutions that you can employ in buildings that are already complete?

Oh, absolutely. One example: I was asked to consult for a hospital where the wayfinding wasn’t working. So I toured it, and I observed, and I realized that the problem was the lighting—it was drawing people to a certain location, and other paths seemed so dark that people thought, “I’m not meant to go down there.” It’s a matter of using the anthropologist in me to understand human behavior, the neuroscientist in me to try to understand what sensory stimuli might make this happen, and then the architect in me to design a solution that’s feasible. ■

noted

Tallest Mass-Timber Building in U.S. Receives Approval for Construction

Framework, a 12-story-tall wood building by LEVER Architecture, has been approved for construction in Portland, Oregon. The 145-foot tower, which will break ground this fall, will contain office space, street-level retail, and 60 units of affordable housing.

Olson Kundig to Renovate Seattle Space Needle

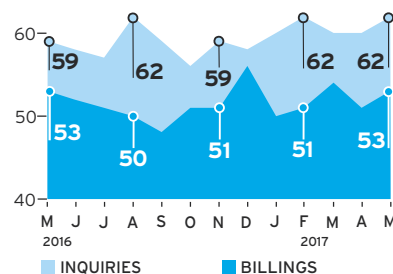
Seattle firm Olson Kundig has been tapped to renovate the 55-year-old Space Needle and its Tophouse observation deck. The firm’s plans include replacing metal barriers with glass walls to maximize the panoramic views, and refurbishing the revolving restaurant. The first phase of the \$10 million project will begin in September.

Diller Scofidio + Renfro Designs Juilliard’s International Campus

The Juilliard School broke ground last month on its first overseas campus. Diller Scofidio + Renfro designed the project, which is in China’s Yujiapu Pilot Free Trade Zone. It will include facilities for performance, practice, research, and interactive exhibitions, as well as public spaces, and will be the only performing-arts school in the country to offer a U.S.-accredited master’s degree.

Samuel Bravo Wins Wheelwright Prize

Harvard University’s Graduate School of Design has named Chilean architect Samuel Bravo as the winner of the 2017 Wheelwright Prize. The \$100,000 grant will go toward funding Bravo’s research proposal *Projectless: Architecture of Informal Settlements*, which aims to combine vernacular traditions with modern architecture.



ABI On Solid Ground

According to the AIA, design services have a healthy outlook, reflecting the fourth-straight month of even growth. In May, the Architectural Billings Index (ABI) scored 53 points, up 2.1 points from the prior month (any score above 50 indicates an increase in billings). The new-projects inquiry also experienced an uptick, scoring 62.4. AIA economist Kermit Baker calls this growth “a steady, stable, increase.”

Frank Lloyd Wright's Unity Temple Restored

BY JAMES GAUER

FEW BUILDINGS are truly iconic, but one that qualifies is Frank Lloyd Wright's Unity Temple. Completed in 1908 in the Chicago suburb of Oak Park, its place in architectural history has long been assured by its seminal synthesis of monumental massing with luminous, richly detailed interior volumes. Closed since spring 2015 for an ambitious restoration effort led by Chicago-based preservation architect Gunny Harboe of Harboe Architects, it opened in time for the 150th anniversary of Wright's birth on June 8, 1867.

This early Wright masterwork was among the first nonindustrial buildings to use exposed, poured-in-place concrete—augmented by precast ornament—as its primary material. But a century of wear, exacerbated by seepage from an undersized internal drainage system—designed by Wright to avoid gutters on 16 separate flat roofs—took its toll both inside and out. A 1973 renovation attempted to remediate the cracked and spalled exterior walls with a coating of “shotcrete” (a spray-on concrete) but problems persisted. Nine years ago, a large piece of ceiling fell down, signaling the need for a more extensive—and expensive—permanent fix.

The comprehensive work includes structural reinforcement, a new roofing and drainage system, repair of windows and skylights, an artfully concealed m/e/p upgrade, and partial replacement of the shotcrete. Inside, concrete and magnesite floors, art glass, plasterwork, paint, light fixtures, and oak trim have all been meticulously restored. The art glass was catalogued, crated, and shipped to California for refurbishment. The painstaking plaster and paint work required the removal of multiple layers of overpainting—including an incongruous scheme of white walls and red floors introduced in the 1960s, according to legend, by Wright's widow, Ogilvanna—and the application of new finishes that replicate the translucent originals.

To ensure that all this work won't have to be redone any time soon, maintenance and repair protocols have been developed to prevent water penetration. A new geothermal ground-source heat pump, which required the drilling of nine 500-foot-deep wells on the constrained site, will stabilize temperature and humidity levels year-round, providing air-conditioning and helping to prevent future deterioration.

The project's \$25 million cost is being financed by private donations, including a \$10 million grant from the Alpha-Foundation and \$1.75 million from the Temple's Unitarian Universalist congregation. An additional \$12 million, currently covered by a loan, has yet to be raised.

Harboe describes his team's work on the project as “challenging but also incredibly rewarding. This is the epitome of what we want to be doing as preservation architects. It's what we live to do.” ■

Chicago-based architect Gunny Harboe led the renovation of Frank Lloyd Wright's Unity Temple in Oak Park, Illinois. The building, one of the first nonindustrial buildings to utilize poured-in-place concrete (right), underwent comprehensive structural reinforcement and a meticulous interior restoration (top).



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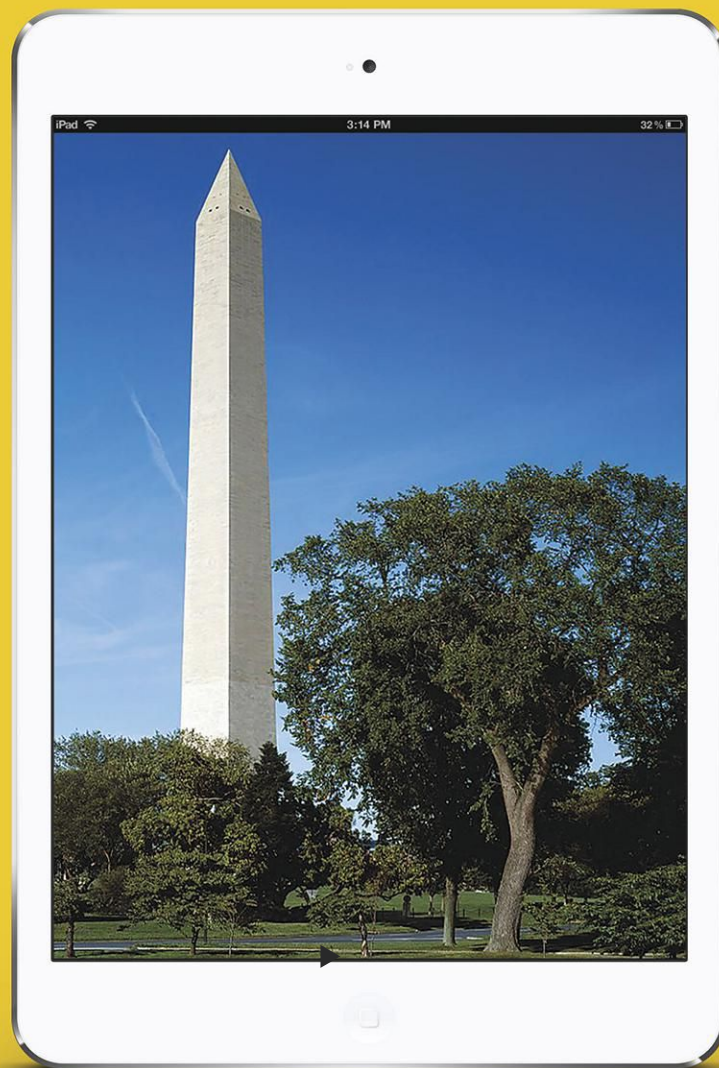
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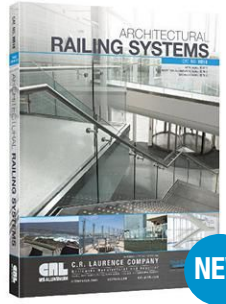
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A CALIFORNIA FIRM WORKS WITH AN INDUSTRIAL-DESIGNER CLIENT TO CREATE A CONTEMPORARY HOME IN THE SANTA BARBARA HILLS. BY ALEX KLIMOSKI

WHEN INDUSTRIAL DESIGNER Marc Tappeiner and his wife bought a 4,700-square-foot wedge-shaped plot in a residential Santa Barbara neighborhood, they wanted to demolish the existing two-story stucco house and build a new one for themselves (and, now, two children). Tappeiner knew he needed a creative solution for the awkward site, which had several zoning restrictions; he also wanted something that was open and naturally ventilated, crafts-y yet contemporary, and that reflected his own minimalist design aesthetic. The couple reached out to Shubin Donaldson, a local firm known for its sleek Southern California houses and commercial interiors.

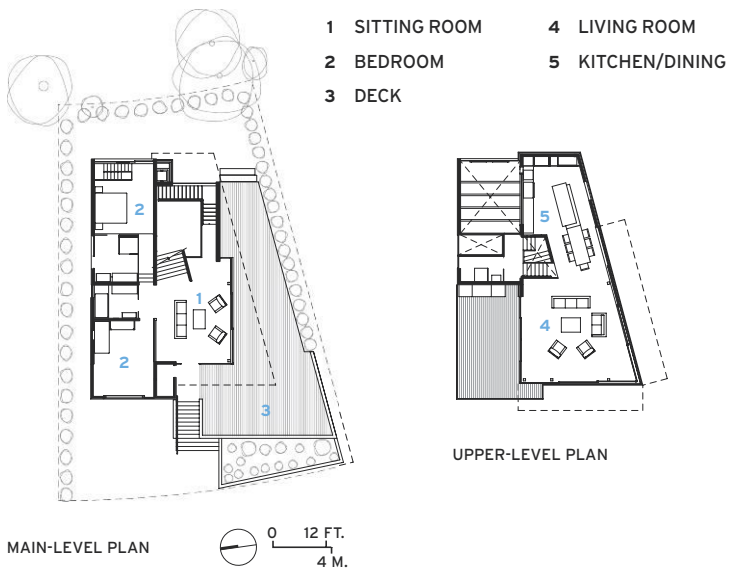
In founding partner and project lead Robin Donaldson, Tappeiner says he found “an architect who could do a house as he would his own”; in Tappeiner, Donaldson found an engaged client with whom he could have sophisticated discussions. “In a sense, we made design rules that we both agreed to,” Donaldson says.

From early on, they decided to design the three-level, 3,000-square-foot house without drywall, and to limit the material palette to steel, concrete, glass, and wood. “The philosophy here was about taking things away until arriving at the essence,” says Tappeiner. Inside, these four elements are expressed in various ways: in some areas, the concrete structure is left exposed as walls and flooring, while in others, the braced steel frame is made visible through glazed partitions. Douglas fir-paneled ceilings are juxtaposed with shiny steel finishes. The steel is seen most prominently in a central staircase topped by a rectangular skylight.

Setback constraints and height limitations, city requirements for open space, plus the



An articulated staircase composed of glass, steel, and concrete (far left) punctuates the house's core. A skylight on the top level hovers above the stair (left), allowing natural light to reach each of the three levels. Wood ceiling panels (left) and Brazilian ipe cladding (above) lend a warm contrast to the material palette's more raw elements.



need to design around the sun's path, drove the building's stacked, cantilevering form, each level housed within its own separate volume. The exterior is clad with slats of Brazilian ipe, which wrap horizontally around the upper floor's fully glazed sliding walls to screen it from the sun, and run vertically along the other volumes, functioning as a rainscreen. The slats also shield an outdoor patio on the main level.

After the form was articulated, the program was “plugged in,” according to Donaldson. “It was the inverse of our typical residential design process,” he says. Since Tappeiner wanted to take full advantage of the upper level's expansive ocean views and breezes, the design team placed the kitchen, dining, and main living area in this space, and two bedrooms and a large sitting room on the floor below; a basement level, which houses a garage and family room, was excavated.

“I think that what made the house special was the synergy between Robin and myself,” says Tappeiner. “We're both from California; we're both similarly minded.” Donaldson agrees: “The mutual respect for each other's design abilities really helped propel the process.” ■

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KENGO KUMA INFUSES A MODEST RESTAURANT IN PORTLAND, OREGON, WITH THE CRAFT AND AURA OF JAPAN. BY NAOMI R. POLLOCK, AIA

LIKE CHEF Naoko Tamura's Japanese cuisine, Tokyo-based Kengo Kuma's design for her Portland, Oregon, restaurant exploits the finest natural ingredients. Each component, be it wood or stone, is rendered with attention to texture, color, and detail. Both the menu and milieu of "Shizuku by Chef Naoko" blend the refinement of Japan with the freshness of the Pacific Northwest.

Tamura—who met Kuma through a mutual acquaintance while he was working on the Portland Japanese Garden (PJG)—had a small restaurant in a single-story commercial building. When a neighboring business moved out, the chef asked the architect to design an expansion.

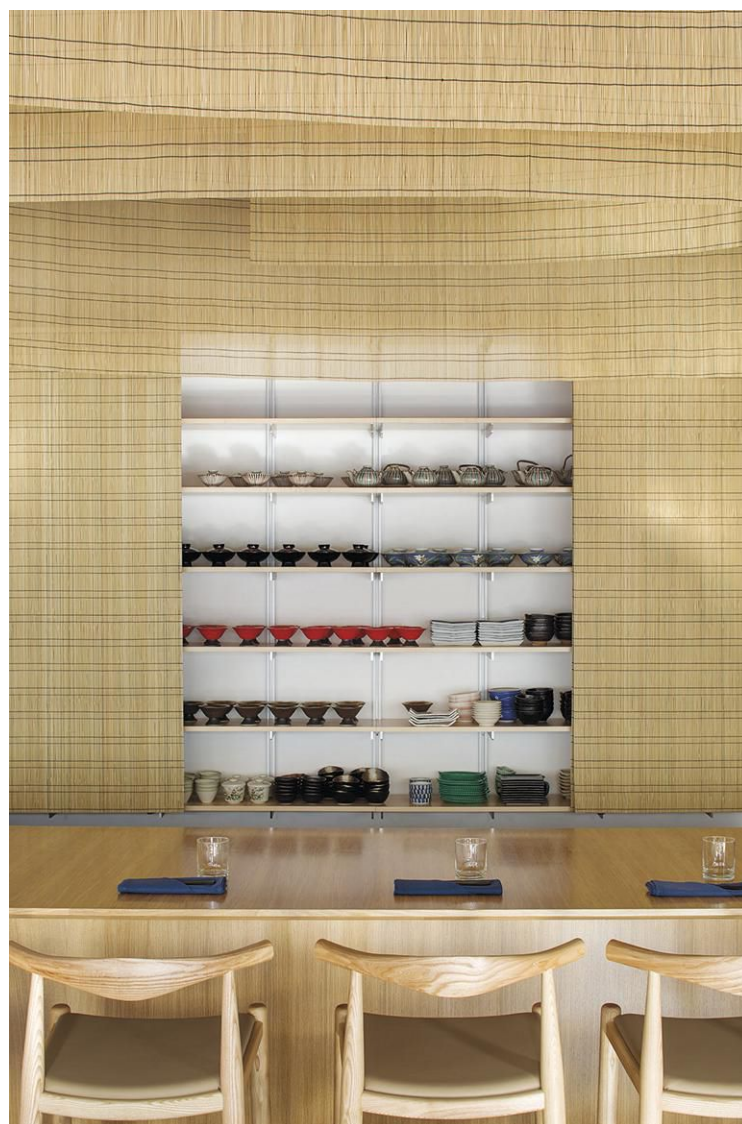
Kuma created an airy 1,200-square-foot scheme with a new dining room in the acquired adjacent space. Parallel to the street, his oblong plan has three eating areas: a group of Western-style tables and chairs, a counter with stools, and, opposite the entrance, tatami-mat seating. His design also included the transformation of Tamura's existing 256-square-foot eatery into a private event venue. Along the rear of the joined properties, a kitchen, designed by architect of record Lorraine Guthrie, is triple the size of the old one.

Capitalizing on the building's 14-foot ceiling height, the restaurant's defining feature is a sequence of swirling *sudare* shades suspended overhead. Dynamic yet delicate, these lightweight screens loop gracefully, enlivening the top of the room as they implicitly divide the bottom. While their concave surfaces suggest clusters of seating, their convex surfaces imply circulation pathways in between.

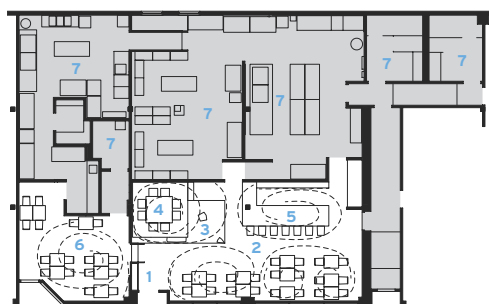
Traditional Japanese roll shades used for privacy and sun protection, *sudare* are made of bamboo filaments woven loosely together with thread to allow air and light through; outside Japan, they are often used for interiors to evoke the country's flavor. Here the architects achieved an entirely new effect by hanging the screens widthwise from the ceiling, which generated their curling shapes. Manufactured in Japan's Fukuoka Prefecture, the restaurant's *sudare* measure 6 feet across, the loom's maximum width, and up to 40 feet long. Determining the precise curvature of each piece was "pretty low-tech," says project architect Balazs Bogner. But affixing the shades took ingenuity and craftsmanship. Working on-site, the local contractor traced the shades' profiles onto the restaurant's concrete floor. Guided by these lines, he bent the pairs of metal bands that support the top edge of each screen. He then sewed the shades and bands together with stainless-steel thread before attaching the whole construct to the drywall ceiling.



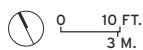
Suspended woven shades softly delineate table, counter, and tatami-mat seating, while the original concrete floor unifies the space. The raised area is also used for a traditional Japanese tea ceremony, whose implements are concealed beneath the tatami mats. Adjacent to the platform, the closed door leads to the restaurant's private dining room.



Sudare shades loosely divide the main dining room (left) but also serve as a wallcovering behind the counter (above), framing the shelves that hold the various dishes required for *kaiseki* cuisine.



FLOOR PLAN



- 1 ENTRANCE
- 2 MAIN DINING
- 3 DRY GARDEN
- 4 TATAMI PLATFORM
- 5 COUNTER SEATING
- 6 PRIVATE DINING
- 7 KITCHEN/BACK OF HOUSE

Some of the shades encircle groups of tables built by Tamura's husband. Others spiral above the seven-seat Oregon oak counter where the chef demonstrates her skills to restaurant patrons. But the room's visual focus is the tatami-mat platform, which the *sudare* help define.

Designed for dining and traditional tea ceremonies, the 88-square-foot raised tatami area hovers above a dry garden created by the landscape architect (and PJG curator) Sadafumi Uchiyama, composed of crushed rock, punctuated by three hunks of local Baker Blue granite. Respectively, these large rocks mark the open corner, act as a pedestal for a floral arrangement, and serve as a step to the tatami-mat seating. "Both [the PJG and the restaurant] have strong sensations of being outside and inside; this in-between character is so central to our work," explains Kuma. Lit from below by LED strips, the platform appears to float but is actually supported by two layers of structural plywood atop a recessed wood box.

Tamura chose as the restaurant's name the Japanese word *shizuku*, which means "drop of water." Embodying tranquility, simplicity, and natural beauty, Kuma's elegant space is worthy of its title. ■

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The architect for the house in the June issue is **PETER BEHRENS**, who designed the cottage for himself in 1901 as part of an artists' colony in Darmstadt, Germany. Behrens, who was self-taught, exploited his graphic sense to give his dwelling an unusual linear quality. This, along with his design of all aspects of the interiors, resulted in a striking work.

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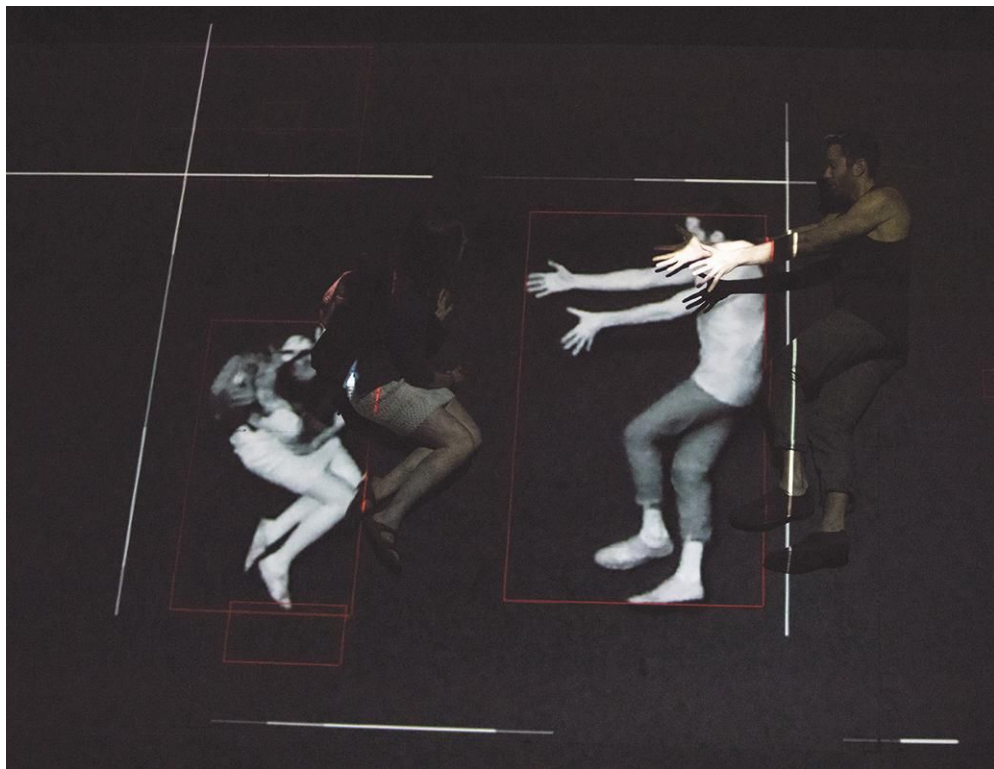
All Seeing, If Not All Knowing

BY PETER PLAGENS

THE CHINESE ARTIST-ACTIVIST Ai Weiwei is nothing if not connected. All through the introductory remarks at the press preview for *Hansel & Gretel*, the giant art installation about electronic surveillance at the Park Avenue Armory in New York (open through August 6), Ai was busy on his phone. When cocurator Tom Eccles turned from the project's other two collaborators, the Pritzker Prize-winning architects Jacques Herzog and Pierre de Meuron, giving Ai the cue to speak, the artist looked up and without missing a beat chimed in with the wittiest and possibly most substantive remark of the preview. As Herzog and de Meuron had been bandying the success rate of the exhibition's digital facial-recognition technology about—the estimates rising from 40 to 50, then 60 percent—Ai wryly added that the Chinese government's accuracy rate is 150 percent.

Hansel & Gretel—the latest in the Armory's series of huge Drill Hall extravaganzas, whose title indicates that we all leave breadcrumb trails, whether we want to or not—is another collaboration among Mr. Ai and Mssrs. Herzog and de Meuron. They've worked together on and off for 15 years on such projects as the Bird's Nest stadium for the 2008 Olympics in Beijing and, in 2012, the Serpentine Gallery in Kensington Gardens in London. Herzog & de Meuron, moreover, is the architectural firm in charge of the ongoing \$210 million renovation of the 19th-century Park Avenue Armory building itself.

Part 1 of this technology-rich dystopian spectacle occupies the whole of the darkened 55,000-square-foot Drill Hall, which the audience enters not from the Armory's grand, staircased main entrance, but through an inconspicuous rear door on Lexington Avenue. (Herzog and de Meuron wanted to punch a kind of guerilla entry into that brick wall, but the idea was nixed.) Once inside, visitors make their way through almost pitch-black corridors to a ramp that takes them up a few feet to the main attraction: a floor on which are projected their surveilled overhead images, which follow them around like digital puppy dogs. The images come from dozens of overhead cameras, not the tethered drones buzzing around overhead. The phenomenon undoubtedly inspires awe in a few ("awe" was mentioned by the designers as the principle desired effect), but to anyone who's watched one of the Toms—Cruise or Hanks—trying to flee a crew of totally wired bad guys, those illuminated brackets accompanying moving



Ai Weiwei, Jacques Herzog, and Pierre de Meuron's latest collaboration—an interactive display about surveillance in the digital age—uses facial-recognition technology to track its visitors.

targets are all too familiar.

Getting to Part 2 involves exiting the Drill Hall through another door on Lexington, turning a corner, and hoofing it down the block to the main entrance on Park Avenue. Upon entering, you're photographed and your face is matched with surveillance photos that were taken surreptitiously in the Drill Hall. (My match turned out not to be me but a handsomer guy a few seats down at the iPad table where visitors see—or, 40 percent of the time, fail to see—their cover blown.)

Part 2, in a much smaller area of the Armory called the Head House, is much the better part of *Hansel & Gretel*. It's less glamorous—simply furnished with big wood tables at which visitors can sit. There they can see how well they've been spotted in the Drill Hall, as well as peruse the best item in the show: a timeline of surveillance techniques and events from ancient Egypt ("eyes of the Pharaoh," aka spies) through the proto-computer Turing Machine that broke the Nazis' "Enigma" code and to weaponized drones currently in use in Afghanistan.

Hansel & Gretel seems made to order for middle-school kids on a field trip; they always

find special effects in the dark totally cool. (At \$15 a ticket, bringing them in would require a drastically reduced group rate.) The Drill Hall gizmo-palooza gives everyone a visceral experience of what it's like to be watched by unseen forces, and the Head House didactics fill in details about the making of the installation. The problem with the exhibition is that in spite of—or perhaps because of—the expensive light show (the Armory won't say how much it all cost), its insights into the power and meaning of surveillance are superficial. There's not much beyond a general vibe that electronic surveillance is bad—and this emanates mostly from Ai's history of persecution by the Chinese government. Meanwhile, every time there's a terrorist attack in the West, pundits wonder why the culprits weren't more thoroughly and continuously surveilled. The lesson of *Hansel & Gretel* is that a convincing work of art addressing the conundrum of civil liberties versus public safety can't merely be a funhouse ride in the shadows. ■

Peter Plagens is a painter and writer whose reviews appear regularly in *The Wall Street Journal*.

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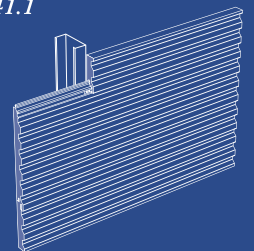
Figure 41.1

LESSON № 41

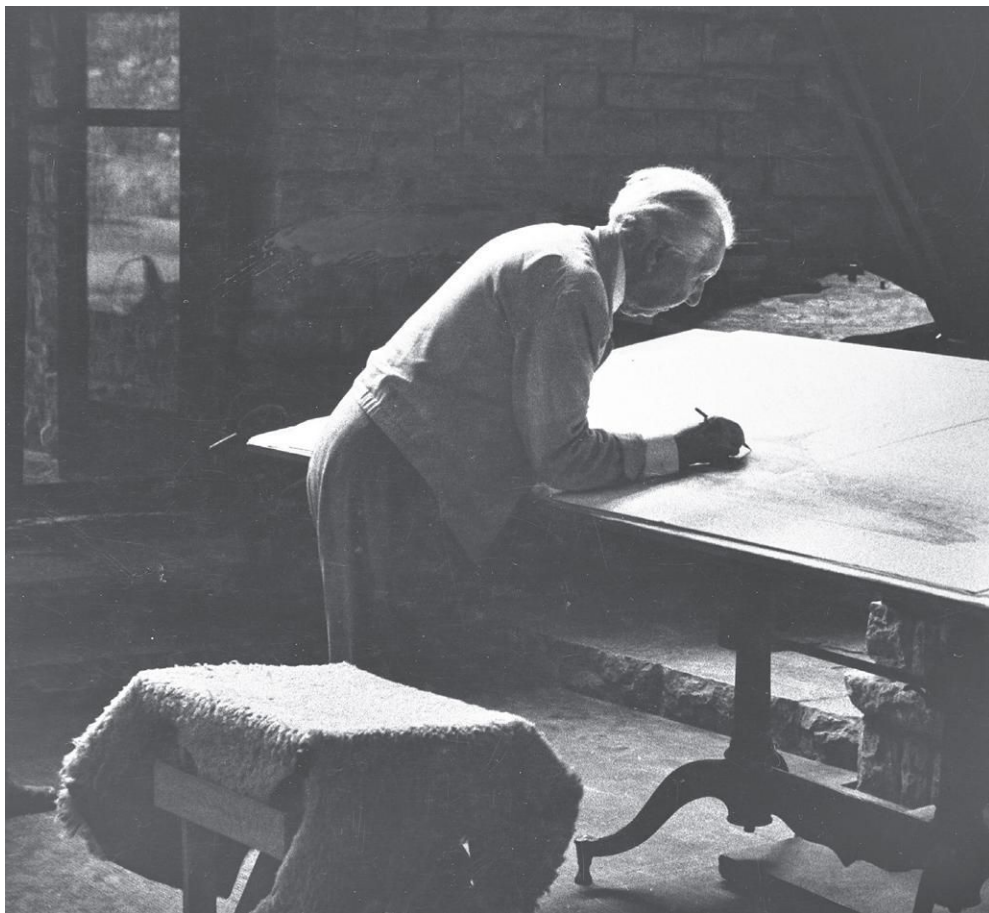
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fig 41.1



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The pioneer architect hovers over his drafting board, as shown in the exhibition *Frank Lloyd Wright at 150: Unpacking the Archive*, on view at New York's Museum of Modern Art.

A Different Slant on Frank Lloyd Wright

BY SUZANNE STEPHENS

“THIS IS an anti-retrospective,” says Barry Bergdoll, the curator of *Frank Lloyd Wright at 150: Unpacking the Archive*, on view until October 1 at New York’s Museum of Modern Art (MoMA). “It doesn’t try to perfectly shape an unfolding career.” Instead, he describes the show’s thematic structure as “eccentric.” And that it is. (Some might call it hard to follow.)

Instead of rolling out a standard repertory of all-time hits—Robie House, Unity Temple, Fallingwater, Johnson’s Wax, Guggenheim Museum—Bergdoll ferreted out lesser-known efforts, many of which were unbuilt. Wright the form-giver is still in evidence, but so is the protean creative genius as a socially conscious architect, planner, and inventor. The idea to uncover little-known corners of his staggering body of work came as a result of the archive’s being acquired by MoMA and the Avery Architectural and Fine Arts Library at Columbia University from the Frank Lloyd Wright Foundation in 2012.

Bergdoll, who organized the show for MoMA with project research assistant Jennifer

Gray, explains that choosing among 55,000 drawings, 125,000 photos, and 285 films, along with dozens of models and voluminous correspondence, was arduous. In the end, there are some 400 objects on display. But how to present the material? Bergdoll decided to enlist both Wright and non-Wright scholars as curators, asking each to focus on one project, using about 30 items to help explain its significance. (A few selections come from other collections.) The categories range from “Reframing the Imperial Hotel” (1923), showing drawings, photos, furniture, and textiles from the legendary Tokyo masterpiece, to Wright’s “Little Farms Unit,” an experimental proposal of 1932–33 responding to the plight of the farmers in the Depression. Other topics are more general, such as “Ornament,” “Circular Geometries,” and “Drawing in the Studio.”

The variegated mix is intriguing—even though the categories are about as unified as apples and oranges, plums and kumquats. One participating scholar is Mabel O. Wilson, a

practitioner, Columbia University professor, and author of *Negro Building: Black Americans in the World of Fairs and Museums* (2012). For her section, Wilson chose to explore Wright’s “Rosenwald School,” designed in 1928 as part of a mission of the Rosenwald Foundation to educate African Americans in rural areas. The design was more luxurious than desired by the beneficiary of this proposal, the Hampton Normal and Agricultural Institute (now Hampton University in Virginia), which believed in simplicity and discipline for its student body. The scheme—a flagstone, concrete, and cypress-board structure that included a theater and opened onto a rear courtyard for physical exercise—was never built, even though Darwin D. Martin, a past client of Wright, wanted to pay for it. The work emphasizes Wright’s belief that architecture should reinforce progressive academic ideals for students of any color.

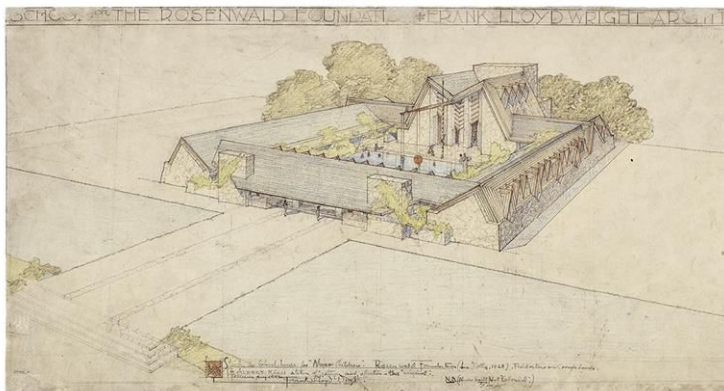
Another portion of the show presents the master’s design-build ideas in his Usonian Automatic System Project of the early 1950s. As Matthew Skjonsberg, an architect who studied at Taliesin and is currently a Ph.D. candidate at the Swiss Federal Institute of Technology in Lausanne, shows, Wright retooled the textile concrete block he developed in the 1920s—for the Millard and Ennis houses in California—for this project. The later version allowed do-it-yourself construction, where homeowners would build their own dwellings using 12 standard shapes of blocks.

Neil Levine, the eminent Wright historian and Harvard professor, focuses on the “Skyscraper Regulation” project in his section on “Urbanism.” In Wright’s 1926 scheme for a nine-block area in Chicago’s Loop, the architect imaginatively tried to solve city planning problems—a surprising discovery, considering his better-known predilection for decentralized growth. Here, Wright raised sidewalks to a second level, permitting traffic circulation at grade. He placed perimeter block apartments around courtyards, with eight-story buildings along the streets and towers rising to a 350-foot height at the corners.

In a section of the show called “Reading Mile-High,” Bergdoll analyzes the famous proposal for the Mile-High Illinois skyscraper in Chicago, which he included in the inaugural archival MoMA show he curated in 2014, *Frank Lloyd Wright and the City: Density vs. Dispersal*. Now Bergdoll exhibits a 1956 drawing Wright dedicated to architects and engineers, listing his favorites at the top of



In one section of the show (above), its organizer, Barry Bergdoll (shown in video), placed Wright's Mile-High Illinois drawings (1956) within a context of others' efforts, such as Mies van der Rohe's Friedrichstrasse Skyscraper Project (1921). Also exhibited (right) is the perspective rendering of the Rosenwald School project (1928), and (far right) a model for the St. Mark's Tower project (1927-29).



the 100-by-17½-inch rendering on tracing paper. One is J. J. Polivka, who executed structural calculations for the needlelike skyscraper, and whose plan sketches on a napkin are displayed.

Crucial to understanding each section of the exhibition are video interviews with the various curators to underscore their points of view about their selections. (“Urbanism” lacks this necessary component—a loss.) By providing the individual choices as the storyline rather than the chronology of the Wright canon, Bergdoll has created an intriguing smorgasbord for those who know well the standard fare, but no doubt it will be hard to get if you are a novice. The handsome installa-

tion frames the works on display with an understated rigor. The galleries in the freshly renovated 1939 portion of the museum are painted in muted tones (such as Farrow & Ball’s “Pale Powder”) that give the space an ethereal quality. Newly restored models, such as Wright’s unbuilt St. Mark’s Tower (1927–29) in painted wood and cardboard, and replicas of Taliesin drafting tables, add a sculptural quality to the show, while home movies of the master and his apprentices at work and play give the entirety a lively humanity. This exhibition is not for those uninitiated into the realm of Wright, but it does provide something new for almost everyone, even some who thought they knew it all. ■



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Wright on Exhibit: Frank Lloyd Wright's Architectural Exhibitions, by Kathryn Smith, Princeton University Press, 288 pages, \$60.

Reviewed by Anthony Paletta

FRANK LLOYD WRIGHT's 65 years of museum exhibitions during his lifetime produced little surviving evidence in catalogue form—and the domineering manner he brought to the process of putting on a show does much to explain the dearth. Now Kathryn Smith takes us on a comprehensive tour through Wright's exhibitions, from his first at the Chicago Architectural Club of 1894 to New York's Metropolitan Museum of Art in 1959. The details are fascinating, especially because of what they tell about the inclusions in those presentations and why they were chosen.

Wright was not content to let curators select or arrange his own work, and he erupted with scabrous objections at their mild efforts to do so. He often provided his own drawings, models, photographs, and text, and at times had a hand in the layout of shows. Accordingly, the impression has emerged of Wright as a cantankerous traveling salesman, arranging his wares to maximize profit. This idea Smith categorically rejects. As she emphasizes, Wright's museum displays resembled not the advertising pitch but the sermon. He reliably failed to take opportunities to meet museum trustees or other deep-pocketed grandees, and was given to omitting his most popular or venerable works in favor of projects he found more artistically important.

The overall history of his exhibitions, Smith says, reveals “an artist-architect projecting an avant-garde program, an innovator expanding the palette of installation design as technology evolved, and a social activist challenging architectural students and the public with his accompanying lectures and publications.”

The single most discernible trend in the decades of Wright shows was an increased emphasis on the modern qualities of his work with an effort—sometimes accurate, sometimes knavish—to claim credit as the source of inspiration for later modernists. In the early 1930s, Wright began to omit his more conservative or ornamental works from museum shows in favor of schemes he regarded as prototypically

modern. His *Mostra dell'Opera di Frank Lloyd Wright* (often called the “Italian Exhibition”), which opened in 1951 in the Palazzo Strozzi in Florence, featured the Willits House and the Larkin Building, leaving out the better-known Dwight D. Martin and Robie houses. It was part of his consciously self-selective effort to stress emblematically modern developments within his work, such as the unit system, the free plan, and flat-roof buildings.

Smith's book is a long-needed chronicle of changes in curatorial practice and technology, particularly at New York's Museum of Modern Art (MoMA), which mounted six solo exhibitions on Wright between 1932 and 1953, and eight others in which he appeared during this time. The architect's Chicago Architectural Club forays primarily were a showcase for delicate water-colored draftsmanship and small architectural drawings; by 1959 you might find large photomurals, 14 by 20 feet. Wright did not always embrace color in renderings and then photographs: for the expanded version of *The Work of Frank Lloyd Wright, 1893–1930* at the Art Institute of Chicago in 1930, he had early polychrome renderings re-drawn as large black-and-

white perspectives to show, as Smith points out, “he had anticipated the radical forms of European modernism by decades.”

The book also includes his caustic correspondence, notably with Philip Johnson. After Johnson had come back to MoMA in 1946 to once again act as the director of the department of architecture, he assured Wright he wanted to install a Usonian house in the MoMA garden. But Breuer beat Wright to it in 1949, when his design for a full-scale modern house opened in this setting. Wright wrote: “Phil . . . how could you allow the museum to buy and plug with Usonian language that shanty town version from '33rd Street and the tracks' now in your garden. For Christ's sake—what a travesty.”

MoMA, judging by its sprawling show, *Frank Lloyd Wright at 150: Unpacking the Archive*, is clearly fond of its substantial, newly acquired Wright collection, but it may not miss the confrontations it experienced when the master was alive. ■

Anthony Paletta has written about architecture and urbanism for *The Wall Street Journal*, *The Guardian*, *Metropolis*, and other publications.



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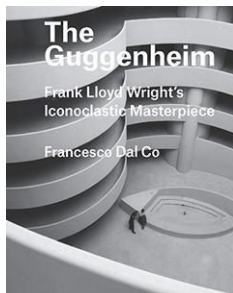
The Wright Time

Marking Frank Lloyd Wright's 150th Birthday

Reviewed by Suzanne Stephens

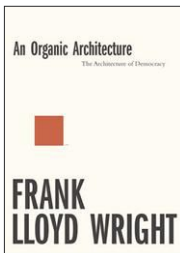
The Guggenheim: Frank Lloyd Wright's Iconoclastic Masterpiece, by Francesco Dal Co. Yale University Press, July 2017, 184 pages, \$30.

In updating his book, published in Italy in 2004, on New York's Solomon R. Guggenheim Museum, Francesco Dal Co offers an absorbing history and technical analysis behind the design of the landmark structure. Accounts of the 17-year process, from Wright's receiving the commission to the building's completion in 1959, offer insights into the architect and his clients—the first director of the museum, the supportive and adventurous Hilla Rebay, to her successor, James Johnson Sweeney, who didn't think Wright's daring scheme was so hot for displaying art. (Many artists agreed, even avant-garde designer Frederick Kiesler, who liked spirals.) Robert Moses, a distant cousin of Wright (!) and political powerhouse, helped with city code approvals, while structural engineer Tomaso Trombetti came up with the solution for the cantilevering upward spiral of concrete ramps and galleries. Dal Co could have offered more about Kiesler's spicy pro/con reaction to the Gugg, published in his journals, rather than the ponderings about culture by intellectual heavyweights Marcel Detienne, Walter Benjamin, and Hans Georg Gadamer that are included.



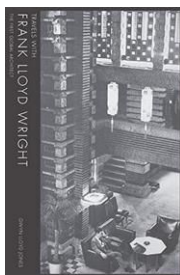
An Organic Architecture: The Architecture of Democracy, by Frank Lloyd Wright, with a new introduction by Andrew Saint. Lund Humphries, 108 pages, May 2017, \$25.

The reprint of four lectures Wright gave in 1939 at the Royal Institute of British Architects explores his organic principles based on an "architecture of nature, for nature." In a Q&A with the politely inquisitive audience, Wright dismisses Michelangelo and Renaissance architecture's "grandomania."



Travels with Frank Lloyd Wright: The First Global Architect, by Gwyn Lloyd Jones. Lund Humphries, 192 pages, April 2017, \$59.95.

Gwyn Lloyd Jones, an architect living in London and Wales, has followed in the footsteps of Frank Lloyd Wright to Japan, Europe, Russia, and the Middle East, where he often lectured and sought commissions. The author looks up works influenced by the master, such as those by Willem Dudok, Robert Mallet-Stevens, and Carlo Scarpa, and others designed long after Wright's death. The conversational style is fine but lacks a tight editorial hand. ■



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Filling a Void

A new surgical center by Kliment Halsband Architects will offer urgent care in Uganda.

BY LAURA RASKIN

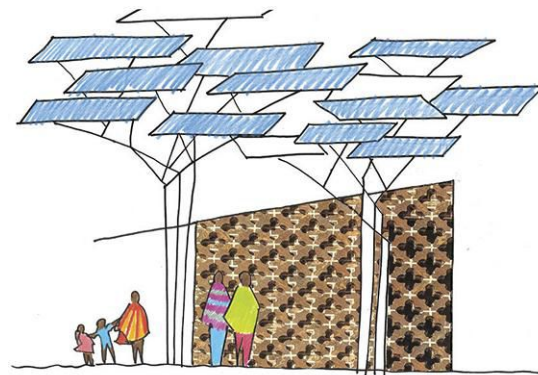
IF YOU develop appendicitis in the United States, chances are high that you'll receive a top-notch appendectomy at a local hospital and be on your feet in 12 hours. But if you live in rural Uganda, "you will die," says Dr. Michael Marin, chairman of the department of surgery at New York City's Mount Sinai Medical Center. "Simple surgical interventions are life-altering or life-ending." Roughly 5 billion people—two-thirds of the world—do not have access to safe and affordable surgery, causing 19 million deaths per year. AIDS, tuberculosis, and malaria combined result in far fewer—3.5 million—and yet, as Marin laments, most philanthropic investments are not made in surgery.

Renowned for revolutionizing vascular surgery, Marin has also dedicated his career to championing global surgical health and to delivering surgical care to underserved parts of the world. Surgery is commonly believed to be expensive and complicated, requiring special equipment and the skills of a genius. "So we've set out on a pathway to see if we can dissuade people from that belief," he says.

To do that, Marin found a private donor and engaged New York's

Kliment Halsband Architects (KHA) to design a stripped-down ambulatory surgery center in Kyabirwa, a rural village close to the equator in Uganda. Marin chose Uganda because of its poverty and need, and because he found an already operational health clinic in Kyabirwa that could refer surgical patients. Although KHA has worked on plenty of civic, cultural, and educational projects since Frances Halsband and her husband, the late Robert Kliment, founded the firm in 1972, they had never designed a health-care facility. "Dr. Marin said, 'That's why I want to talk to you,'" says Halsband. "He wanted a new viewpoint."

Marin took Halsband and her team on a tour through state-of-the-art operating rooms at Mount Sinai, pointing out everything extraneous or unnecessary for streamlined surgery. "There's really a very small area where you have to have absolutely top-of-the-line standards for sanitation," says Halsband. For Kyabirwa, she designed a three-volume, 8,500-square-foot center: an entry pavilion with offices surrounding a reception courtyard; an intermediate volume for pre-op and recovery; and a sterile volume with two operating rooms and adjacent support spaces. The operating rooms can accommodate video-conferencing for consultation with doctors and staff at Mount Sinai.

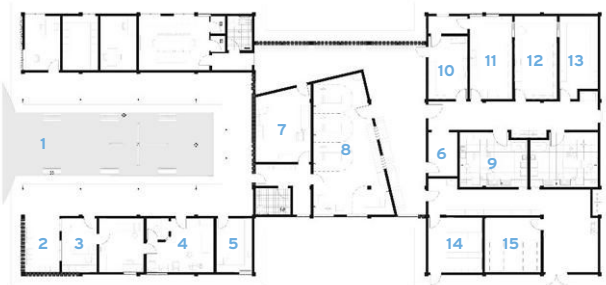


WELCOME RELIEF The center will feature an entry courtyard (top). The configuration of its photovoltaic panels (above) was inspired by the area's banana plants, which provide shade and serve as gathering places. Local bricks will form walls and screens.

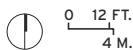
The steel-framed surgical center is filled in with locally made bricks, forming either solid walls or ventilating screens. Inspired by the proliferation of banana plants in the area, Halsband conceived of a tree-like system of solar panels that canopies the building, providing shade and energy (with backup generators). The surgical center will be open in 10 months.

Because Mount Sinai is not funding the operation of the center, Marin is developing a business plan, which includes the establishment of a small banana-cloth factory to generate income for its operations. Another goal is to create an environment and economic model in Kyabirwa that will help attract and retain surgeons.

Marin, a self-proclaimed architecture buff, says he didn't want this surgical center to be a MASH unit. "I want this first one to be right. It should fit into the community and have some unique features," he says. He hopes it will result in a cascade of "dozens or hundreds" more like it around the world. ■



FLOOR PLAN



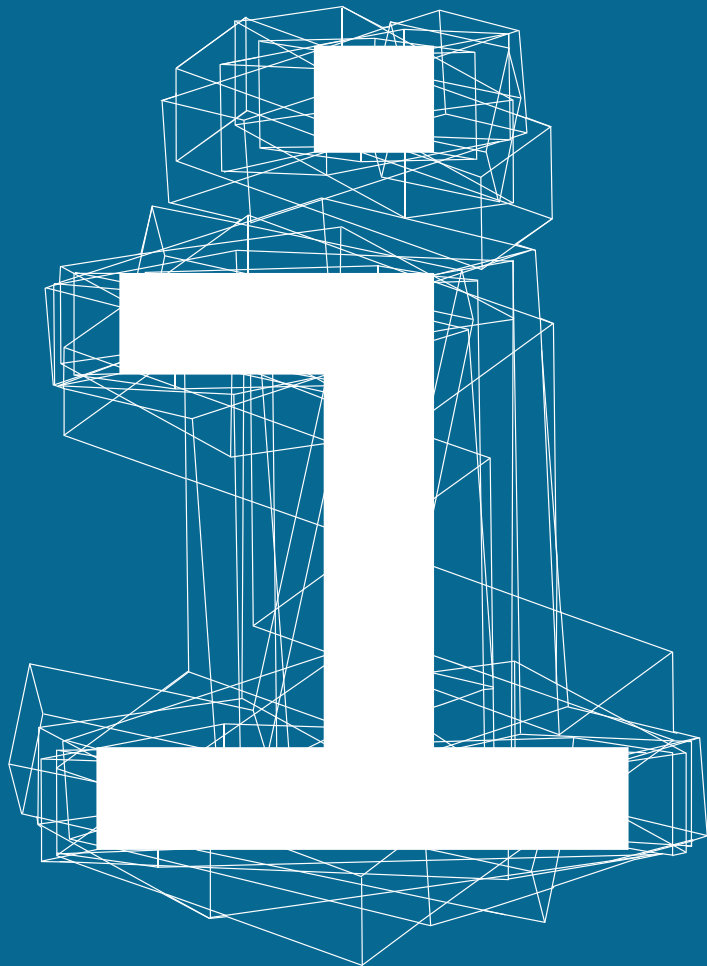
- | | | |
|-------------------|-------------------------|----------------------------|
| 1 COURTYARD | 7 PRE-OP | 12 SURGICAL CLEAN ROOM |
| 2 WAITING AREA | 8 RECOVERY | 13 STERILE SUPPLY |
| 3 REGISTRATION | 9 OPERATING ROOM | 14 MEDICAL SUPPLIES |
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By Rita Catinella Orrell



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waldmannlighting.com



Repose Sofa

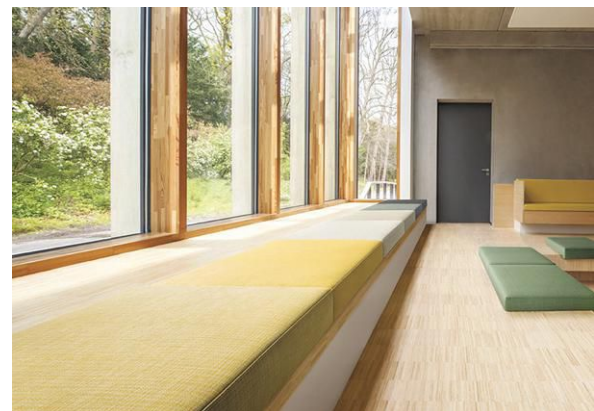
Designed for sitting, lounging, or sleeping, this versatile sofa from Nemschoff accommodates multiple seat depths and transforms into a chaise longue with an optional pullout ottoman. These modifications can be made without complicated maneuvers or noise. Repose supports a range of activities, which include working, patient visits, and sleeping, allowing overnight stays by family members.

nemschoff.com

Scott & Jemo

Two new fabrics in the Vescom vinyl upholstery collection include Scott, a fine woven structure reminiscent of linen fabric, available in 18 colors, and Jemo, a matching tone-on-tone coordinate with a slight gloss that is available in 21 colors. Composed of a vinyl top layer with a cotton backing, Vescom vinyl upholstery is highly resistant to bacteria, urine, blood, and perspiration stains.

vescom.com



Symmetry

This recessed ceiling light from Visa Lighting provides glare-free illumination within a round diffuser profile. The 44½"-diameter LED fixture is offered in 90 CRI and has 10-volt dimming to 1%. General use, health care over-bed, and tunable-white models with a 1650K to 8000K color temperature range, plus a full spectrum of saturated colors, are available.

visalighting.com



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en.wineo.de



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bobrick.com



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usg.com



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mechosystems.com



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dupont.com



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steelcasehealth.com



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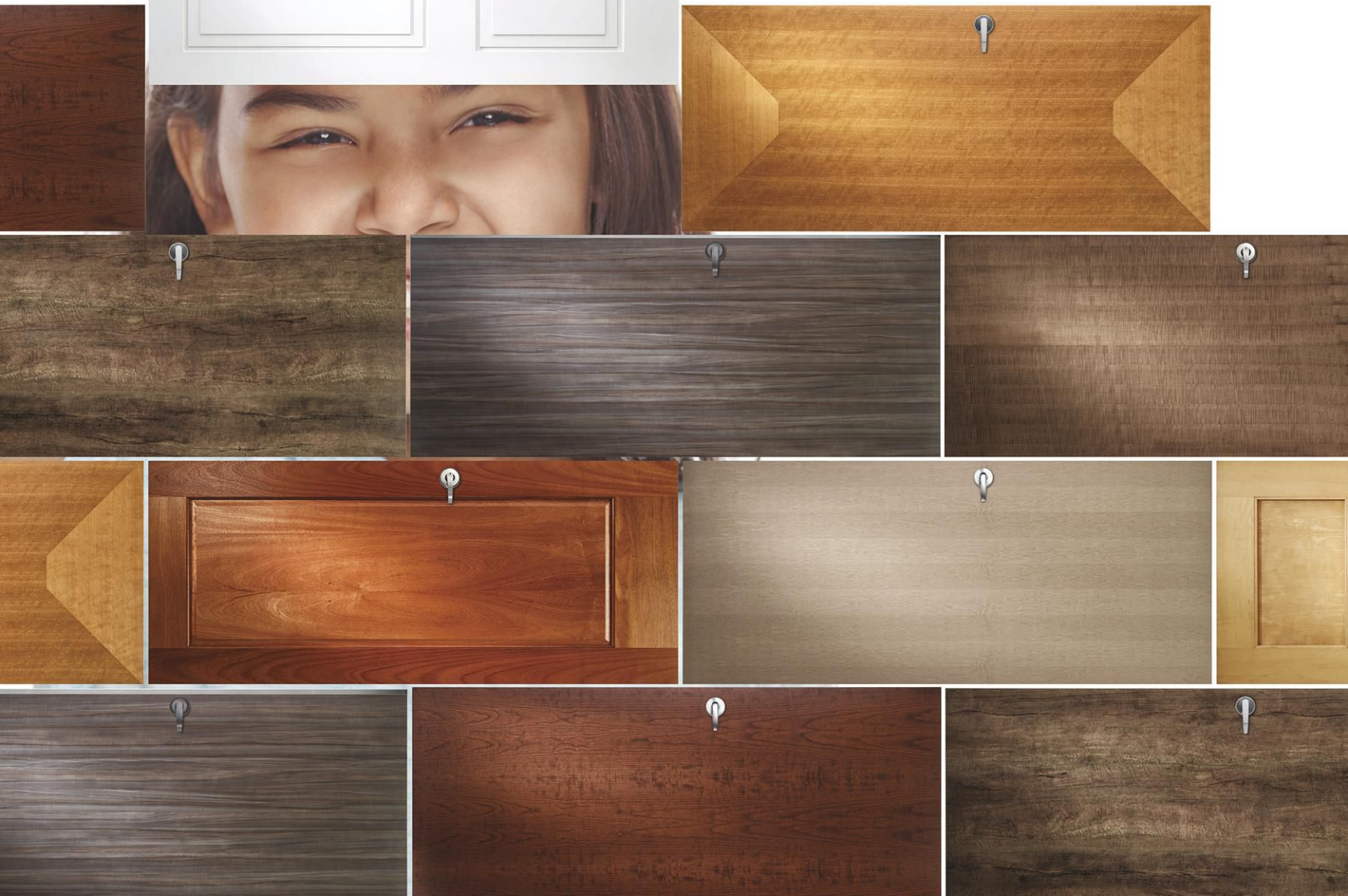
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tesla.com



Sun Blocks

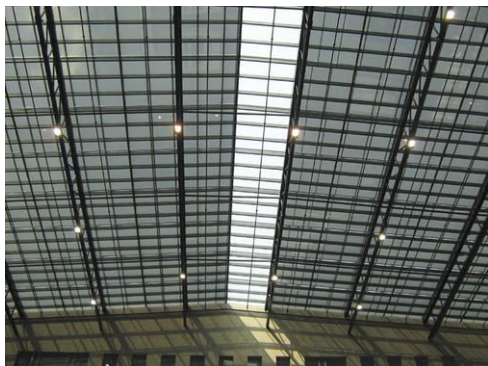
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By Rita Catinella Orrell

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lutron.com



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draperinc.com



Solar Canopy

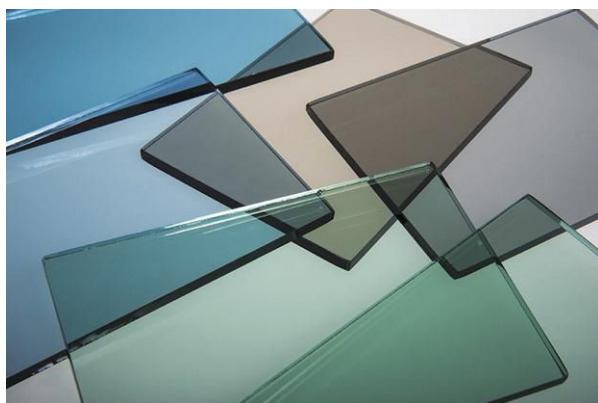
Created through a collaboration between Brooklyn SolarWorks and Situ Studio, the Solar Canopy is a modular rooftop structure with PV solar panels affixed to a lightweight, adjustable aluminum frame. Designed for the requirements of residential buildings in New York, the canopy can expand a rooftop solar system by up to 200%, dramatically reducing utility costs.

brooklynsolarworks.com

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From sea to shining sea, new and adapted buildings show off this country's diversity and can-do spirit. On the following pages we celebrate architecture, in both big cities and small towns, that reflects aspects of our rich history.



MARGUERITE AND GERRY LENFEST BUILDING

MUSEUM OF THE AMERICAN REVOLUTION, PHILADELPHIA, ROBERT A.M. STERN ARCHITECTS

PHOTOGRAPHY: © PETER AARON/OHTO





The new museum is the latest addition to the Independence Hall neighborhood in Philadelphia. The spiral stair is the centerpiece of the interior (opposite, top), which has historic displays (opposite, bottom).

The Battle for History

Robert A.M. Stern Architects' Museum of the American Revolution frames a window onto the past while catering to the needs of 21st-century mass tourism.

BY DIANA LIND
PHOTOGRAPHY BY PETER AARON

In the mid-20th century, Philadelphia witnessed the demolition of dozens of non-Colonial buildings, including two extraordinary Victorian ones by Frank Furness, in an effort to preserve the Independence Hall neighborhood's 18th-century character. That approach to "preservation" was typical of the era, as the re-creation of Williamsburg, Virginia, attests, where hundreds of historic structures were destroyed to turn it into a Colonial theme park.

Nearly 70 years later, Philadelphia is still struggling with how to integrate new buildings into an urban fabric teeming with Founding Father-era gems, Greek Revival banks, and Federal rowhouses.

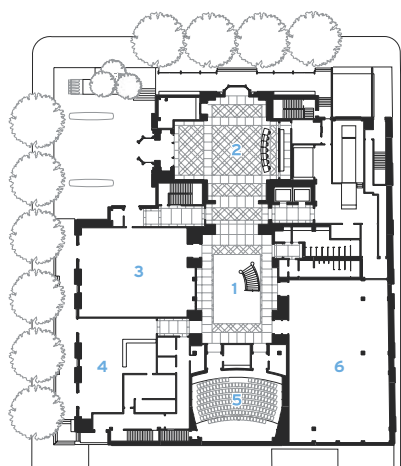
Within this context, who can blame Robert A.M. Stern Architects (RAMSA) for its homage to history in the design of the new \$150 million Museum of the American Revolution?

"The building is meant to capture the spirit and context of the area, and capture a sense of the architectural environment that existed during the American Revolution," says Robert Stern. "At the

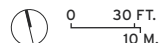
same time, it makes a statement that is suited to its 21st-century period." Indeed, the central challenge of the project was to adapt Federal elegance to today's tourism needs.

Sited on a bustling corner in the heart of Philadelphia's tourism district, the 118,000-square-foot building fulfills Stern's primary wish for the museum to be a good citizen. Its massing takes its cues from the neighboring historic buildings' cornice lines, while Pennsylvania red brick, white trim, and keystone-accented arches dutifully reference the neighborhood's aesthetic. Its dense, urban feel is enhanced by oversized retail-like windows and an outdoor café that reinforce the building's connection to the street.

But unlike the reserved buildings of yore, this one features exaggerated blind arches and a voluptuous bronze-painted domed entrance that contribute to a sense of playfulness. "It's very important that the building be friendly and dignified," says Stern. The exterior conveys the message that interpreting history can be fun, and larger than life.



GROUND-FLOOR PLAN



- | | |
|-------------------|----------------------|
| 1 GRAND STAIRCASE | 4 CAFÉ |
| 2 ROTUNDA | 5 THEATER |
| 3 MUSEUM SHOP | 6 TEMPORARY EXHIBITS |

Inside, a more formal tone sets in. A terrazzo-tiled rotunda opens on to the design's centerpiece, a two-story spiral staircase that winds up to a skylit atrium. These spaces, with cream-painted walls, evoke both the gentility and longevity of historic civic buildings and, with a center-hall floorplan, the hominess of a great residence. In a building that necessitated 32,000 square feet of windowless exhibition space for light-sensitive objects, such as George Washington's war tent, this atrium offers the museum's only natural light.

But despite the architecture's best efforts to encourage visitors to inhabit the grand past, the often crass present is as quick to assert itself as the short walk from front entrance to gift shop. Getting this building built was a struggle that took longer than the Revolutionary War itself (which lasted eight years) and the museum seems to be at pains to acknowledge the funding that made it possible. From the museum's abundance of donor nameplates (including one in honor of the architect himself, paid for by Comcast CEO Brian Roberts) to its several rentable events spaces, the building is no trust-fund baby. It needs to pull double duty both as a theatrical showcase for a history museum and as a revenue engine—and at times the financial priorities of a 21st-century cultural institution seem to have undermined more exciting design choices.

With the exception of the rotunda, the first floor is largely occupied by the uninventive gift shop, café, theater, and temporary-exhibit spaces. The outdoor plaza, designed by OLIN, and the main staircase could be contemplative respites but instead feel engineered to accommodate the reality of masses of tourists. On the exterior, details such as the cornices—bland strips instead of the delicately ornate moldings typical of historic buildings—hint that the architects were limited in how seriously to appropriate the past.

The building and museum try hard to have it all, and this may be the source of its problems. How American. ■

Diana Lind is the founding managing director of the Penn Fels Policy Research Initiative. Previously she was editor in chief and executive director of Next City.



Southern Revival

Auburn University's Rural Studio transforms an aging bank building in Newbern, Alabama, into the town's first public library.

BY BETH BROOME

PHOTOGRAPHY BY TIMOTHY HURSLEY



Driving along Alabama's State Route 61 is like a journey through the land that time forgot. Past catfish ponds and rolling pastures, the highway pauses for a moment where it swells to form downtown Newbern (population 189), a rustic collection of warehouses and storefronts from the turn of the last century. But over the last couple of decades, Rural Studio, Auburn University's design-build program, which is based here, has left its mark, erecting a fire station and other structures. For its latest endeavor, the school has transformed a diminutive masonry bank building into a modern, 1,600-square-foot library—Newbern's first—that maintains the local down-home spirit while providing an inviting community resource.

The building has a typical American story. Built in 1906 as the Bank of Newbern, it went on to have a varied life after the financial institution failed during the Great Depression. It housed an insurance office, a livestock-feed storage facility, and then sat empty,

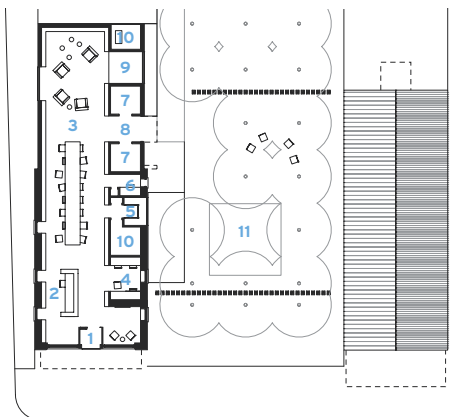
occasionally serving a stint as a polling center. In 2012, the owner, a local family, donated the use of the building to Rural Studio. The town postmaster had been pushing for a library, and, later that year, four thesis-year students were assigned to the project. In Rural Studio tradition, the small team oversaw the planning, design, and construction over the next 24 months. "The students not only design and build," points out acting director Xavier Vendrell, "they work with the community to figure out what they need and define the organization behind the building."

The team realized more space would be needed to accommodate a flexible program for both private study and a host of social and educational activities for a wide range of age groups. "There were two basic questions," says team member Will Gregory. "How do you preserve this old building? And what does the new small-town library look like?" Restoring the front and side facades, the students pushed out the building's back with a 700-square-foot

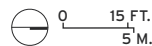


The library's folded steel awning (opposite), like other elements, riffs on aspects of the aging neighboring buildings. A courtyard is defined by repurposed bricks (above). Inside (left), perforated ceilings and cork flooring were selected for their acoustic properties. The old bank's tellers station is now the librarian's desk.

- 1 ENTRY
- 2 CIRCULATION
- 3 READING ROOM
- 4 COMPUTER STATIONS
- 5 GARDEN ALCOVE
- 6 STUDY ROOM
- 7 RESTROOM
- 8 COURTYARD ENTRY
- 9 WINDOW SEAT
- 10 STORAGE
- 11 COURTYARD



FLOOR PLAN




extension, clad in locally sourced cypress to differentiate it from the masonry. Inside, in the long, open reading room, the new and the old connect seamlessly, with birch plywood ceilings and CNC-milled shelves lining the interior. A row of alcoves along the building's north side contains computer stations (with the town's first public Internet access), study nooks, a deep window seat, and restrooms and storage, while a shaded courtyard allows study and gatherings to flow outside. The team salvaged over 8,000 bricks from the old vault, using them for paving and low walls in this area. They rescued other original elements, such as the vault door, which hangs near the entry, and the teller counter, which was repurposed as the librarian's desk.

This little project reflects many ideas that have shaped the recent designs of larger libraries around the world, as digital technologies have emerged and these civic institutions have reconsidered their role in the community. But it does so without losing sight of its roots and the people it is now serving in this corner of 21st-century small-town America. ■

Factory Made

Bruner/Cott expands a contemporary-art museum while staying true to the industrial character of its historic campus.

BY JOANN GONCHAR, AIA
PHOTOGRAPHY BY MICHAEL MORAN



MASS MoCA's just-inaugurated Building 6 sits at the confluence of two branches of the Hoosic River (this page). The structure houses long-term installations by several artists, including the late Louise Bourgeois. One of her pieces (opposite) weighs nearly 30 tons and necessitated reinforcement of the floor.



The American landscape, and especially that of New England, is dotted with relics of our industrial past, shuttered factories that once churned out everything from shoes to steam engines. Many of these facilities have found new leases on life in the postindustrial age as housing, offices, or retail spaces. One of the best examples of such architectural adaptation is in North Adams, Massachusetts. Here, in the foothills of the Berkshires, MASS MoCA has been gradually expanding into its sprawling campus of late 19th-century textile mill buildings since the contemporary-arts center first opened its doors in 1999.

At the end of May, the museum inaugurated its newest set of galleries in a just-renovated three-story wing known as Building 6. The \$55 million project, designed by Cambridge-based Bruner/Cott & Associates—the same firm responsible for the two previous phases of renovation, as well as the campus master plan—nearly doubles the institution’s exhibition space to 240,000 square feet and adds new visitor amenities, art-fabrication workshops, and support facilities for music festivals and other outdoor events. With its completion, almost all of the 28 red-brick structures that make up the landmarked 16-acre complex have been renovated.

The recently revamped building, which sits at the site’s western edge, has a triangular footprint shaped by the confluence of the north and south branches of the Hoosic River. It completes a long-envisioned “big, gracious infinity loop across the entire campus,” says Joseph Thompson, the institution’s director. Previously, visitors had to backtrack through galleries they had already viewed in order to return to the main lobby.

Although the museum has no permanent collection, the new galleries continue a strategy initiated in 2008 with the second phase of construction, when MASS MoCA mounted a 25-year installation of Sol Lewitt’s wall drawings. Similarly, the new wing was conceived to host the long-term installations of artists that include Laurie Anderson, James Turrell, Jenny Holzer, Louise Bourgeois, and Robert Rauschenberg, as well as lesser-known artists. Some of the galleries, such as those tailor-made for Turrell’s investigations of light and perception, will be fixed in place for decades, while others, such as those devoted to the work of Anderson and





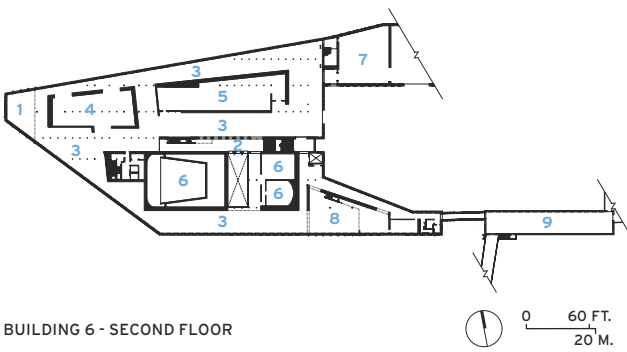
With completion of Building 6, MASS MoCA has renovated nearly all of its 16-acre campus (opposite, bottom). As part of the project, the architects transformed a narrow open-air light court into a circulation spine by covering it with a skylight and inserting walkways across it (left). At the building's "prow," they created a dramatic double-story space (opposite, top).

Holzer (each has a 15-year agreement with the museum) are more flexible, allowing the artists to periodically change out their exhibitions as new work is created.

Much of the art is displayed against the tough backdrop of worn (but refinished) maple floors, patched brick walls, and heavy timber beams. But some of the work required constructing what Bruner/Cott founding principal Simeon Bruner calls "galleries within a gallery." These enclosed rooms offer museum-quality temperature and humidity controls as well as protection from daylight. It would have been nearly impossible to provide such environmental conditions within the old structure, says Bruner.

These areas for display are organized around an existing 140-foot-long, 20-foot-wide light well that Bruner/Cott transformed into a circulation spine and orientation device. The firm demolished small rooms that had accrued in this slotlike space over the years, covered the previously open-air court with a skylight, and inserted walkways across it. In addition, the architects exploited the masonry-and-timber building's oddly shaped plan by creating a dramatic double-height room for social gatherings and relaxing in the prowlike western end. Here they removed part of a floor and added a generously sized window that offers a view of the Berkshire and Taconic mountains.

New steel trusses, bracing, and ties reinforce the aging structure and help it conform to current seismic codes. These components are mostly left unpainted and raw, making it difficult to tell if the brawny elements are original or recently added. But the lack of self-conscious differentiation between old and new doesn't detract from the overall power of the expansion. The approach is in keeping with the complex's organic development, with structures modified "in the most expeditious way" over time, explains Jason Forney, a Bruner/Cott principal. It's a strategy that celebrates the complex's industrial past but perfectly suits its new life as a place for the experience of contemporary art. ■



BUILDING 6 - SECOND FLOOR

- | | |
|---|------------------------|
| 1 PROW LOUNGE | 6 TURRELL INSTALLATION |
| 2 LIGHTWELL | 7 BUILDING 5 |
| 3 GALLERY | 8 EVENT SPACE |
| 4 BOURGEOIS GALLERY | 9 BUILDING 8 |
| 5 RAUSCHENBERG/CAPTIVA FOUNDATION GALLERY | |





A Kentucky Classic

Christoff : Finio revamps a Louisville museum and asserts its presence on Main Street.

BY ALAN G. BRAKE
PHOTOGRAPHY BY KEVIN KUNSTADT

The Kentucky Museum of Art and Craft (KMAC) in Louisville is a small museum with big ambitions. Founded in 1981 as a center to promote the state's traditional crafts, such as quilting and wood carving, it has evolved to become a contemporary-art museum with a focus on materials and artistic process. In line with this revised direction—and to better serve its growing audience—the museum was recently renovated by New York-based Christoff : Finio.

Occupying a four-story former warehouse building from 1885, the 20,000-square-foot space was redesigned to strengthen the museum's connection to Main Street, which it faces. Its neighbors on Main Street include the Louisville Slugger Museum, the Louisville Science Center, the Frasier History Museum, and the 21c Museum Hotel, all of which occupy renovated historic buildings. Together, they form a museum district, which has helped revitalize the western end of downtown Louisville, a once thriving center of the bourbon, tobacco, and hardware industries that had suffered neglect.

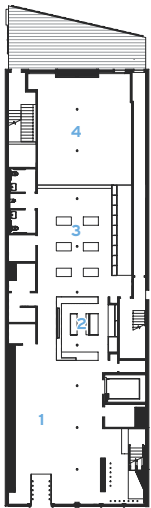
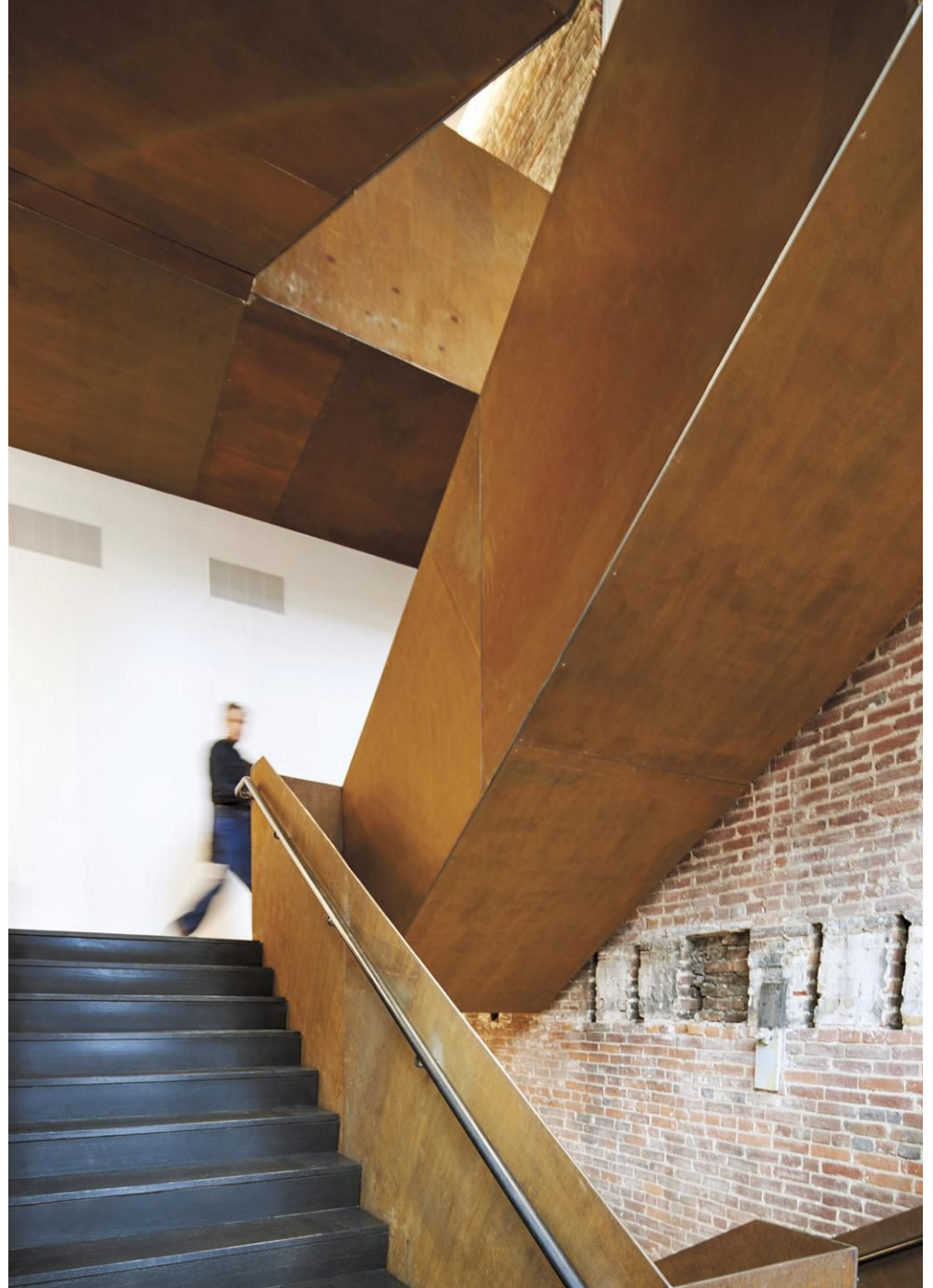
The architects used a method of “subtraction” in approaching the project, according to Martin Finio, a partner at Christoff : Finio. The strategy involved removing nonessential walls, exposing elements of the historic building, and revealing views. The main intervention was relocating the staircase from the center of the floor plates along the building's eastern side to the southeast corner immediately on the street-facing side, and replacing a cluttered gift shop that made the institution look more like a store than a museum. The new staircase, visible through the floor-to-ceiling windows of the cast iron facade, is constructed of rusted-steel plates. Rather than use

preweathered steel, the architects opted for a less expensive option, exposing low-carbon mild steel to the elements. “The staircase knits the building together, and the rusted steel is a way of introducing the idea of craft, with the imperfections and the marks of the fabricators left visible,” Finio says. “We wanted it to have a sense of improvisation—to feel like a sculpture.”

The new configuration increased the gallery and programming space, and created a maker space and a studio for resident artists, all of which support the museum's new focus. “Many artists talk about how they use materials to express their ideas, redefining craft in the contemporary context,” says KMAC director Aldi Miliken. “The previous iteration of the museum really limited what we could do.”

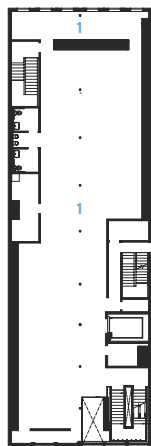
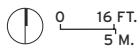
The first floor features a flexible lobby gallery. Furnished with rolling carts and movable displays, the gift shop can be expanded during the holidays or consolidated to create space for larger events. The second level houses the largest gallery, a floor-through space that overlooks Main Street and the Ohio River beyond. The architects placed freestanding walls at three-quarter height in front of windows to provide surfaces for hanging art and to protect select pieces from direct sunlight. Mechanicals were moved into new perimeter walls, which similarly rise just short of the ceiling to allow for air return.

Miliken couldn't be more pleased with Christoff : Finio's work. Since reopening last summer, he says, “We're attracting a younger and more diverse demographic of visitors, and connecting people to art and creative practice.” The firm's intelligent renovation demonstrates how well-crafted architecture can better an institution, no matter the size, while enriching the remnants of a city's history. ■



- 1 GALLERY
- 2 RECEPTION HUB
- 3 GIFT SHOP
- 4 MAKER SPACE
- 5 EDUCATION SPACE
- 6 KILN ROOM
- 7 ARTIST IN RESIDENCE
- 8 ADMINISTRATION
- 9 DIRECTOR'S OFFICE

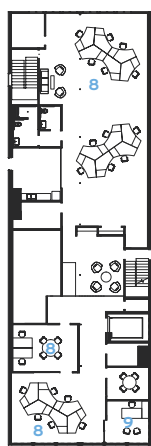
FIRST-FLOOR PLAN



SECOND-FLOOR PLAN

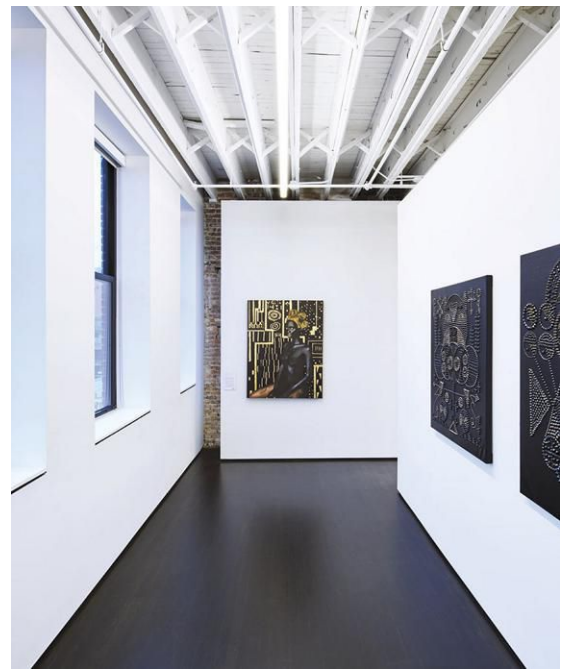


THIRD-FLOOR PLAN



FOURTH-FLOOR PLAN

The museum occupies a 19th-century cast iron building (opposite). Expanded galleries showcase art with a focus on materials and process (above, left). The architects inserted a rusted-steel staircase at the front of the building (above). New perimeter walls house mechanicals but expose a sliver of brick. Original joists are visible overhead (right).





Sign of the Times

A once-popular Masonic temple, adorned with symbols, transforms into a private museum.

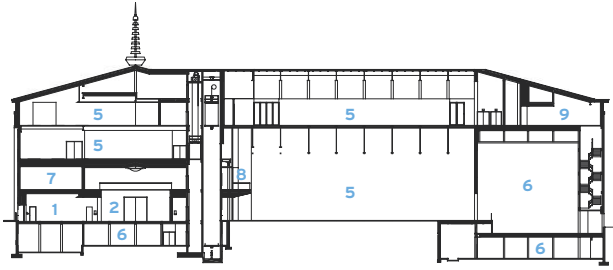
BY SARAH AMELAR

Masonic temples tend to be curious buildings—largely windowless and laced with cryptic symbols—and the one on Wilshire Boulevard, in Los Angeles, is no exception. Monumental and blocky, with heroic statues along its facade, the Scottish Rite Masonic Temple has always had an imposing yet enigmatic presence, punctuated by ciphers, such as an eye, a spear-skewed heart, and drafting compasses, across its travertine shell. For all its grandeur, however, the secretive 110,000-square-foot building languished vacant for years. But this onetime palace of ritual has recently come back to life as the Marciano Art Foundation (MAF)—a repurposing by the design firm wHY that simultaneously lays bare, embraces, and transcends the venue's abundant idiosyncrasies.

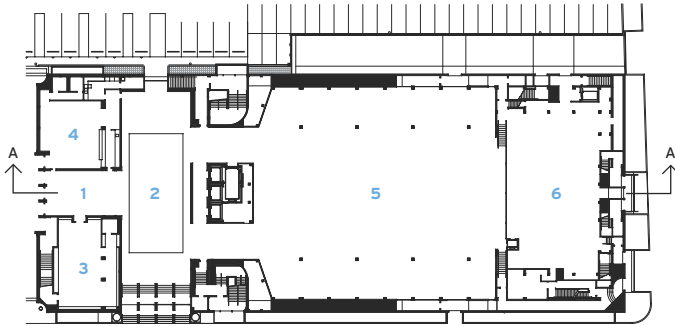
In 1961, when artist-designer Millard Sheets completed the building, the Scottish Rite fraternal order had soaring ambitions for it, incorporating such amenities as a banquet hall for 1,500 and a 2,200-seat, full-fly, raked theater, where the brotherhood staged elaborate initiation dramas. Sheets was known for his Midcentury Modern branch banks across Southern California. And the temple's mystical ornamentation included his huge interior and exterior mosaics. But by 1994, dwindling membership forced the Masons to vacate. The building became an occasional venue for raves, boxing matches, and

sundry other uses before the city shut it down. Fortunately, in 2013, Paul and Maurice Marciano, two cofounders of the Guess company—famous for its sassy ads and provocatively tight jeans—purchased the property and transformed the eccentric shrine into their own museum to publicly display their extensive collection of contemporary art and planned site-specific commissions.





SECTION A - A



FIRST-FLOOR PLAN

0 30 FT.
10 M.

- | | | |
|---------------|-----------|------------|
| 1 ENTRY FOYER | 4 LOUNGE | 7 OFFICE |
| 2 LOBBY | 5 GALLERY | 8 BALCONY |
| 3 BOOKSTORE | 6 STORAGE | 9 ART PREP |



The limestone facade features enigmatic Masonic symbols (opposite, top) and heroic statues (opposite, bottom). The lobby, clad in travertine, doubles as an exhibition space (top). The building's ornamentation includes a large exterior mosaic (left). On the upper level, the dining hall's cathedral ceiling has been opened to its rafters, with long fluorescent bulbs punctuating the rhythm of girders (above).



“We imagined a playground for experimentation, where artists could try things and even make mistakes,” recalls WHY principal Kulapat Yantrasast. His team’s strategy focused on restoring many of the building’s original details while also stripping key interior areas to their concrete-and-steel bones, opening up vast, raw spaces for art.

Beyond such architectural flourishes as elevator doors emblazoned with bronze compasses, the Masons had left behind a trove of ritual paraphernalia, including stage sets, costumes, wigs, tasseled fezzes, and dioramas. To display such relics without upstaging the contemporary art, WHY converted the former library into a separate exhibition room, preserving its dark wood cabinetry and double-headed-eagle stained glass.

By contrast, the main galleries—extending through the former theater and banquet hall—have an industrial edge. The 13,400-square-foot auditorium, now stageless, is dramatically warehouse-like, with a high trussed ceiling, concrete floors, and ghosts of the raked seating and balcony visible only in exposed structural traces across the concrete side walls. Upstairs, the dining hall’s cathedral ceiling has been opened to its rafters, with long fluorescent bulbs punctuating the rhythm of girders.

MAF’s many vintage elements include wall-embedded water fountains of polished brass or lined in small, wheat-colored tesserae sparked with occasional gilded tiles. The lobby, which doubles as exhibition space, bears Sheets’s dynamic, vertically streaked travertine wall pan-



The ghosts of the raked seating are visible in the trussed former theater (top). An original embellishment glows in a conference room (above).

els, inset with lines of gold, jewel-like tiles embossed with mysterious glyphs. Overhead are restored pendant lamps, their quasi-sacred bowls ringed by Masonic symbols.

But most dazzling is the banquet hall’s formerly focal “altarpiece,” a tall Sheets mosaic with raccoons, foxes, and peacocks frolicking amid polychromatic cypresses. To keep its fauna and flora from competing with the contemporary art, however, WHY inserted a partition in front of the mural, separating it from the main gallery space. While evoking a private chapel, the wall stands so close to the mural that viewers can’t back up to take in the whole composition. But the partitions elsewhere in the banquet hall are more successful, positioned to control daylight and views while taking advantage of a panoramic band of windows (the onetime dining area has the temple’s only fenestration).

The dialogue between Masonic and contemporary permeates the building. And artists are invited to integrate select temple artifacts into new works here. (For MAF’s inaugural show, which opened on May 25th, artist Jim Shaw incorporated a vision-of-hell theatrical backdrop into one piece, and leftover wigs into another.)

It’s oddly fitting that Guess, a company whose name plays on the role of symbols (albeit fashion ones), is associated with this repository of obscure motifs. Certainly WHY embraced that pairing, meshing old and new with such nimbleness that the facade’s boldface “G” could pass for a reference to Guess’s single-letter sub-brand, instead of yet another Masonic cipher. ■

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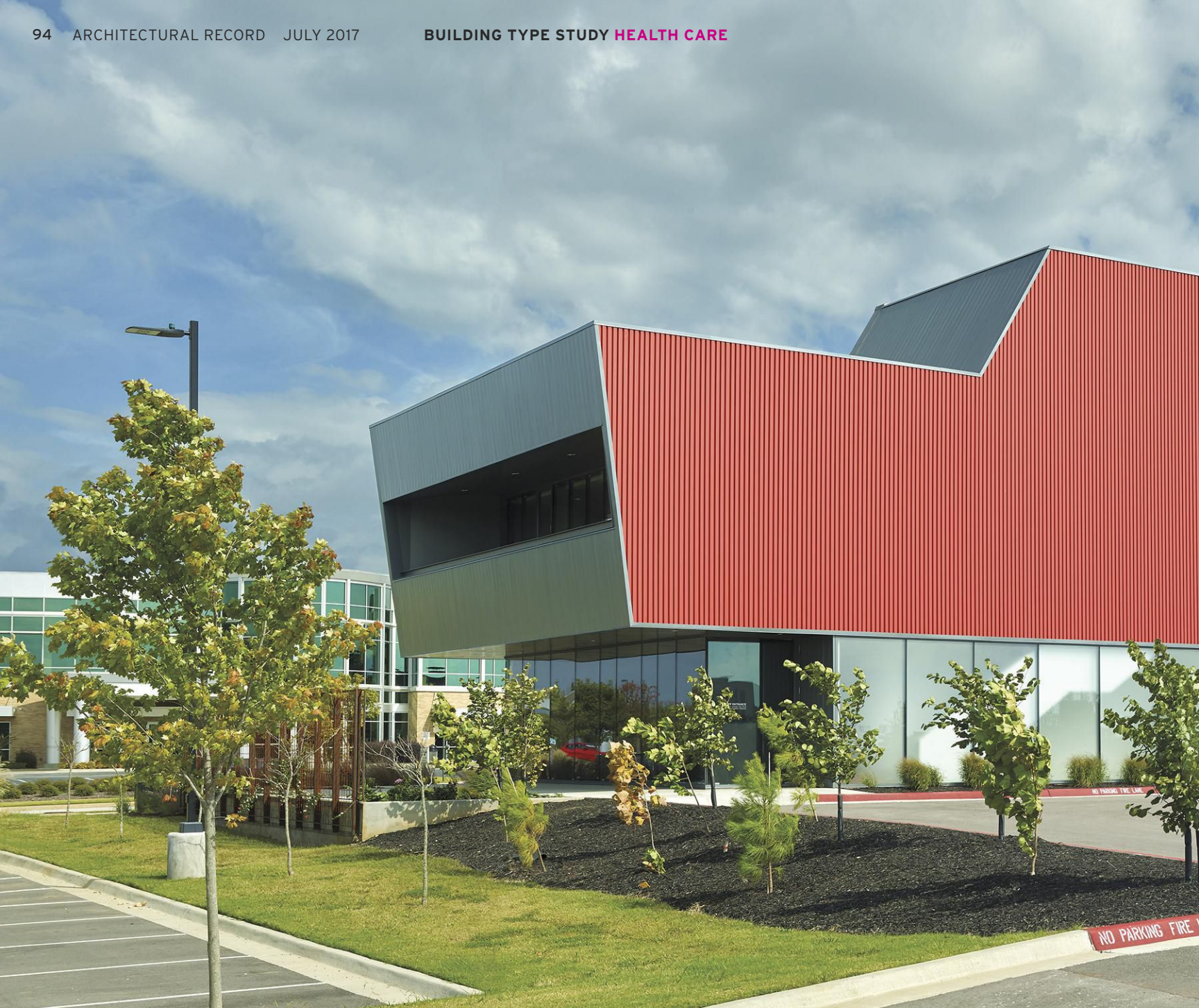


Building with conscience.



HEALTH CARE

It used to be that medical facilities were often unhappy, institutional places. As explored by Michel Foucault and others, hospitals of yore were more akin to prisons than to places of healing. A lot has changed. Today's health-care design skews more hospitality than hospital—filling treatment centers and patient rooms with natural light, lush greenery, and works of art—to lend patients a feeling of freedom and dignity. From a 377,000-square-foot cancer center in the Midwest to an intimately scaled palliative clinic in Denmark, the range of projects on the following pages demonstrates how one's surroundings can be as vital to well-being as medical treatments.



Harvey Pediatric Clinic | Rogers, Arkansas | Marlon Blackwell Architects

Beacon of Health

A suburban structure housing several doctors' offices acts as a billboard for progressive care.

BY JOSEPHINE MINUTILLO

PHOTOGRAPHY BY TIMOTHY HURSLEY



STAND OUT The abstracted shape of the southern facade is rendered in a vivid red, giving the building a strong presence among its suburban neighbors. The box-ribbed aluminum-zinc alloy upper bar that houses the Harvey Clinic sits over a fully glazed lower level leased to other doctors.

From striking houses to a sprawling high school, Marlon Blackwell's spare, inventively simple buildings are sprinkled throughout Northwest Arkansas. In Fayetteville, his design for an addition to the Fay Jones School of Architecture at the University of Arkansas, where he is a professor, comprises a rectangular volume that mirrors the original Beaux Arts structure in plan, but introduces a contemporary look in elevation (RECORD, November 2013, page 128). A few miles away in Springdale, Blackwell converted a common metal shed into a surprising Eastern Orthodox church (RECORD, November 2011, page 68). Now, farther north, in Rogers, Blackwell's firm, Marlon Blackwell Architects (MBA), again demonstrates how to do more with less in its most recent project.

The Harvey Pediatric Clinic combines the bold geometry and distinctive material palette for which MBA has become known, into a statement-making medical facility that stands out among its suburban

neighbors. The long, south-facing, box-ribbed aluminum-zinc alloy exterior wall is painted vivid red—a sharp contrast to the neutral gray of the rest of the building—so that it looks like a billboard along the road. “Everything is beige in the suburbs,” says Blackwell. “We wanted to use color, to add a sense of wonder. The clinic’s staff voted on this mix of cayenne and burnt orange.”

“The exterior is unusual and definitive, but not flamboyant,” says Dr. Bryan Harvey, who hired Blackwell to design the 15,500-square-foot building after attending a tour of modern houses in Fayetteville, which included the L-shaped, cantilevering home that Blackwell designed with his wife and MBA co-principal, Meryati Johari-Blackwell, for their family. Adds Harvey, “We wanted a building that was a stimulus for the kids but also a great work environment for the staff.”

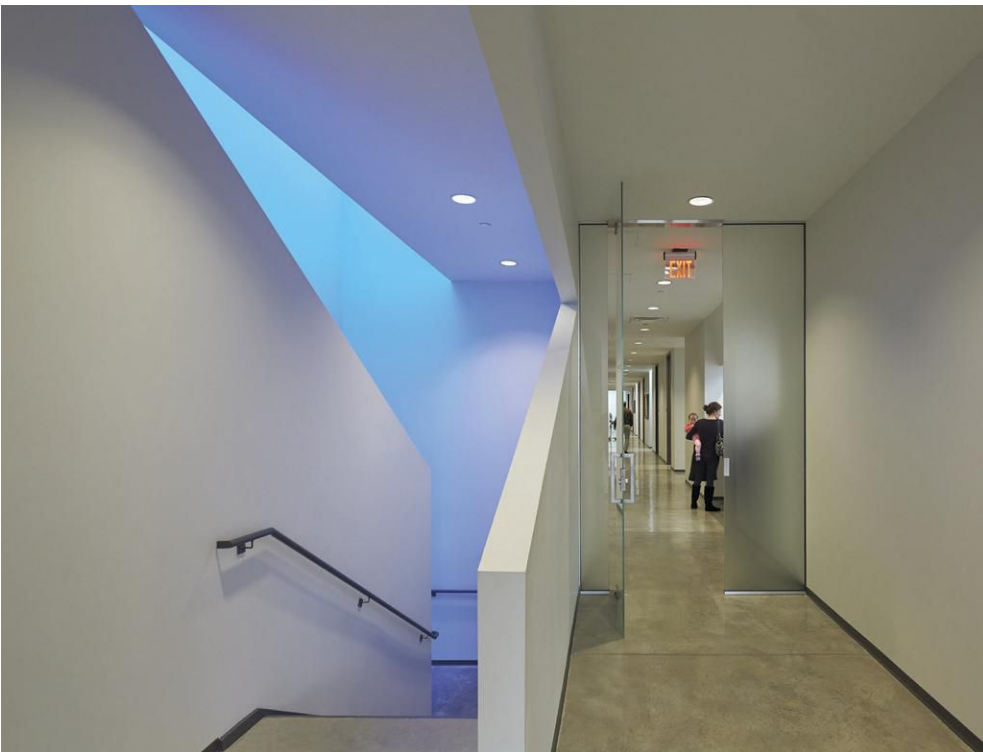
Harvey's practice, which he runs with several other doctors, is located on the upper level; his nearly 40 employees administer daily to over 150 patients ranging from toddlers to young adults. The design

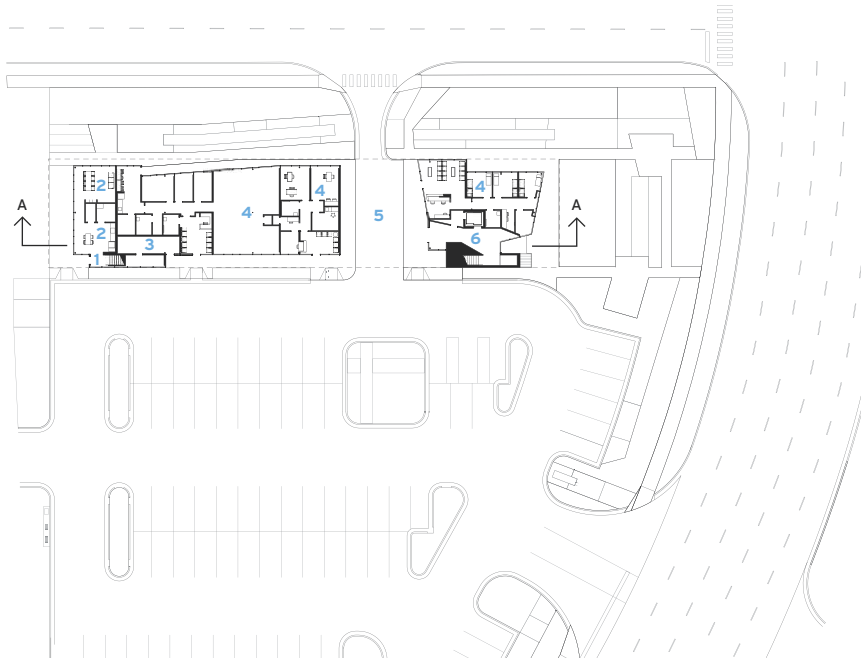


incorporates abundant daylight, outdoor access, and greenery through the use of large windows, skylights, and a second-story porch, with extensive landscaping and a rear patio garden at grade. The fully glazed lower level is rented out to pediatric specialists to whom the Harvey Clinic sends referrals.

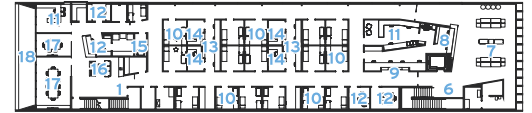
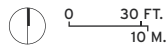
Patients enter the steel-frame horizontal structure through a breezeway, accessed via a car dropoff on the north side, or from the parking lot, which MBA kept to the south. The colorful bar is accented by zippy diagonal protrusions that house stairs—like a shoe at the bottom on one end and a hat on top at the other—resulting in an abstract shape. Harvey Clinic patients ascend the first set of stairs to enter the lobby and waiting room; the clinic’s staff use the second set to reach a serene flex space overlooking, but away from, the activity of the office.

“This building doesn’t lean on typical tropes,” Blackwell says. “Its design was discursive rather than prescribed—based on exchange and collaboration with the client, whose approach to medicine is similarly





FIRST-FLOOR PLAN



SECOND-FLOOR PLAN

- | | |
|----------------|--------------------|
| 1 STAFF ENTRY | 10 EXAM ROOM |
| 2 BREAK ROOM | 11 BILLING |
| 3 MECHANICAL | 12 OFFICE |
| 4 TENANT | 13 NURSES' STATION |
| 5 BREEZEWAY | 14 DOCTOR'S OFFICE |
| 6 CLINIC LOBBY | 15 LAB |
| 7 WAITING ROOM | 16 FLEX SPACE |
| 8 CHECK IN | 17 MEETING ROOM |
| 9 CHECK OUT | 18 PORCH |



SECTION A - A



COLOR AND LIGHT
 The gray side of the building includes the long north facade, with its band of windows, and the short west facade, which contains a porch on the upper level (opposite, top). A patient inside an exam room (opposite, middle). The skylight in the patient staircase is covered in a blue film, adding a touch of color to the otherwise white interiors (opposite, bottom left). Nurses' stations at the center of the floor plate are also topped by skylights (opposite, bottom right). An expansive waiting room features floor-to-ceiling glazing (left).



TAIL END A brise-soleil along the east facade, with 2-foot-4-inch-deep vertical fins, shields the upper level's large waiting room from the late-morning sun.

unorthodox.” Over the years, the focus of Harvey’s practice has shifted from treating typical childhood ailments to fostering child development and sound mental health. “The question is, ‘How are you helping children grow rather than just survive?’” he asks.

The upper level’s floor plan optimizes flow within the busy practice, essentially creating a loop around which patients can circle, beginning with check in, and followed by exam, consultation, and check out. Full-height doors within the nearly 10-foot-tall space punctuate the rhythm of that procession around the 6-foot-wide corridors. Past that loop, at the west end of the building, is the administrative hub, with offices and conference rooms for staff meetings or visits from insurance or pharmaceutical reps. Throughout, white walls set off buffed and sealed concrete floors.

At just under \$200 per square foot, the project is economical, yet the architects did not ignore the details—“making craft from off-the-rack systems,” is how Blackwell describes his approach. The 8-inch-wide flat-seam metal panels that line the breezeway, for instance, are completely coursed with other areas of the facade, all trimmed with a 2½-inch-wide rubber base and a 2 ¾-inch-wide custom break metal for a sharp finish. For MBA, rigor and creativity don’t necessarily come at a cost. ■

credits

ARCHITECT: Marlon Blackwell Architects – Marlon Blackwell, principal in charge and design architect; Meryati Johari Blackwell, principal; Justin Hershberger, project architect; Scott McDonald, Stephen Kesel, Spencer Curtis, Stephen Reyenga, design team

CONSULTANT: Stuart Fulbright (landscape)

ENGINEERS: HP Engineering (m/e/p); Tatum Smith Engineers (structural); Bates & Associates (civil)

GENERAL CONTRACTOR: SSI

CLIENT: Dr. Bryan Harvey

OWNER: Pediatric Workplaces

SIZE: 15,500 square feet

COST: \$2.9 million

COMPLETION DATE: May 2016

SOURCES

ROOFING: Firestone Building Products

METAL CLADDING: Morin

ELEVATOR: Otis

PLUMBING: Elkay, American Standard, Symmons

CARPET: J+J Invision

RESILIENT FLOORING: Johnsonite

PLASTIC LAMINATE: Pionite

PAINTS AND STAINS: Sherwin-Williams

ACOUSTICAL CEILING: CertainTeed

CABINETWORK AND CUSTOM WOODWORK: Kitchen Distributors

HARDWARE: Hager, LCN, Kawneer, Best Access Systems

GLAZING: Kawneer, Ace Glass

WOOD DOORS: Marshfield Door Systems

LIGHTING: Juno, Forum, Coronet, Leviton



Urban Hospice | Copenhagen |
Nord Architects Copenhagen

Elegant Finish

A small, low-scale hospice fits into a larger campus with discretion and polish.

BY HUGH PEARMAN

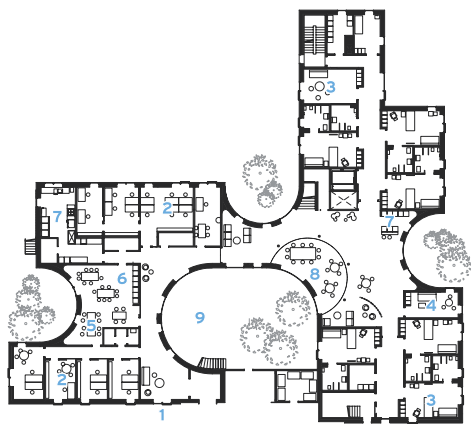
PHOTOGRAPHY BY ADAM MØRK

As a building type, the hospice has programmatic peculiarities that require a special understanding on the part of its architects. The terminally ill patients in this palliative-care facility in Copenhagen survive on an average of just 19 days after admission, with many dying in the first week. While it is heavily staffed for expert round-the-clock care, the environment needs to be as domestic as it is clinical—a dignified, calm, even cheerful place for patients and their families.

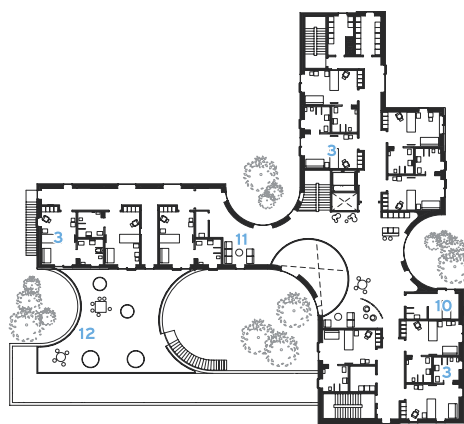
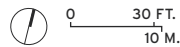
It is normal in Denmark for hospices to be in the rural hinterlands, rather than the city. But as Morten Gregersen, partner of NORD Architects Copenhagen, says: “The idea is to be close to the relatives.”



A TRANQUIL LOOK A bronze-zinc alloy that has weathered to a greenish gold clads the Urban Hospice in Copenhagen (top), which is part of a redevelopment for social and health-care facilities. Courtyards are carved out of the block (above).



GROUND-FLOOR PLAN



SECOND-FLOOR PLAN

- 1 ENTRANCE
- 2 OFFICES
- 3 PATIENT ROOMS
- 4 VISITORS' MEETING SPACE
- 5 MEETING ROOM
- 6 STAFF AREA
- 7 KITCHEN
- 8 LIVING ROOM
- 9 COURTYARD
- 10 SPA
- 11 LOUNGE
- 12 ROOF TERRACE



FITTING IN The hospice is nestled among historic buildings belonging to the Deaconess Foundation's campus (above). Kebony—a sustainable softwood treated with chemicals to give it properties of hardwood—is used for window frames and shutters on the exterior (right).

To achieve that, the client, the *Diakonissestiftelsen* (Deaconess Foundation), part of a Lutheran pastoral-care movement dating back to the 1860s, included the facility in a redevelopment master plan for a 10-acre teaching-hospital complex in the affluent, low-rise district of Frederiksberg. There it replaces an earlier, smaller hospice.

NORD, a fairly young practice known for its community engagement, won the commission following an interview selection process. With the financial help of the A.P. Møller Foundation, it was able to design a new structure that has high-quality medical and related equipment as well as generous spaces, with premium finishes and fittings.

From the street, the 24,000-square-foot, \$7 million Urban Hospice gives little away about its use. With its brass-zinc alloy cladding weathering to a greenish gold, set off by wood details, it could be a small office or even apartment building. NORD's architecture is often more exuberant than this, but as Gregersen explains, the client did not want





CLOSE COMMUNITY
Each room has a convertible sofa for family stay-overs (left). The public living areas open on to a central courtyard (below). The architects provide smaller, more secluded areas where patients can come out from their rooms. Privacy is emphasized in the design of visiting areas as well (opposite) with enclosed two-person seating.

a landmark building that might attract sightseers. In this area of residential villas, it sits low—one and two stories plus a basement for services and storage, while behind it rise the neo-Gothic redbrick facades of the original teaching hospital. The site is tight, but **NORD** still wanted to provide secluded, landscaped open spaces where patients could come out into the light and fresh air—in their beds, if necessary—with space for family and staff. The firm accomplished this by introducing a series of curving courtyards into the otherwise rectilinear plan and by placing a roof terrace on the single-story section at the front.

Once inside the building, it becomes clear that the layout encourages a self-contained community. On the ground level, staff quarters occupy the western side of the floor, with patient rooms on the east, and the largest courtyard between the two. The second floor is devoted completely to patients, including the roof terrace. Designed to accommodate a total of 16 residents, each room has a sofa that can convert to a bed for visiting family: there are also two separate guest rooms in the facility. Specific technical requirements can be met easily: electric hoists are integrated into the rooms to help staff move around those who are immobile; soundproofing solves acoustical needs, and even the thick doors have rubber seals. Windows throughout the building are triple-glazed for acoustical and thermal insulation, including the large curved ones around the courtyards (“an expensive detail,” says Gregersen). Surfaces are tough and washable. And though the rooms have operable windows for use when appropriate, each is air-conditioned in such a way that they can be easily refrigerated following a death by lowering the thermostat. There is no separate morgue: the bodies remain in place for 24 hours, so that families and friends can visit to pay their final respects.

Often, in hospices, there is a separate, out-of-sight service entrance for undertakers. Here you can encounter (as I did) a family group of all ages accompanying a casket as it is wheeled through the public areas of the building and out the front door to the hearse. This way of doing things is part of the brief: “Death and life share the same entrance,” says the hospice’s





director, the straightforward and cheerful Helle Tingrupp. “It shouldn’t be hidden away.”

Tingrupp explains the building’s rationale: a place for healthy families as well as very sick people, and a place of often heavy physical work for the rotating staff of 50. There is a need for seclusion and grief, but also celebration—in fact, the building’s popularity is such that Tingrupp has to cope with more requests to visit from large family groups than she had anticipated. “The building is fantastic,” she concludes. And I have to agree: it is an uplifting place with a remarkably noninstitutional ambience. This is architecture that improves our experience of the inevitable. ■

Hugh Pearman, based in London, is the editor of RIBA Journal and the former architecture and design critic for The Sunday Times.

credits

ARCHITECT: NORD Architects
Copenhagen – Morten Gregersen,
Johannes M. Pedersen, partners; Mia
Baarup Tofte, Steffan Iwersen, Astrid Leth
Gregersen, team

ENGINEERS: Rambøll Copenhagen
(structural, m/e/p)

GENERAL CONTRACTOR: Georg Berg

CLIENT: Diakonissestiftelsen (Deaconess
Foundation)

SIZE: 24,000 square feet

COST: \$7 million

COMPLETION DATE: May 2016

SOURCES

METAL PANELS: Alumeco

**OAK-AND-KEBONY WOOD-AND-
GLASS WINDOWS:** Krone

MOISTURE BARRIER PANELS:
Fermacell

ACOUSTICAL CEILING: Ecophone

Swedish Edmonds Ambulatory Care Center | Edmonds, Washington | NBBJ

Northwest Passage

A new emergency department boldly signals the high quality of a community hospital's services.

BY MIRIAM SITZ

PHOTOGRAPHY BY BENJAMIN BENSCHNEIDER





less than three miles from the shore of Puget Sound, in the Seattle suburb of Edmonds, an angular silver building peeking out between the evergreens announces the campus of Swedish Edmonds medical center. Designed by NBBJ, the 77,000-square-foot building updates and expands the services offered at the community hospital while adding a much needed “front door” to the sprawling complex.

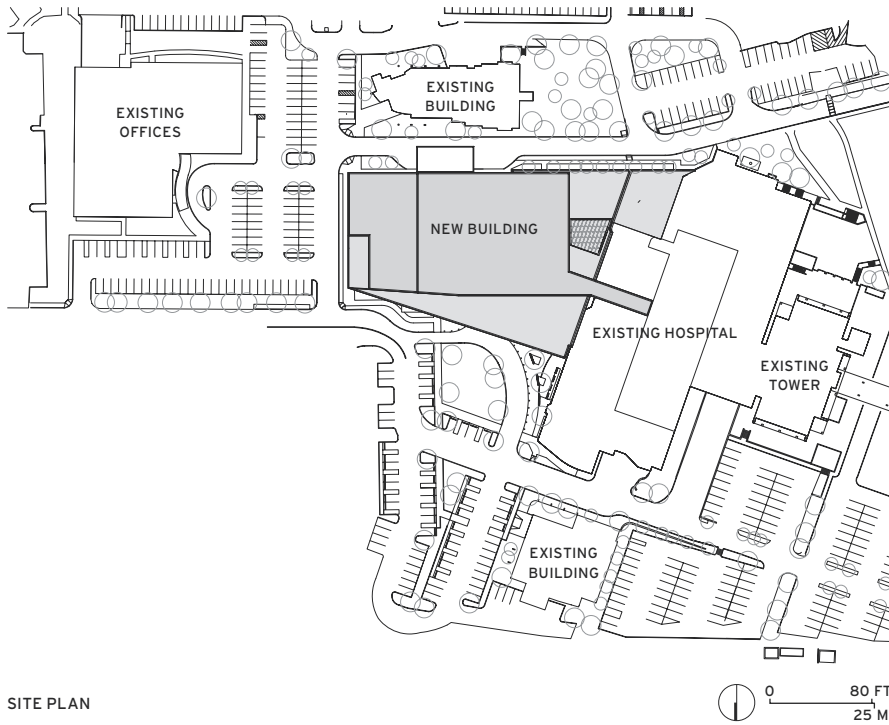
When Swedish Edmonds’s chief operating officer Sarah Zabel came to work for the hospital (which was then known as Stevens Hospital) in 2001, the first thing she heard from the medical staff was that they needed a new emergency department. It was housed in a 1970s building intended to serve 20,000 patients annually but was seeing more than twice that number.

“I remember the hospital as a bunch of outdated Brutalist buildings,” says project designer Brian Uyesugi, who lives just a few miles from the project. “The perception was that the care wasn’t good, even though the performance statistics were high,” explains NBBJ principal and project planner Janet Dugan (also an Edmonds local). The hospital became part of the Seattle-area Swedish health-care system, which, soon after, committed to building a new emergency department. In addition to providing this urgently required facility, the project would also create a portal to the campus that, with more than a dozen buildings constructed over the course of five decades, was a hodgepodge of architectural styles. “We envisioned it as a connector,” says Dugan of the new building (completed in July 2016), which was designed to be more welcoming and inspire confidence in the quality of care.

Effective emergency departments must be easy to navigate. So the architects focused on streamlining circulation throughout the new steel-frame building, to increase the speed with which patients are assessed and treated. They also aimed to create distinct arrival points: some for patients with emergencies and others for visitors and those receiving outpatient treatment. Their solution was to place the entrances strategically and provide explicit and implied wayfinding measures. A painted-steel-clad overhang and double-height, glazed facade function as a “front porch,” and boldly



TRIAGE BY DESIGN The architects called attention to the main doors by placing them beneath the highest point of the canted roof, which slopes down toward the fiber cement panel-clad emergency entry volume (left). In the lobby (above), metal ceiling panels that imitate wood extend outside, beyond the glazed facade, maintaining continuity of materials while adhering to fire codes.



SITE PLAN

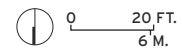
- | | |
|--------------------|---------------------------|
| 1 MAIN ENTRY | 7 WAITING AREA |
| 2 EMERGENCY ENTRY | 8 EXAM ROOM |
| 3 AMBULANCE ENTRY | 9 TRAUMA ROOM |
| 4 INFORMATION DESK | 10 BEHAVIORAL HEALTH ROOM |
| 5 COFFEE SHOP | 11 CARE-TEAM STATION |
| 6 GIFT SHOP | 12 IMAGING ROOM |



OF THE LAND The texture of the steel-panel cladding recalls glacial striations in the local landscape (above). Art and sculptural elements adorn the lobby (opposite, top), including decorative painted paddles, from the Tulalip Tribe, reclaimed boom logs, and reclaimed wood panels engraved with photos of historic Edmonds. Exam rooms surround the care-team stations (opposite, bottom).



FIRST-FLOOR PLAN





announce the main entrance. Standing outside next to a large water feature by the doors, one can see past the reception desk deep into a skylit lobby with 30-foot ceilings and an art-filled, living room-like waiting area, complete with a fireplace.

The front porch, which is tallest over the main entrance, pitches down toward the emergency-department doors, decreasing the scale of the building to prevent people without true emergencies from accidentally wandering in. This clearly marked entrance is smaller and situated closest to the imaging facilities for diagnosing time-sensitive conditions like strokes and heart attacks. According to Zabel, this design decision has directly contributed to significant improvements in Swedish Edmonds's care statistics.

The new building houses 35 treatment rooms designed for different levels of emergency, from "vertical" rooms with specialized armchairs for people with minor emergencies to trauma rooms where doctors can perform surgery. The glass-walled treatment rooms encircle central clusters of staff workstations, which are low enough to give seated nurses direct lines of sight to patients. The new wing also includes a separate area with behavioral health rooms for individuals in crisis who might pose a danger to themselves or others. In the old emergency department, behavioral health (BH) rooms weren't separated. "It was





traumatic for general emergency patients to see and hear individuals in distress,” says Zabel.

Throughout the largely one-story facility, details of the design demonstrate a respect for patients’ well-being and the surrounding context. Shielded cove lighting keeps fixtures from shining directly into the eyes of those on gurneys, while the material palette refers to specific aspects of Edmonds’s history. For example, the architects relied heavily on wood in a nod to the former shingle-mill town’s industrial past. Nine boom logs in the lobby (long, straight trunks that were once fastened together, corralling felled trees as they floated downriver) form a sculptural, 18-foot-tall work of art. Perforated metal ceiling panels, which extend beyond the glazed facade to the soffit of the exterior canopy, match the color and look of wood veneer panels. In the gardens, the architects incorporated landscaping features such as shingles, made from trees that were cleared from the site during construction.

Other material choices, such as the grooved fiber cement panels, hark back to a more distant past, when advancing and retreating glaciers carved the earth, leaving behind the hilly, rocky landscape that characterizes the area. “We tried to find materials and products that would help describe that movement and sedimentation,” says Uyesugi. But even if the connection to the site’s geologic past isn’t obvious to the casual observer, NBBJ’s design for Swedish Edmonds respects its context and elevates the hospital’s physical presence to the same level as the quality of its care. ■

DOWN TO EARTH Trees cleared from the site were repurposed as landscape features, suggesting canoes or shingles, which recall the city’s mill-town past.

credits

ARCHITECT: NBBJ

ENGINEERS: KPFF (civil, structural); Stantec (electrical, telecom); Mazzetti (mechanical, plumbing)

CONSULTANTS: Site Workshop (landscape); Stantec (acoustic); Mazzetti (energy modeling)

GENERAL CONTRACTOR: Sellen Construction

CLIENT: Swedish Medical Center, Providence Health & Services

SIZE: 77,000 square feet

COST: withheld

COMPLETION DATE: July 2016

SOURCES

GLAZING: Vitro Architectural Glass

ROOFING: Sika Sarnafil

DOORS: Kawneer North America

CEILING: USG

PAINT: Benjamin Moore

WALLCOVERINGS: Carnegie Fabrics

SOLID SURFACING: Corian

RESILIENT FLOORING: Johnsonite, Armstrong

CARPET: Shaw Contract

FURNITURE: Allsteel, Knoll, Steelcase

UPHOLSTERY: Allsteel, Bernhardt, Maharam

LIGHTING: Cooper, Bega



TAKING FLIGHT
Foster's interest in aviation influenced the building's form and plan.

Maggie's Centre | Manchester, United Kingdom | Foster + Partners

Green House Effect

A drop-in cancer center within a verdant setting provides a comforting environment.

BY CHRIS FOGES

PHOTOGRAPHY BY NIGEL YOUNG

According to Angela Daniel, a support specialist at the new drop-in center for cancer patients at Manchester's Christie hospital, "When people come into this building for the first time, they gasp. Then their shoulders drop and they visibly relax. Quite often, they start crying and ask, 'Is this really all for me?'"

Designed by Foster + Partners for Maggie's, a charity that provides practical and emotional support in purpose-built settings, the center at the Robert Parfett Building is the antithesis of the sterile, strip-lit wards in which many patients receive medical treatment. It yokes the consistent concerns of Foster's work—for light, landscape, and the beauty of technology—to a unique program developed by the charity's late founder, Maggie Keswick Jencks, a cancer patient and wife of architecture critic Charles Jencks. Maggie's buildings should be domestic

in scale and character, with every detail considered in terms of its emotional impact, affirming the joy of life without ignoring patients' fears.

Foster + Partners' design process began with visits to all 18 existing centers to discover what works best, says project architect Darron Haylock. (These include buildings by architects such as Zaha Hadid, OMA, and Frank Gehry.) The firm's initial concept sketches, produced before a site was determined, are vague about the building's formal or material properties but emphasize social interactions and strong visual connections between the building and a garden.

The importance of surrounding greenery led the architects to consider numerous locations before selecting one at the end of a tree-lined street, some distance from the main hospital, where the 5,000-square-foot center sits within a verdant oasis three times its size. Positioning the building at the northern end of the plot left the largest open space



HOME & GARDEN Shelves in the “cockpit” greenhouse were arranged to give visitors the sense of being wholly surrounded by plants (opposite). The heated greenhouse and encircling gardens (left) have specific therapeutic purposes, allowing visitors to work with their hands and producing fresh ingredients for the kitchen.

on the sunny southern side, where landscape designer Dan Pearson created a lush cottage garden, mingling shaggy shrubs and ferns, bright clusters of flowers, salad plants in raised beds and espaliered fruit trees. Densely planted strips of garden extend down the building’s long east and west sides, where its low-slung roof forms a canopy over open-sided courts set into the white clapboard facades.

The entrance is on the west side, where visitors are greeted by two sitting rooms with open fireplaces and the kitchen, which is the physical and metaphorical heart of all Maggie’s Centres. Smaller consultation and activity rooms surround the courts on the east side. Separating the open-plan public areas from the cellular private spaces is a north–south spine, which houses bathrooms and study rooms. On top is a mezzanine office, from which staff members overlook all areas.

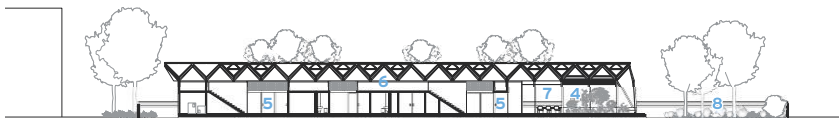
This spine is flanked by two rows of treelike wood columns that carry the roof. Each sprouts a long beam, which angles downward to the eaves, and two shorter arms angled upward to form a ridge over the mezzanine, framing operable triangular skylights.

To the south, the avenue of structural “trees” extends beyond the envelope, and the building dissolves into the landscape by degrees. A conservatory leads onto a veranda sheltered by an oversailing roof, which merges into a pergola that will be cloaked by climbing plants. At its tip, the roof extends over a wood-framed greenhouse stocked with exotic flora.

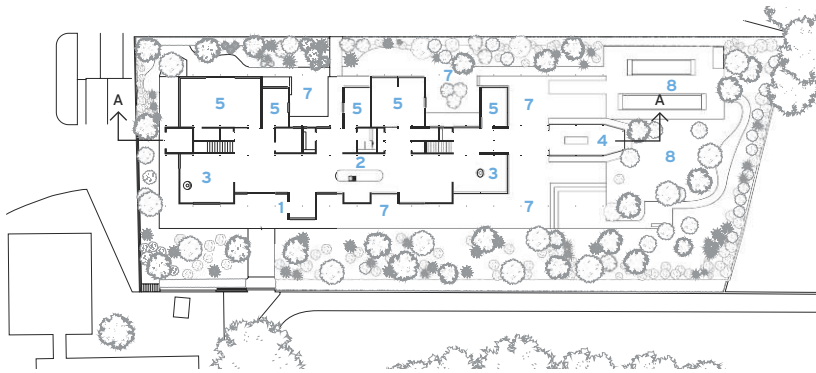
This faceted greenhouse is known as the “cockpit,” as if to confirm the aviation influence suggested by the form of the building’s plan (Foster is himself a pilot) and by its distinctive wood trusses and columns, with their filigree lattice of curved chords partly inspired by geodesic airframes of the 1930s. There is “beauty and joy in technology at its pinnacle,” says Foster, and the lattice beams advance the art of timber construction. Each was milled as a single piece from laminated veneer lumber. Columns and beams are joined by gravity connections. “It had to be more refined than a typical public building,” says Haylock: “an essay in timber, without visible metal plates.”

The structure has both the cozy familiarity of a garden trellis and the rational elegance of Gothic tracery. Its quiet sophistication is matched by the close attention to detail that touches every experience of the building, starting at the entrance, where the challenge was to draw in nervous visitors. Large windows and operable ventilation panels give views in, and the sheltered front door is left ajar. Inside, instead of a formal reception area, arrivals pass the open kitchen, where staff greet them.

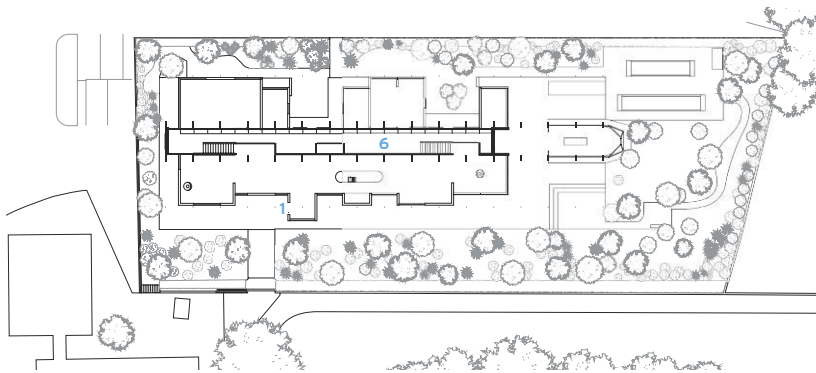
Interior design reflects the principle that the building should be “homey but not like home,” says Haylock. “It’s comfortable and familiar but also de-



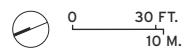
SECTION A - A



GROUND-FLOOR PLAN



MEZZANINE-FLOOR PLAN



- | | |
|------------------------|------------------------------|
| 1 ENTRANCE | 5 CONSULTATION/ACTIVITY ROOM |
| 2 KITCHEN | 6 MEZZANINE |
| 3 SITTING ROOM | 7 COURT |
| 4 “COCKPIT” GREENHOUSE | 8 GARDEN |



**OPEN PLAN**

Long views draw visitors from the central kitchen (above) toward relaxation spaces with open fires and outdoor terraces (opposite) that are sheltered from Manchester's frequent rain. Clear sight lines from the mezzanine office (left) allow "passive surveillance" of all spaces by the staff.



mands respect—like having coffee in your best friend’s mother’s kitchen.” Corridors were eliminated from the design, along with the paraphernalia of medical environments such as signage. Clay-tile floors and sheepskin rugs add warmth and texture. Acoustic soffits dampen reverberations, so quiet conversations remain private.

Much of the furniture was designed by Foster + Partners and has a midcentury Scandinavian style that chimes with the architecture. Seat heights are tuned to the length of time visitors might spend in a particular space. In the “cockpit,” a heavy dining table is set on steel tracks so one person can push it outside in fine weather—one of many small anticipatory gestures that communicate care for the user.

Up to 150 patients visit each day, to take a class, research treatment, or pass the time in sympathetic company. Such informal interactions “might look like we’re just having a chat,” says Daniel, but they disclose important information about a patient’s mobility or mood. She cites a young man who sat at the kitchen counter and asked, “Now that I’m dying, what must I think about?” His question might not have been voiced in a medical setting but could be raised in this calm, intimate environment. “That’s what this building does,” says Daniel. “It helps us do our job.” ■

credits

ARCHITECT: Foster + Partners – Norman Foster, principal; Darron Haylock, project architect; David Nelson, Spencer de Grey, Stefan Behling, Diego Alejandro Teixeira Seisedos, Xavier De Kestelier, Mike Holland, Richard Maddock, Daniel Piker, Elisa Honkanen, design team

ENGINEERS: Foster + Partners (structural, environmental, fire)

CONSULTANTS: Dan Pearson Studio (landscape); Cundall (lighting); IBI Taylor Young (planning); Gardiner & Theobald (quantity surveyor); Fleur de Lys (greenhouse)

GENERAL CONTRACTOR: Sir Robert McAlpine (main); Blumer Lehmann (timber design and build)

CLIENT: The Maggie Keswick Jencks Cancer Caring Centres Trust
SIZE: 5,000 square feet (building); 21,000 square feet (total area)
COST: withheld
COMPLETION DATE: 2016

SOURCES

GLAZING SYSTEMS: Kawneer
DOORS: Reynaers (sliding)
FIREPLACE: Traforart
FURNISHINGS: Benchmark, Vitra, Molteni
TEXTILES: Kvadrat, Maharam
PLUMBING: Vola, Duravit, DuPont Corian
LIGHTING: Lightyears, Lumina, Artek, Martini Light, KKDC

Taussig Cancer Center | Cleveland | William Rawn Associates and Stantec Architecture

Building Confidence

A collaboration among architects and client results in a medical facility designed to empower patients.

BY MARK LAMSTER

PHOTOGRAPHY BY ROBERT BENSON





FORWARD THINKING The front elevation of the Cleveland Clinic's Taussig Cancer Center is cantilevered 32 feet, allowing for a covered airport-like dropoff to ease congestion. A lightwell, located on the grassy island within the driveway, brings daylight to the lower level.

The Cleveland Clinic took a chance when it commissioned Boston-based William Rawn Associates (WRA) to be lead architect for its \$276 million Taussig Cancer Center. The firm had no prior experience designing medical facilities. However, says principal William Rawn, “at some basic level they hired us because we were curious. They didn’t want some firm’s version of a past hospital.”

It is an account affirmed by Dr. Toby Cosgrove, a thoracic surgeon who has been the clinic’s chief executive for the past 13 years. “He had a willingness to listen to the clinicians here and put that knowledge into the design,” Cosgrove says of Rawn. “We talked to some architects who didn’t want to listen.”

It was Cosgrove’s interest in architecture that prompted him to include WRA in the search. As a trustee of Williams College, he had been impressed by a Rawn project on that campus, the light-infused Class of ’62 Center for Theater and Dance, completed in 2006. “We think that the atmosphere in which people work and get treated is important for their confidence and their outcomes.” The effort to promote well-being through architecture also prompted Cosgrove to appoint Christopher Connell, a partner in the London-based Foster + Partners—the firm responsible for the clinic campus master plan—as chief design officer, in May.

Working with Stantec Architecture, brought into the project for its health-care expertise, WRA created a 377,000-square-foot, steel-frame building with a reassuringly calm atmosphere—a quality signaled by a glass curtain wall animated by a precise grid across the front and rear facades. The unitized system of glass panels is 17 percent reflective and has a shifting, quicksilver sheen that, while transparent, doesn’t readily display the people and activity within. “It’s a very subtle facade,” says Sam Lasky, a firm principal. “There aren’t a lot of giveaways. It is what it needs to be, and not more than that.”

A directive for a minimal aesthetic came directly from Cosgrove. “People aren’t coming to the hospital to be in their living rooms. They’re coming for science,” he says. Rawn shares this philosophy. “Minimalism represents an idea of heightened competence. It indicates that this place is serious and you’ve come because you’ve got a serious problem that you want solved,” he says.

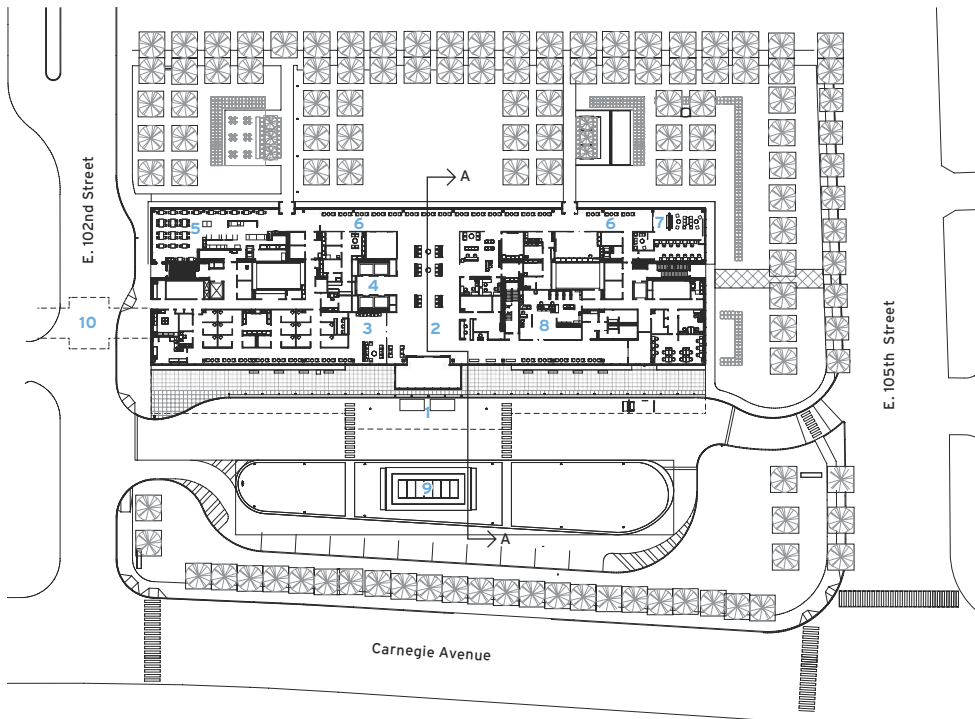
To ease the sense of chaos and congestion that so often characterizes hospital entries, the front elevation is cantilevered forward 32 feet, creating a 360-foot-wide overhang at ground level that serves as a broad, airport-style drop-off. The cantilever is suspended from a dozen trusses concealed at the top of the structure within the mechanical floor, a solution arrived at in collaboration with the consulting engineer, Boston-based LeMessurier.

The lobby is a limpid, open space, with white terrazzo floors and 17-foot-high ceilings, that opens to a garden at the back. The idea of a soaring atrium, another hospital convention, was rejected. “We wanted it to be tall enough so that it’s filled with light, but not overwhelming,” says Dr. Brian Bolwell, chairman of the Taussig Cancer Institute and a central figure in its design development.

The building program was largely determined by the



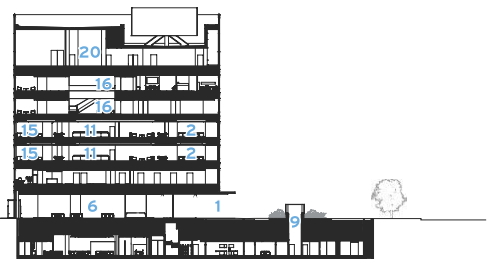
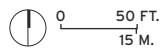
BASEMENT PLAN



GROUND-LEVEL PLAN



LEVEL-FOUR PLAN



SECTION A - A



- | | |
|--------------------|----------------------------|
| 1 COVERED DROP-OFF | 12 EXAM ROOM |
| 2 LOBBY | 13 TEAM ROOM |
| 3 LABORATORY | 14 CARE STATION |
| 4 ELEVATORS | 15 INFUSION ROOMS |
| 5 CAFÉ | 16 OFFICES |
| 6 PATIENT SUPPORT | 17 RADIATION/
ONCOLOGY |
| 7 MEDITATION SUITE | 18 IMAGING |
| 8 PHARMACY | 19 TUNNEL |
| 9 SKYLIGHT | 20 MECHANICAL
PENTHOUSE |
| 10 BRIDGE | |
| 11 CHECK-IN DESK | |



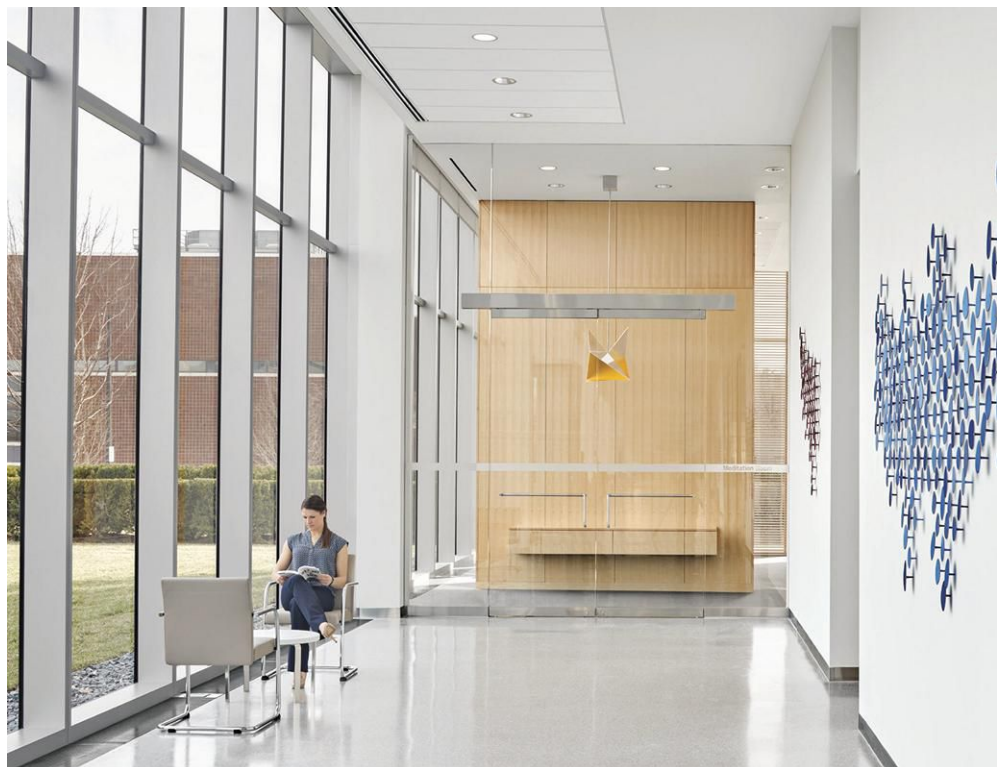
WELCOME CENTER The expansive lobby (above) greets visitors and offers access to a garden, as well as to patient-support services, a cafeteria, and the center's meditation room (right, beyond the glass doors).

clinic's "patient first" mantra. "Everyone who hears they have cancer is very scared, and we wanted to see how we could manage that [fear] architecturally," says Bolwell.

Because it is required of all patients, blood-drawing stations were placed adjacent to the ground-floor entrance. "It was imperative to avoid lines," says Rawn. "Time is the most important thing to a cancer patient."

Other common spaces on the first floor include a cafeteria, an art therapy room, a wig shop, a pharmacy, and a room for meditation.

Disposition of spaces on the three clinical floors was driven by the Taussig Cancer Center's atypical system of group practice, in which medical professionals work in teams organized by disease rather than by specialty. Each team works out of a shared office, a collaborative hub with access to adjacent examination rooms. In keeping with the patient-driven philosophy, the facility's prime, daylight-filled spaces were devoted to





USER FRIENDLY Clinical corridors (above) are carpeted to reduce noise, while wood details and access to views convey a sense of calm. Daylit infusion rooms also have partially glazed walls (top, right). A lightwell illuminates the hallway in the basement (opposite), where treatment rooms have LED lighting that patients can control (right).

those in treatment. “We tried to give the perimeter on all floors to the patient, so you’re not going through some interior world of corridors,” says Rawn.

Indeed, every infusion patient is given a private room. There are 98 of them overlooking the landscape behind the building. All of the clinical floors are carpeted, an added maintenance expense but one that helps keep medical areas quiet and establishes a calming tone.

Most impressive might be the basement level, which extends out below the drop-off area but hardly appears to be underground, due to a large light well in front of the building. Here patients receive radiation treatments in one of six linear accelerators, isolated behind massive lead-lined doors in rooms with 7-foot-thick concrete walls. Even these unforgiving areas are tailored for comfort, with recessed full-spectrum LED lighting so patients can choose color and brightness as they see fit.

“I’m not an architect—I’m a doc—but I like the way this building has turned out,” says Bolwell. “We’ve taken a minimalist aesthetic and made it warm. Also, it just looks cool.” ■

Mark Lamster is architecture critic of the Dallas Morning News and a professor at the architecture school of the University of Texas at Arlington.



credits

DESIGN ARCHITECT: William Rawn Associates, Architects – William Rawn, Clifford Gayley, principals

ARCHITECT OF RECORD: Stantec Architecture – Bruce Knepper, principal

ENGINEERS: Osborn Engineering (civil); LeMessurier (structural); BR+A/Karpinski (m/e/p/fp); Cawrse (landscape); Heapy (IT)

CONSULTANTS: Brockman Design (furniture); Lam Partners (lighting)

GENERAL CONTRACTOR: Turner Construction

CLIENT: Cleveland Clinic

SIZE: 377,000 square feet

COST: \$276 million

COMPLETION DATE: March 2017

SOURCES

CURTAIN WALL: Oldcastle BuildingEnvelope

GLAZING: Viracon (glass, skylights)

DOORS: Stanley (entrances); United Glass

FLOORING: Nora, Forbo (resilient); C&A (carpet); O. A. Bertin (terrazzo)

FURNISHINGS: Knoll, Steelcase, Cartwright



Fundación Santa Fe de Bogotá Expansion | Bogotá, Colombia | El Equipo Mazzanti

Secret Garden

An innovative hospital expansion at the foothills of the Andes brings nature and the surrounding city to the patients.

BY ANNA FIXSEN

PHOTOGRAPHY BY ALEJANDRO ARANGO

The first chapter of Gabriel García Márquez's feverish novel *Of Love and Other Demons* closes with a prescient word of wisdom. After a physician examines a nobleman's daughter feared to have contracted rabies, he prescribes a regimen not of elixirs, but of flowers, birds, and views to the setting sun. "No medicine cures what happiness cannot," the doctor advises.

Such a philosophy is at the heart of a recent expansion of Bogotá's Fundación Santa Fe hospital by Colombian architect Giancarlo Mazzanti, where lush interior gardens combined with vistas of the jagged Andean hills give recovering patients a sense of freedom and hope.

"When you are here, you are no longer inside the building, you are outside of it," says Mazzanti, standing in the hospital's verdant interior garden. "We wanted to bring new possibilities to the patients and the people inside."

Nature has been integral to Fundación Santa Fe's mis-

sion since it was established in 1972. The founders envisioned a nonprofit medical institution that would be at the forefront of research and patient care, while shunning the antiseptic feel of a status quo hospital. Accordingly, the building's architect, the American modernist George Nelson, designed the hospital to be "the Colombian Garden of Health." An X-shaped structure constructed from local brick, the hospital included tree-shaded gardens, an airy atrium, and rooftop plantings.

Over the decades, Fundación Santa Fe became one of Colombia's premier medical institutions, boasting achievements like the country's first heart transplant and partnerships with institutions like the Universidad de los Andes and Johns Hopkins University. But in recent years, it faced overcrowding, and its aging facilities lacked the flexibility to keep up with changes in medical technology. What's more, a series of expansions left the facility a gloomy jumble that strayed from Nelson's original vision.

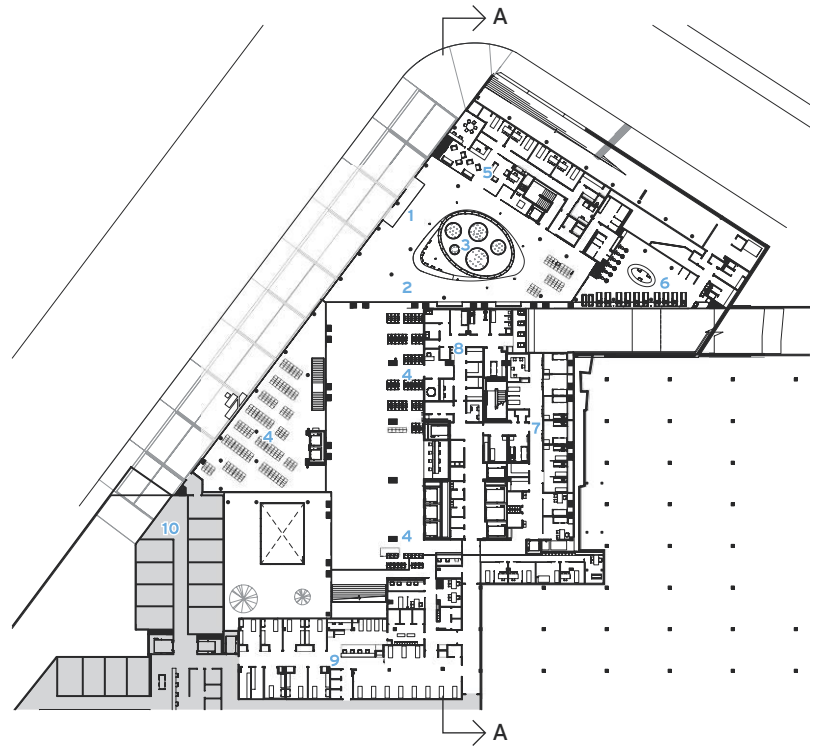
Mazzanti, in a competition-winning design, proposed an

HOLE IN ONE

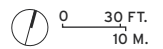
The architects cloaked the building in an airy brick screen (right, below). Behind a circular depression in the facade—inspired by the hospital's circular logo—the architects located a four-story garden. Passersby can enjoy a public plaza, accessible by a street-level staircase, which creates a new civic space in a busy commercial quarter (opposite).







GROUND-FLOOR PLAN



- 1 ENTRANCE
- 2 RECEPTION
- 3 PATIO
- 4 WAITING ROOM
- 5 OFFICES
- 6 REHABILITATION
- 7 CARDIOLOGY
- 8 PNEUMOLOGY
- 9 GASTROENTEROLOGY
- 10 EXISTING BUILDING
- 11 INTERIOR GARDEN
- 12 PUBLIC ELEVATOR
- 13 PATIENT ROOM
- 14 STAFF
- 15 WASTE
- 16 PARKING
- 17 AUDITORIUM FOYER
- 18 GYNECOLOGY
- 19 INTENSIVE CARE UNIT



NINTH-FLOOR PLAN



SECTION A - A

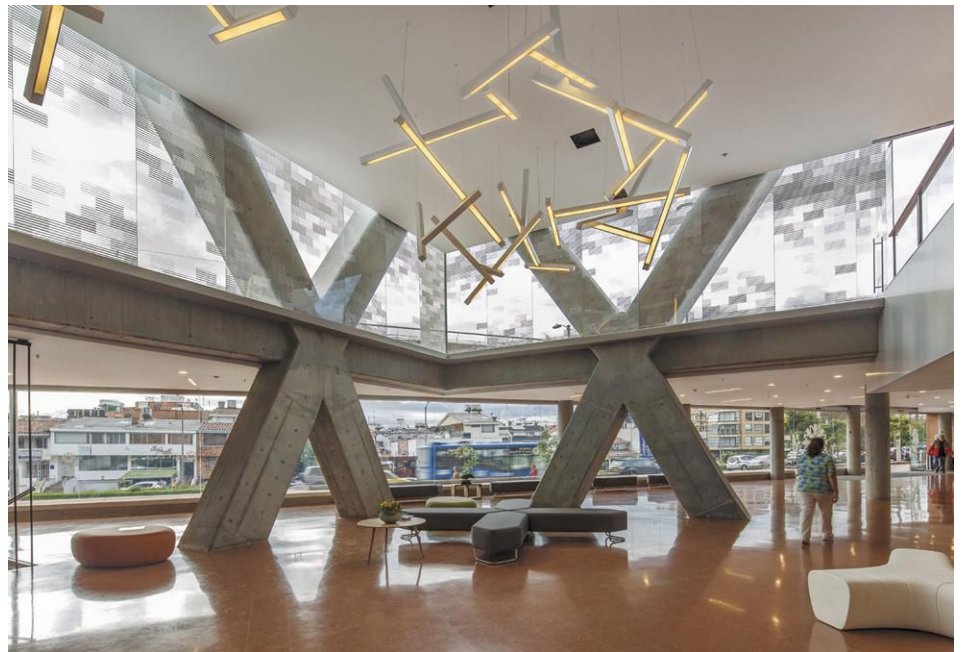


GREEN PIECE The architects brought nature into the building wherever possible. Patients can access an interior garden located behind the facade (opposite), while an enclosed courtyard brings light into the reception area (above). The double-height lobby (right) provides the primary connection to the street and the old building.

extension that would promote a sense of connectivity throughout—physical and ideological links to the original building, the community, and nature. The resulting facility (inaugurated last November)—a 12-story cube set atop a single-story podium and rotated 45 degrees—provides the northernmost anchor for the complex and a new landmark for a bustling site in Bogotá’s Usaquén district, a mixed residential and commercial quarter.

Driving north on Carrera 9, where motorcyclists careen through a steady stream of cars, the new building emerges from behind Nelson’s modernist structure. In spite of the addition’s monumental massing, it is airy and delicate, thanks to an innovative brick veil made from the tawny masonry that characterizes the old building and Bogotá’s larger urban fabric. “Everything in the existing complex was brick,” explains Mazzanti. “I wanted to work with it—but in another way.” The Mazzanti team developed an ingenious system of thin, hollow bricks clipped onto cables like beads on a necklace, to screen the steel-and-concrete building, as well as to provide sunshading and, through a variety of apertures, frame views. The brick weave—loose in some areas, compact in others—creates varying degrees of transparency and opacity. A large concave depression and ribbon windows incise each facade, further adding texture to the four exposures.

The architects sought to promote openness not only with the facade



but with a public plaza that allows the community to approach the building—a difficult task given that the hospital hosts high-security patients, ranging from dignitaries to prisoners. But they convinced the hospital to include a landscaped plaza on top of the podium, accessed by stairs leading up from the sidewalk. It provides a respite between Carrera 9 and Carrera 7, two of the city’s busiest thoroughfares.

This terrace also provides a visual and physical connection to the hospital’s interior. A circular void cuts through the platform, creating space for a glass-enclosed garden below and bringing sunlight and



CHECKING OUT

To maximize comfort, patient rooms are more than double the usual size and include remote control systems to let patients change lighting levels and shades without the need to call a nurse. The masonry screen—a system of thin bricks clipped onto cables—provides dappled light and flickering views of Bogotá (bottom). Catwalks between the veil and the concrete structure allow for easy cleaning and repairs.

greenery into the main lobby. Within this double-height reception and waiting area, accessed by street-level entrances, the team established crucial connections to the existing lobby, two stories above, via a series of stairs.

Elevators carry visitors to the main medical floors, which include levels for intensive care, surgery, neonatology and obstetrics and gynecology. The neurology floor on level 7 also includes an auditorium and staff lounges. Each floor is organized in rings: the outermost corridors lead to patient-treatment and recovery rooms, the middle are for staff, and the innermost spaces conceal back-of-house functions such as food service and waste removal.

For the design of the patient zones, says Mazzanti, “We wanted to create a relationship

with nature and with the city, and also a feeling of being in a kind of hotel instead of a hospital.” This often came down to smaller design moves. Within hallways, for instance, the architects located lights to the side to keep the glare out of the eyes of patients on gurneys. The individual rooms are double or triple the size required by Colombian code. Ribbon windows are located at bed level, allowing patients to have unobstructed views to the city’s red tile roofs and out to the Andes beyond.

On the sixth floor, in the neonatal unit, each family has its own private glass cubicle—24 in all—in lieu of archetypal nurseries with rows of incubators. According to Dr. Juan Gabriel Piñeros, head of this department, the hospital plans to conduct a study to determine how the

new facility is affecting health, but he is already noticing improvements in both infection rates and staff morale. “It’s a dream come true,” he says. “The success of the project is that it’s a project made by everybody.” Before embarking on the design process, the architects solicited input from employees ranging from physicians to the janitorial staff. For instance, catwalks between the brick screen and the building envelope facilitate maintenance; concealed cabinetry allows for contained waste disposal to reduce cross-contamination; spacious staff lounges and cafés feature areas to relax, and stunning vistas. “When your working conditions improve there is also a change of attitude—there is less fatigue, more big smiles,” says Mazzanti.

Nowhere is this more apparent than in an interior garden at the top of the building, where the architects created a four-story indoor jungle within a cavity between the building’s brick screen and concrete walls. Here, a path meanders through a grove of palms and ferns, while vines spill from hanging planters. The city flickers through the perforated screen like a filmstrip. Oxygen connections enable sick patients, otherwise confined to their rooms, to feel fresh breezes. It’s tranquil here; on a recent afternoon, a patient in a wheelchair, with a caretaker, took in the quiet and peace.

Going forward, the patients will sustain the garden, just as it sustains them. According to Mazzanti, each family will receive a plant at the beginning of the patient’s stay, to be cared for over the course of treatment. Before residents return home, they will replant it in the solarium—an enduring symbol of healing. ■

credits

ARCHITECT: El Equipo Mazzanti – Giancarlo Mazzanti, Sebastián Negret, Fredy Fortich, Alberto Aranda, Felipe Pombo, Rocío Lamprea, César Grisales, Trinidad Guzmán

INTERIOR DESIGNER: Solinoff Corporation

CONSULTANTS: CNI Ingenieros, PYP (structural); Groncol (landscape); Carmenza Henao (lighting); Diebold Colombia (security)

GENERAL CONTRACTOR: Payc

CLIENT: Fundación Santa Fe de Bogotá

SIZE: 344,450 square feet

COMPLETION DATE: December 2016

SOURCES

STRUCTURAL SYSTEM: Argos, Diaco

MASONRY: Argos

GLASS: Ventaner

ELEVATORS: OTIS

FURNISHINGS: Contract SA, Herman Miller, Solinoff Corporation

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Breath of Fresh Air

Hospitals that rely primarily on passive means for cooling offer a new model for healing environments.

By Katharine Logan



AT A SCALE unheard of in their home country, American architecture firms are using natural ventilation to achieve energy savings, resilience, and patient comfort in two major health-care projects in Asia. At Singapore's Ng Teng Fong General Hospital (NTFGH), one of this year's AIA COTE Top Ten Award winners, more than 80 percent of bed spaces are cooled and ventilated relying on passive strategies alone. At XiangYa Hospital, a 5.6 million-square-foot medical facility in Changsha, in south central China, slated to start construction this summer, windows will be the primary source of cooling and ventilation for all patient rooms.

Although natural ventilation is common internationally, North Americans are accustomed to full mechanical ventilation, says Travis English, chief design engineer for

health-care consortium Kaiser Permanente and a member of a natural-ventilation task group for the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE). "So, a naturally ventilated health-care building here is going to be somewhat countercultural," he says. The few naturally ventilated North American health-care facilities that do exist, such as Peace Island Medical Center, an award-winning facility on San Juan Island, Washington, tend to reflect considerations so specific to their particular circumstances that they reinforce just how unusual natural ventilation in North American health care really is.

So how do international health-care facilities achieve comfortable environments with natural ventilation? And should North Americans expect to see more of such facilities?

From the very beginning, the design priority for the 1.84 million-square-foot NTFGH, which opened in 2015, was to make the patient's experience far more pleasant, says William Roger, director of health care in the San Francisco office of HOK, architects for the project with CPG Consultants and Studio 505. A pre-design tour of Singapore's public hospitals found standard, multipatient wards configured so that only the patient at the end of the room had access to a window—and drawing that patient's privacy curtain blocked access to light and air for patients farther from the building perimeter. Bedside fans only served to circulate increasingly warm air.

To improve the healing environment, airflow was paramount: research has shown that, in tropical climates, higher temperatures (from 79 to 84 degrees Fahrenheit) in rooms with



ceiling fans are more comfortable than cooler spaces without them. The design team's solution opens the floor plan of the standard ward like the wings of a bird, a move that creates a semiprivate corner with its own operable window for each patient bed. The outside walls of the splayed floor plan catch the wind and channel it toward the windows. As the floor plan narrows, air throttles through the tightening spaces in a Venturi effect, which increases air velocity without mechanical intervention. Single-loaded corridors narrow the building depth, promoting more effective cross ventilation and reducing the passage of air across multiple patients. "Even on a calm day," says Roger, "you can feel a breeze."

Creating a comfortable temperature in Singapore's tropical climate using only natural ventilation begins long before the breeze en-

ters the room, however. NTFGH's facades comprise multiple layers and elements, including vertical sunshades and deep overhangs of precast concrete. In addition to providing shade, the overhangs support plantings that contribute additional shade and some evaporative cooling, as well as views. Facade design is unique to each orientation, providing 60 percent shading on critical facades and 40 percent on others. Critical facades are those for which shading is essential to providing patient comfort or other required conditions. The facade at the patient ward, for example, would be more heavily shaded than the facade adjacent to a corridor. With no need for insulation, the building's weather envelope consists of inexpensive prefabricated panels supporting two types of windows: upper, operable windows, and lower, hurricane windows with vents that

MADE IN THE SHADE The facades of Ng Teng Fong General Hospital in Singapore rely on several types of shading devices. The patient-room wings (opposite) have deep precast concrete overhangs that support plants. These provide additional shade, evaporative cooling, and views.

let in air while keeping out wind and rain.

NTFGH's combined energy conservation strategies achieve a design Energy Use Intensity (EUI)—calculated by dividing the total energy consumed annually by the total gross floor area—of 72 kBtu per square foot per year. This represents a 38 percent reduction compared with a typical Singapore hospital, and a 69 percent reduction compared with a typical U.S. hospital.

While it should be no revelation that natural ventilation and passive cooling help reduce energy consumption, it may be surprising that



the strategy also plays a role in conserving water. Because cooling towers are one of the largest consumers of water in fully air-conditioned hospitals—especially in a hot climate like Singapore’s—the use of passive design to condition 70 percent of the building constitutes the facility’s single most effective water-conservation measure.

In selecting the project as an AIA COTE Top Ten winner, the jury commented that “this project is an extraordinary model for hospitals to behave as healing environments not seen in the United States” and “the passive strategies demonstrated here are a model for hospitals around the world.”

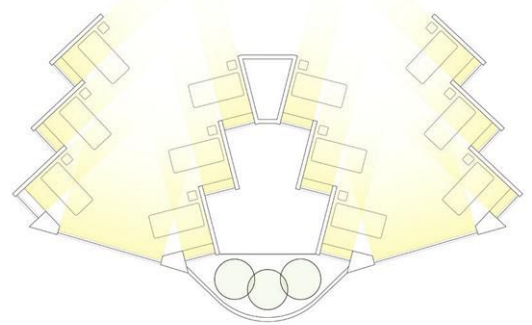
As with NTFGH, the mandate for passive cooling and ventilation at XiangYa Hospital derived from established health-care design practice in the region. “We know how to open windows,” the client told Boston-based Payette Architects in establishing the design parameters for the 2,500-bed facility. “We do not want air-conditioning or any mechanical systems whatsoever in the patient units.” The city’s current hospital is naturally ventilated, and the client expects the new one, which will consist of zigzagging inpatient wings atop orthogonal medical-service podiums, to improve patients’ thermal comfort through a more deliberate approach.

In many ways, Changsha is well suited to natural ventilation. Air quality is not a problem, as it is in many of China’s northern cities, and Changsha’s subtropical climate has four

FAN PLAN Multi-bed wards (above and right) at Ng Teng Fong in Singapore are shaped like fans. The strategy creates a semi-private corner with its own operable window for each patient and helps promote the Venturi effect and cross ventilation.

distinct seasons. However, increasingly frequent summer heat waves make it difficult to guarantee comfortable conditions through natural ventilation alone. “We need to design a system to protect the weakest,” says Alejandra Menchaca, a senior building scientist with Payette, “and we couldn’t quite do it with natural ventilation year-round.” The design solution will provide passive conditioning for what’s estimated to be 70 percent of the cooling season, based on adaptive comfort thresholds, and staff will turn on mechanical air-conditioning to moderate peak temperatures. The concept of adaptive comfort recognizes that people feel comfortable across a wider range of indoor temperatures if they have control over window operability. It’s also a function of outdoor temperature: on a hot day, people are comfortable at warmer indoor temperatures, and vice versa.

To move air, natural-ventilation systems rely on pressure differentials, which can be generated either by the wind for cross ventilation (as at NTFGH) or by temperature or humidity differences. In stack ventilation, an example of this, warmer air exits high and draws cooler air in low. This can allow a room to be self-ventilating, taking air in and exhausting it through openings in the same wall. Such is the



NG TENG FONG WARD PLAN

strategy planned for XiangYa.

In a way, though, the XiangYa design team is fighting with one hand tied behind its back: while the client’s mandate calls for natural ventilation and cooling, it also calls for a building envelope primarily of glass. “It’s an unfortunate trend,” says Menchaca. “The more solar gain we have in a space, the larger the opening needs to be to vent it.” Payette’s in-house research had established that windows opening 4 inches (the maximum allowed for safety) could be configured as louvers, or as high and low awning windows, to achieve a significant increase in the number of air changes per hour compared to a casement window of the same size. But the ventilation needs of XiangYa’s glassy spaces outstrip what any type of 4-inch opening can provide.



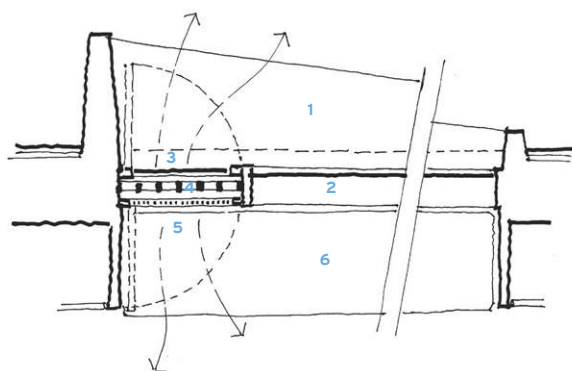
cited concerns. But proponents of natural ventilation in health-care environments say that these worries are based on a misunderstanding of where natural ventilation will be used. Certain areas are generally considered inappropriate for it, including operating rooms, the sterile core, procedure suites, interventional radiology and cardiology areas, airborne isolation rooms (unless separately exhausted), protective environments, and intensive care units. Outside the operating room, the most common hospital-acquired infections (HAI) are pneumonia, urinary tract, bloodstream, and gastrointestinal diseases, none of which are likely to be affected by ventilation systems. In fact, HAI rates in Europe, where natural ventilation is common, are no higher than those in the U.S.

Peace Island Medical Center, the 39,000-square-foot, two-story facility in Washington State, exemplifies North America's baby-steps approach. Located in a climate where mild summers make natural ventilation a perfect fit, the facility, which opened in 2013, is "a very modest starter kit," says Anne Schopf, partner and director of design at Seattle-based Mahlum Architects. "The accomplishment was huge, but the risk was also lower because of climate and project scale."

With a goal of resilient health-care delivery on an island where power outages are common, the design team tailored the hospital's environmental control systems to its program areas' specific needs. In inpatient areas, which are intermittently or partially occupied, operable windows provide cooling and ventilation (supplemental fans prevent air changes from falling below code minimums); the outpatient clinic, which accounts for about a third of the building, uses the same setup as the inpatient areas, but with a more basic fan exhaust providing fewer air changes. Emergency and imaging departments are conditioned by mechanical means using a conventional variable air volume (VAV) system and ground-source heat pumps; the surgery is equipped with a dedicated fan-coil unit that can be shut down when the space is not in use. This design has enabled Peace Island to achieve an EUI of 87.7 kBtu per square foot per year (a typical hospital in the Pacific Northwest scores around 265).

After more than four years of operation, "I'd say the majority of users think [natural ventilation] is great," says Ben Coon, regional construction project manager for PeaceHealth. But with only two or three inpatients admitted per day, he adds, the data pool is tiny.

Even for so small a facility in an ideal climate zone, however, obtaining Department of Health approval for operable windows wasn't



XIANGYA PATIENT ROOM WINDOW PLAN

- 1 EXTERIOR ALUMINUM BOX
- 2 FIXED PICTURE WINDOW
- 3 OPERABLE WINDOW
- 4 ALUMINUM SAFETY SCREEN
- 5 OPERABLE INSECT SCREEN
- 6 INTERIOR WINDOW SEAT



QUIET CORNER

The design for Fifth XiangYa Hospital in Changsha, China (top), includes operable windows (above and left) that rely on the stack effect to ventilate the patient rooms. The windows incorporate patterned screens, shading devices, and a bench.

Payette's solution is to provide for safety and ventilation separately. A patterned aluminum screen, with openings sized to comply with the 4-inch safety maximum, will serve as a guard on the interior side of the window. This will free the window, sized tall enough to generate a stack effect, to open fully. The assembly will form part of a window frame and seat in each patient room. Outside, the frame projects to act as a shading device for the glass. For the patient, the window will provide fresh air and views to gardens, while the scale of the window box will offer a sense of intimacy in the large building. "It would be a hard sell in the U.S.," says Menchaca. "Who's going to clean the screen? Who's going to open the window?" But for a client already used to operable windows and insect screens, these

concerns don't arise. Even so, Payette has designed the insect screen to swing inward for ease of cleaning both sides.

NTFGH and XiangYa are just two among many instances of naturally ventilated health-care facilities internationally, but North American examples are few and far between. A survey conducted by Payette of health-care architects, engineers, and owners in the U.S. suggests that the industry's main concerns pertain to a perceived lack of infection control, the logistics of controllability, patient comfort, and added construction costs. Perceived advantages include a connection to the outdoors, resilience in the event of power failure, improved working conditions and patient care, and reduced operating costs.

Infection control is highest on the list of



STARTER KIT The modest scale of the Peace Island Medical Center (left and below) in Washington State, along with the Pacific Northwest climate, made it the perfect candidate for natural ventilation.

tended to apply only to mechanically supplied air, but Standard 170 is widely understood to preclude natural ventilation anywhere in a health-care facility.

The task group's position paper calls for change, suggesting that natural ventilation should be allowed in most health-care spaces, except for operating rooms and other critical areas. Among the likely benefits, the paper identifies energy reduction and enhanced occupant satisfaction. It advises designers to fully consider space and climate appropriateness, acoustics, security, and outdoor air quality, and cautions that projects implementing natural ventilation should anticipate challenges, since many commissioning agents and air-balance providers in the United States are unfamiliar with natural-ventilation systems. "We're going to look at that horse's teeth pretty hard," says English, speaking from a facility owner's perspective, "but it should be something we have the choice to evaluate. It should be an option." ■

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



easy. Concerns included humidity, security, pollen and dust, infection control, staff controls, patient experience, and the durability of interior materials. Ultimately, PeaceHealth provided reassurance in the form of a memorandum, included with its building-permit application, describing the design provisions and operating policies by which each DoH-identified concern would be addressed.

"It comes down to liability," says Coon, and, with operable windows an ideal rather than a necessity, "We probably would have given up." But the design team persevered, and today the Peace Island Medical Center stands as a path-breaking solution for its circumstances.

That path may be about to open up. At this

year's ASHRAE annual conference, in Long Beach, California, Travis English presented the natural-ventilation task group's position paper summarizing its two-year review of ASHRAE Standard 170: Ventilation of Health Care Facilities. If a design culture of mechanical ventilation is what makes North Americans leery of adopting natural ventilation for health care, Standard 170, which a number of jurisdictions have incorporated into their building codes, is what locks that design culture into industry practice. The standard's provision that "all of the air provided to a space shall be filtered" and that "the entire minimum outdoor air changes per hour . . . shall meet the filtration requirements" may have been in-

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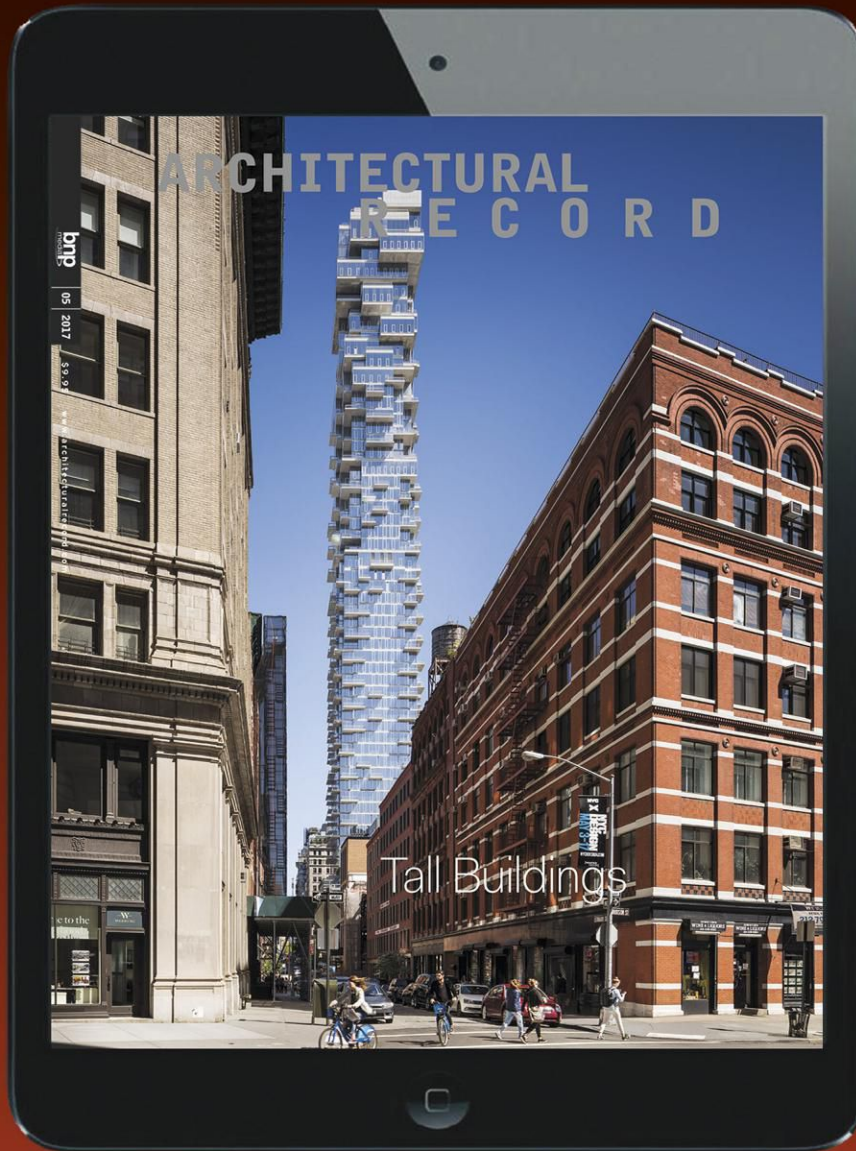
Learning Objectives

- 1 Outline the benefits of naturally ventilated health-care facilities.
- 2 Discuss hurdles to implementing natural ventilation in North American health-care facilities.
- 3 Discuss industry standards and regulations pertaining to ventilation in health-care facilities.
- 4 Explain physical phenomena relevant to natural ventilation, such as the Venturi effect and stack ventilation.

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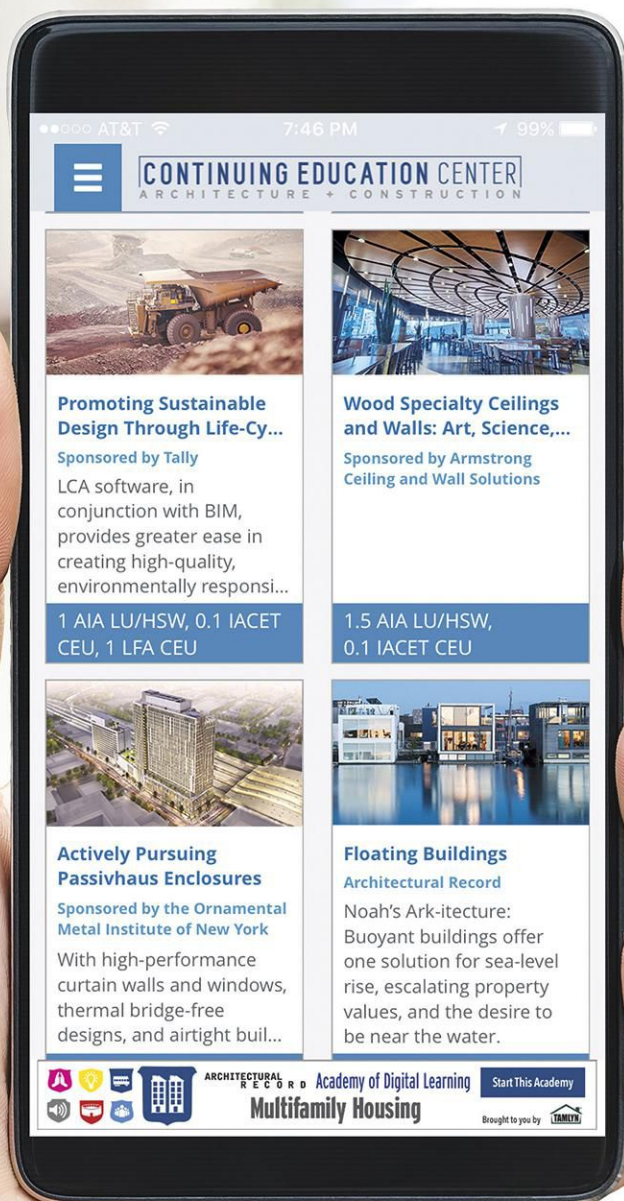
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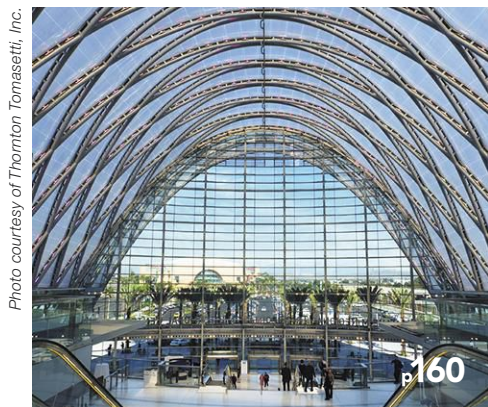


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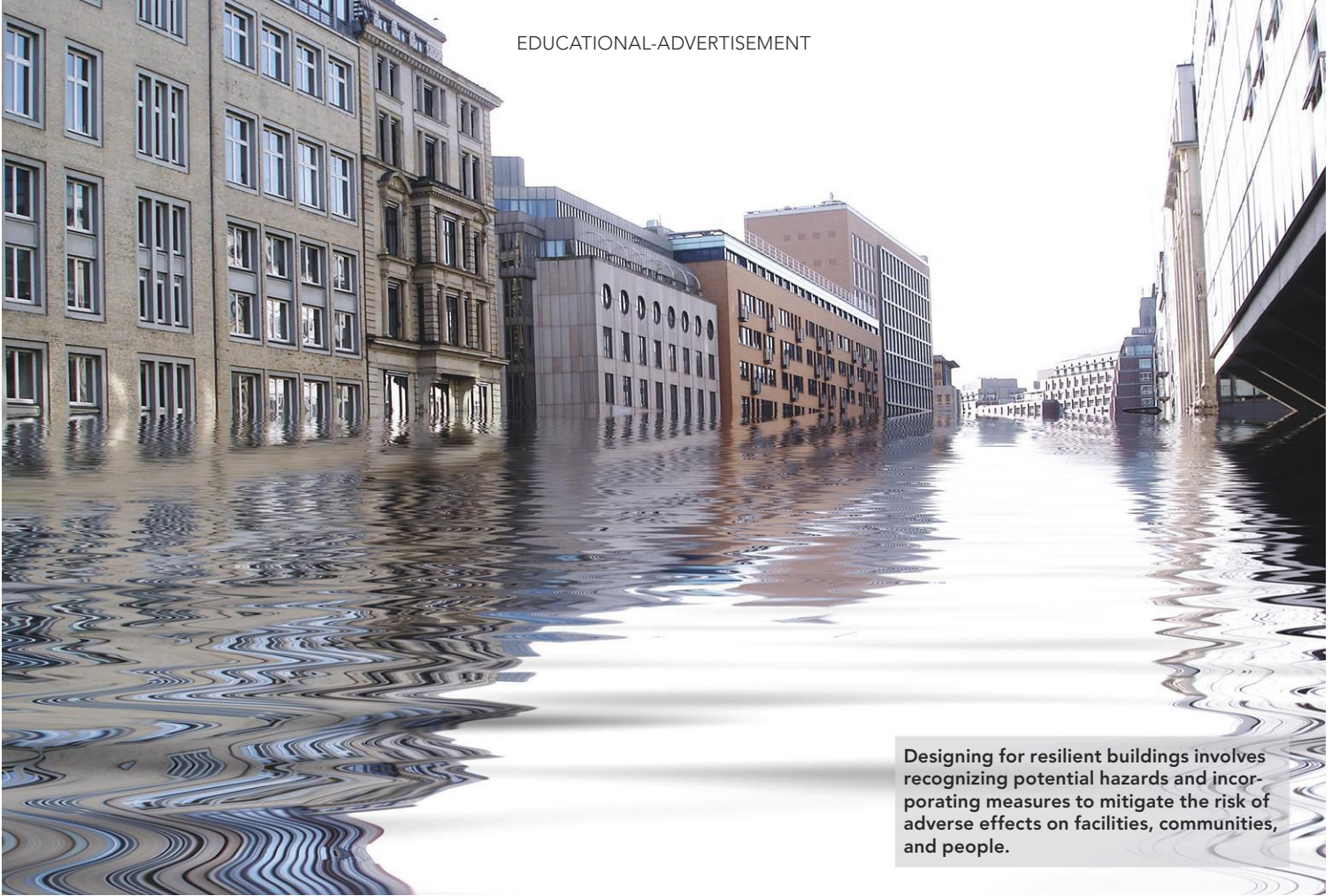
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CATEGORIES

- BE** BUILDING ENVELOPE DESIGN
- IN** INTERIORS
- LS** LIFE SAFETY AND CODES
- PM** PRODUCTS ASND MATERIALS
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- SU** SUSTAINABILITY

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



Designing for resilient buildings involves recognizing potential hazards and incorporating measures to mitigate the risk of adverse effects on facilities, communities, and people.

Image courtesy of Smart Vent Products, Inc.

Exploring Resilient Building Design

Past experience with disasters inform current design decisions

Sponsored by Carlisle SynTec Systems, Construction Specialties, Ross Technology, Smart Vent + ILC Dover, and Walz & Krenzer, Inc. | *By Peter J. Arsenault, FAIA, NCARB, LEED AP*

Well-designed buildings often evoke a sense of permanence and longevity. The reality is, however, that such permanence can be routinely and sometimes dramatically challenged by natural or man-made disasters. Weather-related events such as hurricanes, tornadoes, and flooding can compromise or destroy building enclosures and structures within a matter of hours or even minutes. Seismic events can cause almost immediate destruction of entire buildings or sections of them. And in our security-conscious era, human attacks on facilities can target human lives, building structures, or both. In light of all of these conditions, architects and engineers are called upon to design buildings that can withstand these forces and situations. Some parts of the design may be mandated by regulations, others influenced by insurance requirements, and still others simply by request of the building owners. Regardless of the motivation, design teams need resources and understanding on how to address these very real situations in the interest

of protecting not only the buildings we design and the contents within, but also the full health, safety, and welfare of the people who use those buildings. This course will look at some of the current thinking on these topics.

DESIGNING IN ANTICIPATION OF DISASTERS

The reported rise in natural and man-made disasters in recent years has focused increased attention and funding on how to prepare for and survive different types of disasters. Those engaged in this effort understand that while buildings play an important part, community resources and infrastructure are also critically important. The American Institute of Architects (AIA) has been directly involved in this area since 1972, when the role of architects was formally recognized as part of emergency response. This role became better defined in 2006 when the AIA established a Disaster Assistance Program led by a nationwide committee of architects and other stakeholders. Since

CONTINUING EDUCATION



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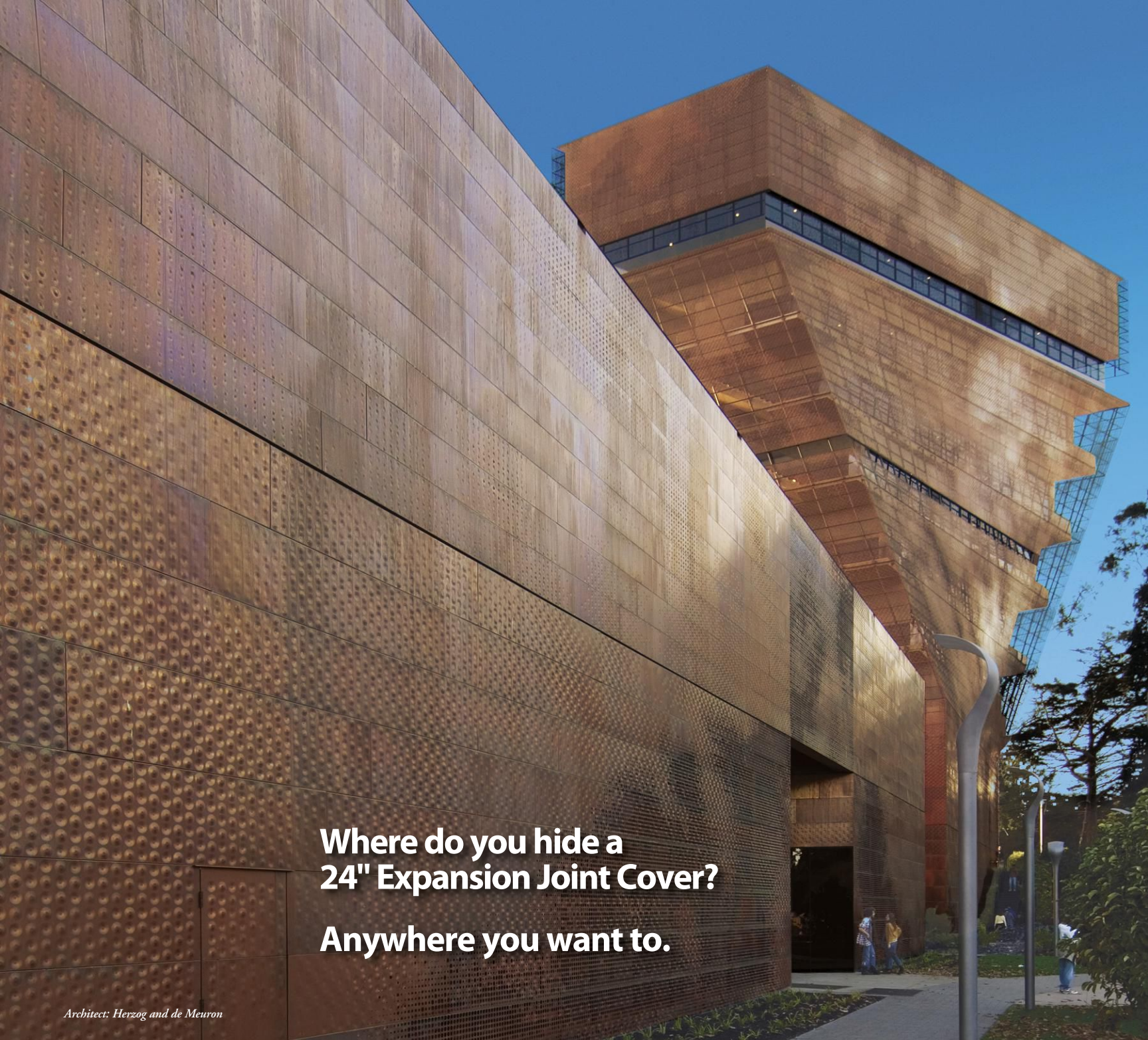
Learning Objectives

After reading this article, you should be able to:

1. Identify and recognize the basic principles and terms associated with resilient building design and disaster mitigation.
2. Assess a variety of methods to protect a building from flooding events.
3. Explain and specify a high-performance, resilient roofing system.
4. Examine a low-profile perimeter fencing and gate system to address security in a building or facility.

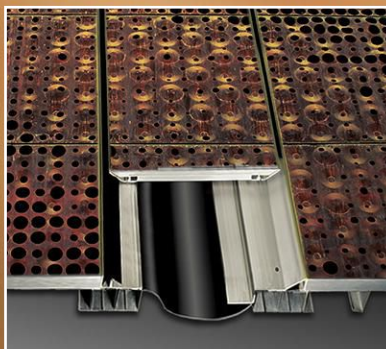
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UNDERSTANDING RESILIENCE

According to the AIA, architects have a responsibility to design a resilient environment that can more successfully adapt to natural conditions and that can more readily absorb and recover from adverse events. To help design professionals and others understand the concepts behind resilient design, the AIA Disaster Assistance Committee has defined the following terms:

- **Hazard** is a natural or man-made condition that poses a threat to human safety. Hazard events include such things as hurricanes, tsunamis, earthquakes, tornadoes, blizzards, drought, and wildfires.
- **Risk** defines the likelihood of a hazard occurring and the potential intensity (or magnitude) of that hazard. A coastal community, for example, is at higher risk of hurricane hazards than inland communities. Determining the level of “acceptable risk” is based on understanding the frequency and potential magnitude of a hazard and is critical to designing for the associated level of building performance.
- **Vulnerability** personalizes risk by assessing what the impact of a hazard can be on a particular building, its occupants, or a community, such as injury, death, and property damage as well as social and economic disruption. Keep in mind that a resilient building in a vulnerable community isn’t truly resilient since infrastructure, utilities, food supply, and services are all necessary for people to function adequately.
- **Mitigation** is the process of reducing negative impacts. Mitigation measures are often developed in accordance with lessons learned from prior incidents. Measures may include zoning and building codes or floodplain buyouts, as well as efforts to educate governments, businesses, and the public on measures they can take to reduce loss and injury.
- **Resilience** is fundamentally an inherent durability or flexibility of buildings and communities. This requires designs that are tough as well as flexible, providing the ability to not only bounce back but to also move forward.
- **Adaptation** is the process of accommodating needs throughout the service life of a building. It is critical to acknowledge the changing conditions in the physical, economic, and social environment as well. Communities are ultimately successful when they are adaptable to change.

Image courtesy of The American Institute of Architects



The third edition of the *Disaster Assistance Handbook* published by the AIA addresses disaster response and preparedness, with an expanded section on mitigation, resilience, and long-term recovery.

then, a number of events and publications have come about, including the recent (March 2017) release of the third edition of the AIA’s *Disaster Assistance Handbook* (available for free download at www.aia.org/resources/71636-disaster-assistance-handbook). This informative publication provides a great overview of the topics related to resilient design (i.e., the ability to not only survive but to “bounce back” after an adverse event), some detailed information on hazard risk reduction and mitigation, and resilience planning before, during, and after an event. There are also appendices identifying AIA member groups to connect with and extensive lists of resources for more information.

The AIA website (www.aia.org/resilience) provides architects and others with additional tools and information to address the design of resilient buildings and communities. In particular, the AIA’s *Understanding Resilience* is a helpful primer on key terms, and *Qualities of Resilience* is a good jumping off point when discussing what makes a building (or community) resilient. Additional technical guidance is also available for both hazard mitigation and climate adaptation.

Using some of the AIA work as a basis, let’s turn our attention to some specific issues and how to mitigate them in the design of resilient buildings.

FLOODWATER RESILIENCE

One of the most devastating and destructive environmental conditions is flooding. Whether caused by heavy rainstorms, hurricanes, or upstream conditions along rivers, buildings and people either need to be protected from floodwaters or buildings need to be designed to withstand the forces of water around the foundation and lower levels. We will look at three different design strategies for addressing flooding hazards.

Wet Flood Proofing with Operable Vents

The primary structural stresses responsible for flood damage on buildings comes from horizontal hydrostatic pressure that builds up on the outside of enclosure walls, thus pushing the walls inward. There may also be some vertical buoyancy forces on the foundation or first

floor seeking to lift or float the building. This is compounded in buildings with enclosed sub-grade space, such as a finished basement, where saturated soil hydrostatic pressures and greater buoyancy forces under the basement floor can cause both lifting and collapse of a building.

Recognizing the significance of these hydrostatic forces, codes and regulations require mitigation efforts in the design and construction of buildings in flood zones. Specifically, all new construction and substantial improvements of fully enclosed areas (including crawl spaces and garages) below the lowest occupied floor that are subject to flooding must be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for both the entry and exit of floodwaters. (Note that new construction in Special Flood Hazard Areas (SFHA) designated by the Federal Emergency Management Agency [FEMA] does not allow for basements [i.e., enclosures that are below grade on all four sides]. Referred to as wet floodproofing, this strategy focuses on designing walls not to resist the hydrostatic pressure but to offset it by allowing water to flow into the enclosed space and create equalized pressure on both sides of the wall. This is a requirement whether the space is used for parking of vehicles, building access, storage, or any other function. Taken to the extreme, this approach would provide no walls at all, just “stilts” or piers that support the building and allow the water to freely pass under the first floor and around the supporting structure. While that may be appropriate for some design situations, it isn’t for all.

Images courtesy of Smart Vent Products, Inc.



Flood vents, whether located in foundation walls as shown on the top or in garage doors as shown on the bottom, allow for wet flood proofing of buildings to equalize water pressure on both sides of a structure.

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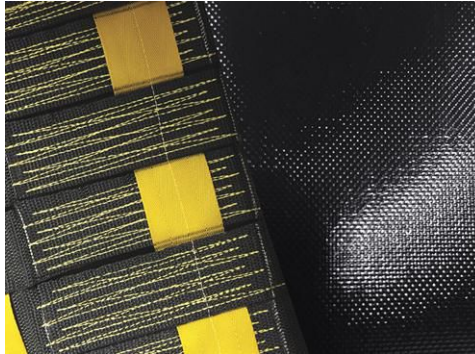
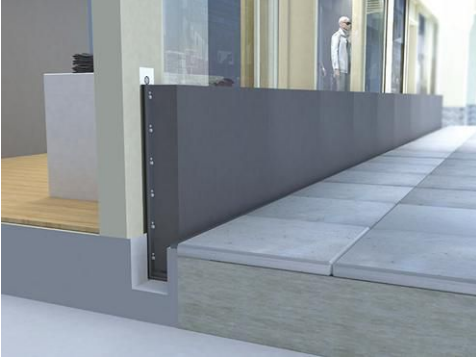
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Flexible dry flood proofing systems offer rapid deployment and point-of-use storage of the system that can be readily designed into a building.

For enclosed areas such as crawl spaces, proper flood openings, also called flood vents, need to allow for the automatic entry and exit of floodwater without human intervention, regardless of the direction of flow of that floodwater. In the case of water entering slowly, that flow into an enclosure can cause outward pressure on an opposite or adjacent wall so water needs to flow out as easily as it flows in. Further, debris is a fact of floods, and it's something that the design of a flood opening needs to address so the debris passes through the opening and doesn't clog it. To be fully effective, flood vents must be installed in at least two different walls. Further, the bottom of all openings must be within 12 inches of the highest adjacent grade directly below the opening to allow no more than 1 foot of head.

FEMA's *Technical Bulletin 1* states that mass-produced, engineered flood openings must have an ICC-ES certification through the International Code Council's Evaluation Service. Other characteristics of ICC-ES engineered flood openings are that they must mechanically open during a flood event from a latched, closed position to provide rodent resistance, and they must allow for a 3-inch-diameter sphere to be able to pass through the vent, when in the open position, to allow for flood debris flow. Full requirements can be found in the ICC-ES Acceptance Criteria for Mechanically Operated Flood Vent (AC364).

Dry Flood Proofing with Flexible Systems

Not all buildings or other structures have floor levels or conditions where wet flood proofing is appropriate (i.e., commercial space at grade level). An alternative approach is to set up a barrier around all or part of a building to protect it from rising floodwaters. Piling up sandbags is sometimes reported on the news as one way to do that, but it is time consuming and not necessarily fully effective. For new construction, this technique is not acceptable or compliant. Building walls in new construction are required to have the structural strength to withstand the flood loads. Openings in those walls, such as doors and windows, need some type of additional flood protection to maintain that structural integrity across those openings. Existing buildings can use perimeter-type systems around the whole building. For either situation, new technology allows for a grade-level floor or opening to be protected using flexible barriers that offer versatility and resiliency. This strategy allows for a flexible, high-tech fabric to serve as a flood mitigation system, with everything needed stored at the point of use at the building or the opening. Because of the flexible nature of the materials, very little space is needed, and with some simple design accommodations, it can be stored virtually unnoticed. Then when it is needed due to a flood threat, the flexible system can be deployed rapidly by building maintenance or security staff. Systems are available that are scalable for different design settings, offer robust construction, and use advanced materials.

Brian Shaw, CFM, director of sales and marketing with Smart Vent Products Inc., points out how the construction products industry has evolved in its thinking. "From recent flooding events, we've learned about the importance of deployment time for infrastructure flood protection systems," he says. "The devastating damage and economic loss totals, as well as the loss of life, from Superstorm Sandy showed us that current flood proofing techniques can be useless if they are not deployed in time. The new concept of dry flood proofing using flexible soft goods stored at the point of use for rapid deployment and retraction with minimal man power addresses these issues." Products like these support architects with flood-proofing solutions that combine aesthetics with engineered and proven performance. They can also help ensure that nonresidential structures located in flood zones are flood resilient, while also providing the lowest flood insurance premium.

Rigid Flood Barriers

Commercial and institutional buildings have often relied on rigid flood barrier systems to protect their facilities, the contents inside, and the people who work or visit there. Such systems can take the form of permanent or removable barrier walls that are constructed to be a watertight line between floodwaters and the vulnerable parts of a building. It can also take the form of doors and hatches that are specifically designed to seal openings from water and air infiltration. The technology for these systems has been traditionally based on the same techniques used for marine doors and hatches on ships. Under this approach, individual metal (i.e., aluminum or steel) components are sized to fit with others and then perimeter gaskets are engaged by mechanical or other means to create a watertight seal. Manufacturers of such systems can customize each aspect of the visible components of the design so that they are architecturally minimized from view. These rigid barriers and watertight door have been used in residences, businesses, nuclear power plants, drill rigs, and even navy vessels.

Products of this nature that are useful for flood proofing buildings can be broken down into three main categories: flood barriers, watertight and airtight doors, and watertight hatches. Each is discussed further as follows.

- **Flood barriers** are designed to seal an opening on three sides (along the bottom and up the sides of the frame) up to a specific height. The top is not sealed; the barrier seals to a specific height of the opening only. This height is usually based on the established flood elevation, plus at least 12 inches. By not sealing to the entire height of the opening, considerable cost savings can be achieved.

A typical rigid flood barrier is made up of a series of panels that can be removable or permanently installed, and are available in single-

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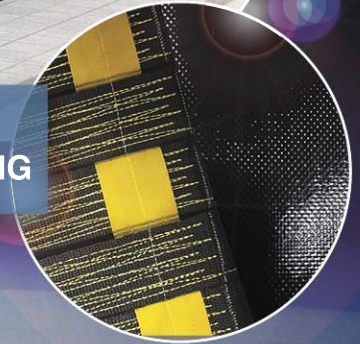
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panel or multiple-panel configurations. Flood barriers are usually manually installed and operated. As a specialty product, all types of flood barriers can be specified to meet standards of federal agencies and code requirements.

Within this category of flood barrier protection, there are some specific types. Removable flood barriers are best used when flooding occurs with some advance warning. Typically, they are stored at the facility or nearby and can be moved into place and assembled by a maintenance or specialty crew in advance of a predicted flood event. A particularly cost-effective version uses stackable, modular “logs” or other components that are well suited for long perimeter protection. Permanent flood barriers can similarly take on several forms. Hinged flood barriers that act as movable portions of walls can be permanently attached to a building opening on either the side or bottom of the opening. Since everything is already in place, they can be closed with very little notice to protect the building from floodwater intrusion. Similar versions are available using panels that slide either horizontally or vertically into place from a permanent stored position. This type is particularly well suited for locations where space constraints exist. Finally, there are also systems which automatically deploy at preset water levels based on floating components that rise ahead of the water level—without any human intervention.

- **Watertight and airtight doors** are designed to seal all four sides of an opening. They are tested and shown to be 100 percent watertight or airtight, and can be designed for practically any size, any location, and for any pressure requirement. Both manual and power-operated doors are available, and there is now even a watertight roller curtain door that automatically deploys at a preset water level. Most of these doors can also be designed for any number of special design considerations, such as blast, ballistic, shock, vibration, radioactive, seismic, chemical, tornado, and high-pressure requirements. Both single- and double-panel doors are available for most applications.
- **Watertight hatches** are designed to mount horizontally in either a flush or raised configuration. Using similar technology to watertight doors, they can be designed for any size, location, or pressure requirement. Larger hatches require some type of mechanical assist for opening and closing the hatch panel, such as the use of gas springs, coil springs, counterweights, or an electrically powered operation. Additional load factors, such as wheel loads and point loads from material-handling equipment, can be readily incorporated into custom designs. Such watertight hatches have been used, for example, as an emergency escape in subway system tunnels.

A key point for architects to be aware of is that there are companies that specialize in this type of equipment and can provide design support beginning in the very early stages of the project. Tom Themel, PE, is vice president of Walz and Krenzer Inc., a flood barrier manufacturer. He relates a very positive collaborative experience working with the Renzo Piano Building Workshop on a project in New York City at the Whitney Museum to help fortify the building’s ability to resist flooding. “Working together, we approached the specific problem with unique solutions that were custom tailored to be sensitive to the architectural design,” he says. Kevin Schorn, an associate with the Renzo Piano Building Workshop, comments, “Their ability to perform complex engineering and invent creative solutions alongside the architects made them an invaluable part of the flood mitigation design team. Their dedication to quality and precise fabrication coupled with their design and engineering skills played a crucial role in safeguarding the Whitney Museum against flooding in the future.”

ROOFING RESILIENCE

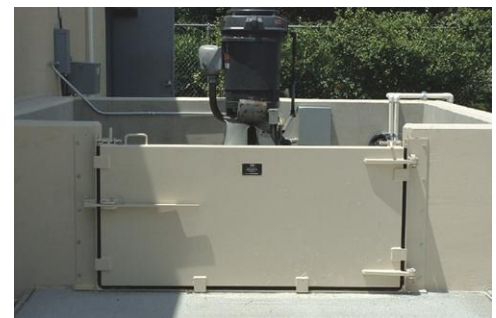
One of the most vulnerable parts of a building during a storm event is the roofing system, particularly a commercial building with a low-slope

condition. Damage or failure to the roofing membrane is not only problematic in its own right, but it also exposes other parts of the building, equipment, critical building systems, and the people inside to the ravages of weather events. Consider that during severe weather, the roof could be exposed to high winds, hail, accidental puncture, unusual snow loads, or intense UV exposure from the sun, all of which could compromise the protective barrier that the roofing is meant to provide. With the short-term and long-term integrity of the building at stake, not to mention human safety, the roofing requires some special attention.

Commercial roofing systems need to address many details and conditions to be fully protective and resilient, but the fundamental decision needs to be made on what type of roofing membrane to use. One of the more popular and cost-effective systems, namely EPDM, has also been shown to be quite durable and resilient if specified and installed properly. With more than 15 billion square feet of membrane installed across the globe since the 1960s, EPDM has an impressive history of performance in the commercial roofing industry. Numerous EPDM roofs installed in the 1980s have been documented to be still performing well over 30 years later, a fact that positions EPDM as one of the strongest and most



Rigid flood protection can include permanent or removable flood barriers, doors, and hatches that seal tightly against water and air penetration to protect people, equipment, and other valuables.



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durable single-ply membranes available. While EPDM has exhibited strong physical characteristics since its inception, it has also undergone many technological advances. Some of these developments include factory-applied seam tape, providing improved seam quality and a quicker application, plus a variety of pressure-sensitive, prefabricated accessories. A particular advancement for resiliency and durability is the introduction of 90-mil membranes and 75-mil reinforced membranes in addition to the standard offerings of 45- and 60-mil membranes. All of these advances have improved the life-cycle performance, resiliency, energy savings, and installation efficiency of EPDM membranes. Manufacturers have recognized this improved performance and can now offer 30-year total system warranties on their installations as well as a 40-year nonprorated warranty option for the material alone.

Some of the defining characteristics that need to be specified for a resilient, high-performance roofing system are as follows.

- **Membrane:** Thicker and more durable 90-mil EPDM, 75-mil reinforced EPDM, or 145-mil EPDM with special fleece backings are available.
- **Splices:** Six-inch-wide splice tape for added peel, shear, and water resistance compared to the typical 3-inch splice tape. Six-inch factory-applied tape greatly exceeds the peel and shear strength of hand-applied seams while delivering a permanent, watertight bond. A seam applied in a controlled factory environment is a tremendous advantage that enhances workmanship.
- **Flashings:** All critical flashing details should be double wrapped with 90 mils of pressure-sensitive flashing.
- **Detailing:** Lap sealant needs to be applied to the exposed edge of all seams, flashings, and joints.
- **Adhesives:** Standard and low-VOC solvent-based bonding adhesives must be properly applied per manufacturer and industry standards.
- **Cover boards:** Usually a minimum ½-inch-thick rigid cover boards should be installed.

Images courtesy of Construction Specialties



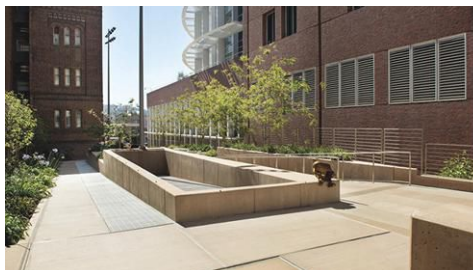
The seismic expansion joint cover system shown on the left is designed to handle everyday thermal expansion and contraction, as well as seismic movement in which the center pan pops up when the joint opening narrows and settles back into place after a seismic event. The photo on the right shows moat covers incorporated into the sidewalk surrounding the Zuckerberg San Francisco General Hospital and Trauma Center. Because the moat cover pans can accept matching floor materials, the covers integrate seamlessly into the sidewalk.



The Wausau, Wisconsin, middle school and high school employed high-performance EPDM roofing for long-term durability and resiliency while achieving very favorable life-cycle costs.

- **Insulation:** Coated glass facing versus standard paper faced polyiso, upgraded to 25 psi.
- **Fastening density:** Increased to one fastener per 2 square feet in lieu of the typical one fastener per 4 square feet.
- **Insulation adhesive density:** Increased to 4 inches on center in the perimeter and 6 inches on center in the field.
- **Perimeter securement:** Six inches on center attachment compared to the typical 12 inches on center.
- **Metal edging:** Engineered systems with high-performance values.

By paying attention to these details, every critical component of a 30-year EPDM roofing system is enhanced to deliver the optimum resiliency performance when the time comes that it is needed the most. Samir Ibrahim, director of design services at Carlisle SynTec, has seen firsthand the notable increase in performance of such systems. “EPDM thermoset roofing membranes feature superior UV and heat resistance along with excellent hail resistance,” he says. “Ninety-mil EPDM is thicker, more durable, and the basis of design for 30-year warranty roofing systems. The end results are that EPDM roofing systems can be designed to handle Mother Nature’s worst, whether it be 100-mph winds and driving rain, 2-inch-diameter hail, unusual snow loads, or intense UV/heat exposure.”



Photos courtesy of Carlisle SynTec Systems



SEISMIC RESILIENCE

While many threats to a building come from above, seismic activity in the form of an earthquake comes from the ground below. Hence, the design of a building foundation and everything around it becomes important to address resiliency and safety when seismic events occur. Toward that end, an engineering technique known as base isolation has been developed and used across the Pacific Rim, including the United States. This technique recognizes that if a building is constructed in a conventional manner, its base (i.e., foundation) is directly connected to the surrounding earth. During an earthquake, that connection will cause the building to move right along with the earth and potentially sustain extensive damage as a result. The isolated base approach disconnects the transfer of seismic forces in the earth from the building by resting the foundation on flexible bearings or pads known as base isolators. The isolators work much the same way an automotive suspension system does when a car encounters a bumpy road and absorbs the shock. In the same way, the base-isolation system absorbs the earthquake movement instead of the building. That means this system can make buildings that are otherwise vulnerable to earthquake damage, such as medium-rise masonry (stone or brick) or reinforced concrete structures, safer and more capable of withstanding earthquakes. Engineers who use it do point out that it of course is not suitable for all types of structures and works best in hard, not soft, soils.

In conjunction with base isolation and other seismic mitigation measures, seismic expansion joints are also needed, particularly for larger buildings. The purpose of these joints is to separate different parts of the building from each other or to separate outdoor areas that are connected to the ground (i.e., patios, plazas, roadways, parking structures) from base-isolated buildings and structures. It is common to use expansion joints for thermal movement in buildings, and the techniques and finish options for that are well known. Seismic expansion joints pose a larger challenge in that both sides of the joint will not only be moving suddenly and dramatically, but



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Photos courtesy of Ross Technology

A low-profile post-and-beam perimeter fence is shown around an industrial plant on the left, while the results of a successful crash test are shown on the right.

they also need to be designed to allow a much greater moving distance. Seismic expansion joints on the order of 12 inches, 24 inches, or even 30 inches are not unusual. The design issue becomes bridging that gap to make a building or site surface usable during the majority of time that earthquake forces aren't being imposed.

In response to this situation, manufacturers have developed some very sophisticated expansion joint cover products that can aid in the functionality of a building before, during, and after a natural disaster, such as an earthquake. The cover is basically a structural (i.e., walkable or drivable) surface that can span the gaps formed by the seismic joints. During a seismic event, some covers are designed to pop up out of the way, allow for the movement going on in the ground, and then return back into place once the seismic movement ends. That means that these covers are not intended to be sacrificial and therefore require minimal repair after a movement event. Because of the ability to return back to its resting position after an earthquake, it also eliminates the concern that the cover might block egress areas or cause tripping hazards.

Manufacturers of such expansion joint covers understand that there are many unique project situations and therefore offer a range of standard choices and will often work with architects on custom-designed solutions as well. Large joints or moat covers are available that are designed to accommodate base-isolated buildings in seismic zones. These covers surround the perimeter of the base-isolated building and, during a seismic event, they too will pop up out of the ground and return to their place after the event. Some seismic expansion joint cover systems have center pans that are strong enough to be filled with surrounding floor or wall finishes, which minimizes the cover's sightlines for an aesthetically pleasing look. For example, a seismic moat cover system can accept concrete or terrazzo so that it blends in with the sidewalk or surfaces that typically surround a building. In other cases, expansion joint covers

will span across areas where vehicular loads travel on a daily basis, imposing heavy and frequent loads. The good news here is that yes, some cover systems can handle these heavy loads, but it is important to notify the expansion joint cover manufacturer of the kind of loads that will be crossing over the cover so it can ensure that the proper heavy-duty cover is selected and installed.

Gabe Blasi, CSI, CDT, is the senior general manager with Construction Specialties. He points out that "expansion joint cover manufacturers work closely with architects, engineers, and facility owners to provide attractive, proven products that augment the seismic performance and resilience of buildings." It behooves design teams, then, to consult with these companies to understand the options and capabilities of the available products so that the best choices can be made for specific building conditions.

SECURITY THREAT RESILIENCE

Having looked at some environmental hazards, let's turn our attention to the man-made hazard of security threats. It has become increasingly clear that serious security threats demand educated planning and proven protection. As radical threats have increased in both frequency and methodology to government facilities, critical infrastructure, and commercial properties, designing a resilient building now also requires designing for security. The process is similar to other resiliency design based on identifying potential risks, understanding industry standards, and providing tested solutions, all within the constraints of meeting the daily operational requirements of the facility, the construction budget, and architectural design objectives.

One of the key components of a good security design is protecting the perimeter of the property or facility. In particular, unauthorized vehicular entry has been recognized as a significant hazard with understandably high risk levels due to the potential for dramatic property

damage, infrastructure disruption, or human casualties. Creating a vehicle secured perimeter includes at least two components. The first is a continuous barrier or protective device along all exposed edges of a property where a vehicle could otherwise breach the perimeter. The second component is a secure gate or entry point to allow authorized vehicles to enter but then return to a secure or closed position. We will look at each of these components separately.

Barrier Fencing

A traditional approach to protecting facility perimeters is the use of chain link or ornamental fences. These may slow or stop pedestrian attacks but are not designed to thwart vehicle attacks. Similarly, highway cable barrier systems are engineered primarily to withstand a glancing impact but not stop a direct frontal approach. The only truly effective vehicle-attack protection is to use a crash test-certified, truck-stopping barrier capable of handling a head-on impact from a vehicle traveling perpendicular to the line of the fence. Such systems are typically engineered to meet U.S. Department of State (DOS) or ASTM testing standards, while addressing common challenges associated with installation, maintenance, restrictive site conditions, and harsh environments. Whether used as a stand-alone system or in conjunction with new or existing anti-pedestrian fencing, this approach can provide anti-ram level protection to the perimeters of high-risk facilities, such as data centers, refineries, chemical plants, utility stations, military bases, and airports.

Continues at ce.architecturalrecord.com

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PRODUCT REVIEW

Exploring Resilient Building Design

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Ross Technology

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XL-501 Post-and-Beam Anti-Ram Fence

Ross Post-and-Beam Anti-Ram Fence safeguards high-risk facilities that require maximum protection against vehicle-borne attacks. Tested to ASTM F2656 M50 P1 standards, the innovative 30-foot clear span beam design reduces overall project costs, simplifies installation, and provides superior aesthetic appeal compared to traditional cable systems.

RossTechnology.com/CEU

Walz & Krenzer, Inc.

Photo courtesy of Walz & Krenzer, Inc.



Removable Lip Seal Flood Barrier

Removable lip seal flood barriers require no tools to deploy. Just place the panel in the permanently attached frame and slide the two top latch bolts in place. Features include a flush sill, lightweight construction, increased reliability (no inflatable gaskets), and small radius corner.

www.stopfloods.com

Construction Specialties

Image courtesy of Construction Specialties



SSR Seismic Floor Cover

Construction Specialties' SSR seismic expansion joint cover is designed to handle everyday thermal movement as well as multidirectional movement that occurs during an earthquake. This virtually invisible floor cover accepts a variety of floor finishes to provide a seamless transition over expansion joints.

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Photo courtesy of MacRostie Winery & Vineyards by Gould Evans/Bruce Damonte



Interior spaces can be linked to outdoor settings through glass windows and doors, roof decks, clearview railings, and the use of natural materials.

Exteriors and Outdoor Design

Design trends for exterior spaces and four-season rooms

Sponsored by AGS Stainless, Inc., Bison Innovative Products, Panda Windows & Doors, and Western Red Cedar Lumber Association | *By Elena M. Pascarella, RLA, ASLA*

There's a lot to love about the outdoors, and this course will explore ways that architects and designers can make inviting and comfortable outdoor spaces that link the outdoors to the interior. There are a variety of products and materials that provide options for designing patios, decks, and outdoor rooms, and that provide experiences in outdoor dining, animated outdoor activities such as poolside recreation, or just relaxing and taking in the surrounding landscape. In addition, outdoor living spaces and rooms can greatly increase the appeal of a home, restaurant, or hotel, and thus increase its value and marketability.

VIEWING THE OUTSIDE FROM WITHIN

One of the ways to link the exterior and interior of a project is through glass. Extending an indoor room to the outside by opening views through

glass windows or doors helps to enhance the interior. Expansive windows and doors allow natural light to penetrate into interior rooms as well as provide a visual extension to an exterior space. Natural light penetrating into interior spaces can also reveal textures and patterns through shadows and provides cues as to time of day.

Appropriately selected windows and doors can also create a space that can be used through the four seasons, even in colder climates. Designers should consider the following criteria when selecting an appropriate window or door system to create a four-season space:

- thermal and energy efficiency,
- ability of the system to accommodate design creativity (i.e., curved walls, corners, etc.),
- impact resistance to storms and severe weather,
- security options,

CONTINUING EDUCATION



1.5 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss the key sustainability criteria (LEED and SITES) that apply to the design of exterior spaces and outdoor rooms.
2. Describe some of the various product systems that are available for designing exterior spaces and outdoor rooms, and understand each system's compliance with sustainability criteria.
3. List design options for exterior deck spaces regarding railings and safety.
4. Explain the ways in which exterior spaces and outdoor rooms can help to meet LEED and SITES requirements of human health and well-being.

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

AIA COURSE #K1707N

CREATING ROOFTOP ENVIRON- MENTS

Wood Tiles | Site Furnishings | Adjustable Pedestals



project: Confidential Global Services Firm (Philadelphia, PA)
architect: Vocon (Cleveland, OH)
contractor: Turner Construction (Philadelphia, PA)
photographer: Halkin Mason (Philadelphia, PA)



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- material durability, and
- ease of system operation.

The window and door product options for creating a visual and physical interface with the outdoors include:

- windows and window systems,
- French doors and pivot doors,
- bifold and folding doors,
- operable glass wall systems,
- horizontal sliding wall systems,
- combination lift and slide door systems, and
- multi-sliding doors.

There are a wide range of material framing systems for windows and door product. Two common systems are all aluminum and combinations of aluminum with wood cladding. The aluminum- and wood-clad frame system provides the reduced maintenance of an aluminum clad finish, plus the aesthetic appeal and warmth of wood. The aluminum is bent and folded over the exterior of the door or window frame to prevent weather from penetrating into the wood frame.

Windows and Window Systems

Windows and window systems are available in various styles and sizes and can be customized to fit the project design. Designers have the option of selecting fixed, casement (inswing or outswing), hopper, awning, sliding, and tilt and turn (inswing only) window products depending on the project requirements. One of the key considerations when selecting a style or type of window is energy efficiency. The National Fenestration Rating Council (NFRC) operates a voluntary program that tests, certifies, and labels windows, doors, and skylights based on their energy performance rating. NFRC labels can be found on all ENERGY STAR-qualified windows, doors, and skylight products. Two major categories that are reviewed by the NFRC with respect to energy performance ratings are Sunlight Transmittance and Heat Gain and Loss.

Windows can gain and lose heat via 1) the direct conduction of heat through the glass or glazing, the frame, and/or door; 2) radiation of heat into or out of the room or building; and 3) air leakage through and around the window and door panels. The U-factor, solar heat gain coefficient (SHGC) and air leakage are evaluated by the NFRC to measure and rate the energy performance of windows, glass doors, and skylights. The U-factor is the rate at which a product conducts non-solar heat flow. The lower the U-factor, the more energy efficient the product.

The ability of glazing to transmit sunlight is measured and rated according to the visible transmittance (VT) and the light-to-solar gain (LSG). A product with a higher VT rating transmits more visible light. The LSG provides a gauge of the relative efficiency of different glass or glazing types in transmitting daylight while also blocking heat gains. For example, window glazing with the newer second-generation low-e coatings are able to

maintain a low U-factor and are also able to reflect solar near-infrared radiation, thus reducing the total solar heat gain coefficient (SHGC) while still providing high levels of daylight transmission.¹

Another example of an energy-efficient window product is a thermally broken aluminum window. The benefits of thermally broken aluminum windows include warmer winters, cooler summers, and a more comfortable living environment. The design of a thermally broken aluminum window includes a polyamide insulator between inner and outer aluminum faces. The result is a permanent thermal barrier that effectively fights energy transfer between the inside and outside and vice-versa.³

PROVIDING BOTH VIEWS AND ACCESS TO THE OUTDOORS USING DOOR SYSTEMS

French Doors and Pivot Doors

French doors can serve as both entry doors and as views to the outside. They are also ideal for creating a smooth flow of pedestrian traffic between the outdoors and indoors. French swing doors using tempered glass can provide panoramic views to the outdoors from inside any home or building

French doors operate by swinging out or by rotating on standard hinges. An optional multi-point locking mechanism allows the door panel to operate easily even when the panel is oversized and heavy. French doors are available with standard hinges or pivot hardware. As the panels are high-capacity in terms of weight and endurance, there is an opportunity for a large swing door that may exceed 70 square feet in a single panel. These systems are chosen often for curb appeal as main entry doors to residences but may also be used in virtually any other application that calls for a large pivot or French door.

Bifold and Folding Doors

Glass folding doors provide an opportunity to gain open views to the outdoors while maximizing the opening in situations where there is insufficient space for wider swing doors. Folding doors can stack or swing and stack to the interior or exterior.

They can be used along a single-track system and can be constructed of multiple panels with up to 10 panels in one direction. The weight of a folding doors' panels is carried along the header, which allows for ease of operation, even with large groups of folding panels. Typical folding doors are available in heights varying up to 144 inches and widths up to 42 inches. Most manufacturers do not limit the number of panels that can be designed for a system configuration. Thus, a system of folding doors has the potential to provide an expansive panoramic view of an outdoor space. Folding doors that offer a recessed U-channel track can provide a seamless transition from the interior to exterior spaces that is also compliant with the ADA. To ensure

Photo courtesy of Panda Windows & Doors



Expansive numbers of folding doors provide opportunities for panoramic views to the outdoors.

security, designers should look for doors that also utilize completely integrated locking and operation mechanisms.

Glass Folding Doors

Glass folding doors provide an opportunity to gain open views to the outdoors while maximizing the opening in situations where there is insufficient space for wider swing doors. Where there is available space in the design, folding doors can be pocketed into the side and completely hidden from view when open, providing an expansive connection to the outdoors.

Pocketing door systems are very popular, as being able to completely hide the door increases the experience of bringing the outside inside, and it also helps to prevent any damage that could occur to the door system while it is closed, such as from children running into it with their bicycles.

Horizontal Sliding Walls and Operable Glass Wall Systems

Multiple panel door systems that operate along a single recessed channel track system are termed horizontal sliding wall systems, and in the case where they are either framed glass or frameless glass, they are sometimes named operable glass wall system. The tracking system uses multiple panels to span large openings without having to stack the tracks, thus eliminating large jamb widths. Additionally, where there is room, these systems are often pocketed inside a closet, providing a fully open expanse when not closed.

Horizontal sliding wall systems allow the designer to create an "operable wall" system that can span oversized openings, while allowing the panel storage in the open position to be minimal. Configurations include independent panels that all stack together when the system is open. They may also be connected similar to a bifold system, however, the hanging wheel sets are then in the center of the panels to more evenly distribute the weight of the panels. Horizontal

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sliding wall systems also provide designers with the opportunity for panoramic views to outdoor spaces. Some systems offer panel heights up to 144 inches and widths up to 60 inches per panel without any limits on the number of panels. Some systems can accommodate panel weights in excess of 1,000 pounds.

Combination Lift and Slide Door Systems

Lift and slide door systems incorporate a specially engineered design and hardware set that allows the user to both lift and slide the door system. By using a large leverage handle, the operator engages a double v-gasket seal at the top and bottom of the door to both open and lock the door. The panels in this type of system use their own weight to compress the double v-gasket seals, which creates a completely weather-tight system when in the “down” position. When in the “up” position, the panels, which can weigh 200 pounds or more, can be easily moved with a few pounds of pressure. Track options can include recessed tracks, which come either with or without a drain channel, and the only visible track is a 3/16-inch rail protruding from the finished floor. Thus, the track is “bare-foot friendly”. This system is the perfect design choice for very large openings. The framing is sturdy aluminum construction that allow the large, heavy panels to operate smoothly and securely. Lift and slide door systems are available in a variety of profiles and styles. For example, they can be installed on curved walls and can be designed to disappear into a pocket, thus providing unobstructed panoramic views.

Glass window and door products provide a variety of options in the design of indoor and four-season rooms, allowing designers to transition from inside to outside. The range of materials and panel sizes as well as the variety of available systems provide great flexibility toward creating an interior-exterior interface that capitalizes on views while creating architecturally exciting designs. Outdoor rooms and four-season rooms provide users and property owners with spaces to relax and support mental restoration as well as

places to meet others and support social interaction, such as at art museums, restaurants, hotels, and other large public spaces.

SUSTAINABLE WOOD FOR EXTERIOR PROJECTS

When considering materials for exterior applications and outdoor environments, wood from the western red cedar has long been revered for its natural durability and beauty. The botanical name for the western red cedar is *Thuja plicata*. The name is derived from *thujaplicin*, which is a chemical substance that is found in mature trees and serves as a natural fungicide, thereby preventing the wood from rotting. Hence, its durability lies in its natural resistance to rot, decay, and insects.

Western red cedar is also a sustainable, resilient tree species, as it has one of the widest growth ranges on the West Coast. It grows in lush forests and mountainsides as well as in many forested swamps and stream banks within its range. According to the U. S. Department of Agriculture’s Plant Guide, “western red cedar is one of North America’s great renewable resources. The range of western red cedar is essentially in two segments: a Coast Range–Cascade Range segment from southeastern Alaska to northwestern California and a Rocky Mountain segment from British Columbia and Alberta to Idaho and Montana.”³ Although the species is slow growing, it is naturally durable and has one of the longest life spans of any North American softwood. According to U.S. Forest Service, this species tolerates shade very well and can thus survive in forest understories. In addition, U. S. Forest Service predictions indicate that this species’ growth rates are likely to thrive as accelerated climate change occurs.

Western red cedar also has a broad range of aesthetic qualities, making it a popular choice in design applications. It is pitch and resin free, which means that it accepts and holds a variety of finishes. It provides both color and texture to projects, as it is naturally imbued with rich tonal properties, and the knotty grades of decking and siding add textural enhancements to designs.

Paul Mackie is known as “Mr. Cedar” in the building industry and is an expert in the properties of western red cedar. In his opinion, “Western red cedar is simply one of the world’s most beautiful woods. No man-made material can duplicate western red cedar’s naturally luxurious appearance.”

Environmental Certifications for Western Red Cedar

Climate change and impacts made by development are adversely affecting the environment, and in turn our communities and our health. Design teams can significantly reduce these impacts by specifying products that have been verified for improved environmental life-cycle impacts. Products whose manufacture or harvesting reduce negative environmental impacts can be certified as environmentally friendly. Cedar is third-party-certified environmentally friendly in the way it is harvested and its forests are managed. Over the past 15 years, the green building industry has invested a significant amount of resources to responsible procurement of forest products. The U.S. Green Building Council (USGBC) encourages the use of construction products and materials carrying environmental product declarations (EPDs) that are calculated through a life-cycle assessment (LCA). LCA is included in LEED v4. EPDs contribute to LEED points. They are created according to internationally harmonized standards and are third-party verified, ensuring that the results for the product are valid. Products with third-party certification (Type III), including external verification, are valued as one-half of a point for credit achievement calculation through LEED. According to its website, the USGBC recently developed a new pilot alternative compliance path (ACP) credit for its LEED rating system. The ACP is designed to further advance environmentally responsible forest management and helps to remove the use of illegal wood by promoting responsible wood sourcing and chain of custody.



The lakeside deck at Black Butte Ranch is made of western red cedar.

CASE STUDY: LAKSIDE AT BLACK BUTTE RANCH, BLACK BUTTE, OREGON

Portland-based architecture firm Hacker won several accolades at the Wood Design awards for the cedar-rich Black Butte Ranch project. The goal for the project was to revitalize the heart of the ranch, giving new life to the original main lodge and pool area, and setting a new standard for resort design in the region. The challenge was honoring the site, which is a sublimely beautiful volcanic landscape, where you can see newly formed land before it was eroded by time. The area borders the moist climate of the Cascade Mountains to the west and the crisp, dry air of the High Desert to the east.

“Such a beautiful and pristine site presents a profound responsibility to design buildings that not only complement but also enhance its surroundings,” says Corey V. Martin, design principal at Hacker.

This deep appreciation for the land led Martin and his team to ensure all aspects of the project minimized energy use and environmental impact. They achieved this by integrating green technology systems and, of course, choosing wood from sustainable resources.⁶



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CEDAR IN OUTDOOR DESIGN APPLICATIONS

Aesthetic considerations and human interaction are not part of the protocols for life-cycle assessments of products, but these qualities are important considerations in design projects. Aesthetic qualities contribute to what people find attractive about a place.

“People who like being outdoors on a deck usually like being part of their natural surroundings,” says Paul Mackie of the Western Red Cedar Lumber Association (WRCLA), articulating the appeal of natural products as compared to the synthetic character of some composites. “If that’s the case, choosing a natural product like cedar is the way to go.”

Cedar is used on a variety of projects from small residences to larger commercial and institutional buildings, and it has been specified as a preferred material on balconies, rooftop decks, and exterior facade cladding. Some examples include the following case studies.

DESIGNING OUTDOORS WITH A ROOFTOP DECK

One of the ways to expand interior spaces into the outdoors is through a rooftop deck. Rooftop decks can provide outdoor rooms for relaxation, entertaining, and dining on both residential and commercial projects. Products used in combination for designing rooftop decks include pedestal systems and modular wood tiles.

The pedestal systems provide the designer with options for creating level decks over sloped surfaces. They can also elevate and support modular wood tiles, pavers, and other surfacing materials over existing surfaces that may be unattractive or that may not be ADA accessible. Pedestals that are manufactured in the United States and made with 20 percent post-industrial recycled materials meet LEED and SITES criteria for recycled content.

Wood tiles that qualify for LEED credits should be commercial grade, constructed from sustainably harvested hardwoods, and available with Forest Stewardship Council (FSC) certified species. Those pedestals and wood tiles that are modular and have interchangeable components provide flexibility with the design composition. Modular systems also provide ease of maintenance, as individual units are easily removed and replaced should any unit become damaged.

Roof Deck Products: Modular Wood Tiles

Modular wood tiles come in a variety of sizes and are fabricated from wood planking. The wood tiles can be fabricated from domestic as well as imported woods. To meet LEED criteria, these woods should be responsibly harvested and FSC certified. Several species of South American (Brazilian) hardwoods, including ipê, cumaru, garapa, and massaranduba, are

popular for the fabrication of wood tiles because these woods are so durable. FSC-certified (FSC-C13454) ipê, cumaru, garapa, and massaranduba wood tiles could contribute to LEED points under Materials and Resources Credit 7 (MR Credit 6 for CS). They could also meet SITES Section 5.9 – Support sustainability in materials and manufacturing.

It is important to note that these wood tiles are constructed from premium-grade remnants from the flooring and furniture industries. These remnants are the waste materials and shorts purchased from other industries so the wood planks are repurposed content. Thus, these wood tiles comply with strict regulations regarding extraction, milling, and transport. In addition, it is important that the imported woods used in fabrication of these wood tiles comply with the U.S. Lacey Act and meet the Brazilian Institute of Environment and Renewable Resources (IBAMA) requirements that show proof of origin and legal harvesting.^{7,8}

Tropical hardwoods are among the preferred woods selected as a source for many modular wood tiles because these tropical hardwoods contain a rich variety of graining and coloration, are exceptionally dense, and are resistant to insects. Modular wood tiles fabricated from tropical hardwoods can be ideal for blending the warm beauty and upscale appearance of real wood with the durability and low maintenance of the tropical hardwood species, thus providing a product that requires minimal maintenance. If maintaining the wood color is desired, wood tiles can be periodically cleaned and sealed. Left to weather naturally, the wood tiles will develop a silvery-gray patina.

Because of their modular characteristic and flexibility, wood tiles can be installed over a variety of surfaces and are adaptable to a variety of sites. Wood tiles can be used to create large roof deck surfaces on top of buildings as well as decks at ground level. Weighing one-fourth as much as 2-inch-thick concrete tiles, wood tiles are a good alternative when surface material weight is a major consideration.

Wood tiles can be laid in a parquet or linear pattern or mixed with other materials, such as pavers, stone, plank decking, or other options, to create unique aesthetics. When used as the sole surface material, modular wood tiles are ADA compliant, as the surface texture and spacing between the units meet ADA criteria. Also, the modular tiles can be removed for routine maintenance, for repairs to the roof, or to gain access to other systems.

The modular wood tiles meet industry standards and certifications for wind uplift, fire ratings, slip resistance, weight-bearing capacity, and seismic. To ensure adequate weight bearing in support of heavier loads, it is recommended that more pedestals be used above the standard 1:2 ratio of pedestals to wood tiles.

CASE STUDY: SCHMIDT ARTIST LOFTS, ST. PAUL, MINNESOTA

In St. Paul, Minnesota, a developer turned a 147-year-old brewery into a live-work-play community that revitalized its surroundings. After sitting vacant for a decade, many of the buildings had fallen into disrepair after attempted remodels from various owners had left them open to the relentless Midwestern winters.

These artist lofts were targeted to young creatives. The building provides a renewed vivacity to the area and creates units with artists’ needs in mind, providing wider doorways to move large pieces of artwork and enough square footage in the units for workspace.

This project was a Multifamily Executive 2015 Adaptive Reuse award winner. The property spent two long years being brought back to life with the help of the local Heritage Preservation Commission, the State Historic Preservation Office, and the National Park Service to honor the building’s iconic history.

The rooftop deck provides scenic views of the Mississippi River that are enjoyed by the entire artist community. The architects used ipê wood deck tiles to provide an inviting, modern retreat for relaxation. The modular wood deck tiles used as the surface material, along with the adjustable pedestals, allowed the architects design flexibility in creating this unique outdoor space.



Schmidt Artist Lofts

Roof Deck Products: Pedestal Systems

Wood deck tiles supported by pedestal systems can be integrated seamlessly to create a rooftop deck that is as simple as it is beautiful. Pedestals have precise integrated spacer tabs that ensure accurate spacing, lock the surface materials in place, and allow water to drain.

Typical pedestal systems have a threaded design, making the leveling process during installation a simple turn of the pedestal base. This allows contractors, designers and installers to accurately plan, precisely align, and uniformly



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install level decks with a combination of ease, speed, and accuracy. Also pedestals that have a broad footprint provide stability and are usually impervious to freeze thaw cycles.

Pedestals can contain 20 percent post-industrial recycled material and could contribute to Materials and Resources Credits Section 4 as a single product contributing to multiple LEED points. This also meets SITES Section 5.3: Design for adaptability and disassembly, Section 5.5: Use of recycled content materials, and Section 5.9: Support sustainability in materials manufacturing.

Products that enhance outdoor views while meeting safety and sustainability requirements are of benefit to the aesthetics and function of a project, as they can provide the user with a close-up experience of outdoor spaces while ensuring user safety. Railing systems that minimally obscure views are one such product.

RAILING SYSTEMS TO ENHANCE EXTERIOR VIEWS

Many exterior spaces, such as decks, patios, and roof gardens, require safety rails to meet code and occupancy requirements. Railing systems with glass panel or stainless cable infills framed in an all stainless steel support structure offer options for providing safety while minimally obscuring views. No other commonly used material can match the timeless beauty and durability of a stainless steel railing system. Custom stainless rails enhance the overall beauty of both the indoor and outdoor living spaces, as custom rails can be considered “functional artwork.” Whereas an original painting or sculpture can enhance a living space, custom rails are not only beautiful, but they also provide a functional use within the space. In addition, cable rail, glass rail, and bar rail infills minimize obstruction of the surrounding view, thus allowing greater enjoyment of landscape views and the environment.

SUITABILITY OF STAINLESS STEEL RAILING SYSTEMS FOR OUTDOOR APPLICATIONS

Ornamental rails add beauty to exterior living spaces, and they should be incorporated into the design at the onset to provide a complete project aesthetic. There are a number of railing styles available in the marketplace, including:

- stainless steel cable railing systems,
- stainless steel glass railing systems, and
- stainless steel horizontal bar railing systems.

Stainless steel is well-suited for railing systems because of its chemical composition. Alloys not found in regular steel, such as chromium and nickel, give stainless excellent corrosion resistance. The origin of the name “stainless steel” comes from the fact that it ‘stained less’ than its parent metal.

The two most common grades of stainless steel for applications like railing, sculptures, and facades are 304 and 316. While similar, the amounts of chromium (Cr) and nickel (Ni) vary slightly (8 to 11 percent Cr, 18 to 20 percent Ni for 304; 10 to 14 percent Cr, 16 to 18 percent Ni for 316). The presence of molybdenum in 316 makes it the best choice for more severe conditions, such as marine, pool, and industrial environments.

PREFABRICATION OF CUSTOM-MADE STAINLESS RAILS VS. LOCAL FABRICATION

When it comes to visual appearance, stainless steel provides a sleek, modern look and can be installed both indoors and outdoors. Creating a beautiful, custom-made stainless steel railing system is not an easy undertaking though, as it requires tungsten inert gas (TIG) welding: a welding skill that requires a fairly high degree of precision and expertise on the part of the metal fabricator. TIG welding is an arc welding process that uses a nonconsumable tungsten electrode to create the weld. In addition, building a custom stainless railing system requires a degree of sophistication and a contractor familiar with the materials. Usually the general contractor subcontracts this work out to a local metal fabricator who estimates, designs, fabricates, and installs the rails. The local metal fabricator will fabricate much of the railing system in its shop, and then, to ensure that everything fits precisely, field adjustments are performed via on-site cutting and welding.

There is an advantage with ‘prefabrication’ in that the railing prefabricator will build out the entire railing system “on paper” first. The prefabricator will adjust all the measurements (down to a $\frac{1}{16}$ of an inch) in CAD, identify and number the system components, and then perform all of the cutting, welding, grinding, and polishing required to build the railing system. When custom rails are prefabricated, the entire railing system ships to the jobsite ready to be installed. Self-installation by the contractor can result in shorter railing installation times and lower installation costs. Additionally, because prefabricated custom rails are built in a quality-controlled environment, the metal fabricator does not have to deal with on-site challenges and other environmental conditions when fabricating the rails.

STAINLESS STEEL CABLE RAIL SYSTEMS

Stainless steel cable railing systems are a good solution when designers are looking for modern and virtually transparent railing systems. These stainless steel cable rail systems provide a linear horizontal aesthetic through the use of thin, highly durable stainless steel cabling. These rails

Photo courtesy of AGS Stainless, Inc.



A stainless steel cable railing system provides panoramic views from this outdoor deck.

can be used for stairways and to secure outdoor living areas. The railing systems are available in standard 36-inch, 42-inch, and custom heights for residential and commercial use. Local codes will dictate the required heights. There are options to powder coat the rails in a choice of colors should clients prefer something other than the brushed satin (#4 finish, 80 grit) stainless steel finish. Top rail styles are available in various geometric shapes and treatments, including elliptical, flat, round, round with lighting, and wood. Mounting options for the posts include top mount on a deck, stringer or flat surface, fascia mount (on the side), or core drill for concrete installations.

Although there are numerous configurations for the structure of the cable, referred to as “the lay,” the most common lay for cable infill is 1×19. This means that one strand of cable is wrapped by 19 strands of cable. This diameter allows for minimal visual obstruction, and the lay (1×19) minimizes stretch. Although both A304 and A316 stainless are commonly used for cable infill, A316 is recommended, as it provides greater resistance to corrosion. A316 is better suited for coastal environments, areas around pools, and heavily salted roadways.

Electro-polishing the cable will provide an even greater level of corrosion resistance. There are a variety of fitting options available, with both adjustable and nonadjustable components, that will accommodate most cable-anchoring scenarios. In most cases, the cables are tensioned at the ends by tightening a nut onto a threaded fitting. This allows for a clean, sleek line.

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PRODUCT REVIEW

Exteriors and Outdoor Design

AGS Stainless, Inc.

Image courtesy of AGS Stainless, Inc.



AGS Stainless Clearview® Rainier Cable Rail System

Rainier cable rail systems are the ideal solution when looking for an exceptionally sleek, modern, and virtually transparent railing system. Rainier features an elegant, linear aesthetic with its custom-made, low-profile stainless steel support structure and thin, highly durable stainless steel cable infill—a perfect fit for stairways, decks, and outdoor living areas.

www.AGSstainless.com

Bison Innovative Products

Image courtesy of Bison Innovative Products



Bison Rooftop Deck Systems

Manufactured in the USA with 20 percent post-industrial recycled materials, Bison Pedestals create level decks over sloped surfaces. Bison Pedestals elevate and support wood tiles, pavers, site furnishings, and a variety of other surfaces. Bison Wood Tiles are commercial grade, constructed from sustainably harvested hardwoods, and available in standard and FSC-certified species.

www.bisonip.com

Panda Windows & Doors

Photo courtesy of Panda Windows & Doors



Demystifying Door Systems

Our line of glass folding doors and other types of folding doors are an excellent way to maximize an opening without having to necessarily pocket the doors. Folding doors are an ideal choice, as they swing and stack to either the interior or exterior.

www.panda-windows.com/products/by-type/folding-doors

Western Red Cedar Lumber Association

Lakeside at Black Butte Ranch by Hacker, photo by Jeremy Bittermann



Real Cedar

Real Cedar is nature's most versatile building material. Rich in tone and texture, this beautiful, durable wood is ideal for contemporary design, especially outdoor applications. It's naturally resistant to rot, decay, and insects. It's also pitch and resin free, which means it accepts and holds a wide range of finishes beautifully.

www.realcedar.com



The Future of Fire-Rated Glass and Framing

A look at the top five innovations in fire-rated glass and framing, and how they are providing aesthetic and code-compliant design solutions

Sponsored by Technical Glass Products (TGP)

From a purely aesthetic perspective, glass undeniably adds contemporary and sleek beauty to modern buildings—whether it’s a big city landscape of soaring high-rise towers or mixed-use spaces with generous windows bringing in natural light to its inhabitants. From offices and education facilities to medical centers and residential apartment complexes, glass has become the go-to choice for designers looking to create open, light-filled interiors and spectacular exteriors with high-design interest.

What is not as obvious to the casual observer, though, is the degree to which today’s sleeker and more sophisticated glazing assemblies can

provide defense against fire. As new combinations of fire-rated glass and frames make their way to the market, design teams can navigate complex code and performance requirements and provide enhanced functionality alongside greater aesthetic appeal and versatility.

When specifying fire-rated glazing products, it is key to understand the differences between the terms fire protective and fire resistive (technically referred to as fire-protection rated and fire-resistance rated). “Fire protective” simply means the glazing defends against the spread of flames and smoke. “Fire resistive” glass provides the same defense against flames and smoke as

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Learning Objectives

After reading this article, you should be able to:

1. Explain the differences between fire-protective and fire-resistive glass and framing.
2. Describe five main innovations in fire-resistive glass and framing, and how they are expanding design freedom in areas with stringent fire and life safety code requirements.
3. Discuss performance, fire-rated building codes and how innovative, fire-resistive glazing products can help meet more stringent codes, particularly NFPA testing standards and 2015 IBC.
4. Identify misconceptions and potential misuse of fire-resistive glazing products, and discuss solutions to ensure maximum benefits.

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Images courtesy of Technical Glass Products (TGP)

fire-protective glazing, but it adds further protection by blocking the transfer of radiant and conductive heat.

This course will primarily focus on fire-resistive glass and framing, their performance, how they help meet stringent safety codes, and ways in which five of the latest innovations—narrow-profile fire-rated frames; versatile cover caps and finishes; structural silicone-glazed (SG) fire-rated curtain walls; butt-glazed fire-rated glass walls; and fire-rated glass floor systems—are changing the future of fire-rated glass and framing from both safety and aesthetic standpoints.

UNDERSTANDING FIRE-RATED GLAZING PRODUCTS: FIRE PROTECTIVE VERSUS FIRE RESISTIVE

The term “fire-rated glass” refers to the complete class of fire-rated glazing products available in the market. Within that wide category, designers can choose from both fire-protective and fire-resistive glazing products. Fire ratings for glass, which are noted on a product’s label, can range from 20 minutes to 3 hours, with the specified number corresponding to manufacturer testing (in accordance with national fire test standards).

How the National Fire Protection Association (NFPA) Testing Works

NFPA testing regulations specify a standard time-temperature curve. For the fire test itself, the standards must be carefully followed while a large furnace heats window frames or doors holding glass. In order to receive a particular rating, the assembly remains in the wall for the duration of the test; there can be no flaming on the exposed surface of the assembly or openings.

Additionally, glass must pass a mandatory hose stream test in which the glass and framing must remain intact. After heating the glass and framing components in a furnace, they are then sprayed with water from a fire hose. This evaluates such aspects as impact, erosion, and the cooling effects of water, as well as eliminating any inadequate materials or constructions that may fail under similar conditions. This test is a critical consideration since most modern buildings include fire sprinkler systems. It is, therefore, imperative to ensure the door or window assembly can withstand the stress and thermal shock levied by the hose stream. A failure of the hot glass would create unsafe conditions in that flames and smoke could spread throughout a building.

In the United States, the hose stream test is required for fire ratings in excess of 20 minutes (in Canada, all fire-rated glass products must pass the test). To earn a fire-resistive classification, glass and framing products must pass both tests, as well as meet temperature-rise criteria.

FIRE PROTECTIVE

- Stops flames and smoke
- “Thin” glazing
- Traditional fire-rated material (wired glass, glass ceramic, hollow metal steel frames, etc.)
- May not exceed 25 percent of the aggregated length of the wall
- May not exceed 120 square feet

Note: Products with fire ratings of more than 20 minutes must pass the required hose stream test.



FIRE RESISTIVE

- Stops flames, smoke, and radiant heat (both glass and frames)
- “Thick” glazing
- Classified as a “wall” rather than an opening (window)
- Both glass and frames must block passage of radiant heat

Fire protective: Fire-protective glazing means the glazing assembly defends against the spread of flames and smoke for its designated fire rating. Such materials include traditional wired glass, glass ceramics, and specially tempered glass. Fire-protective glazing typically is suitable where building codes allow “opening-protective” assemblies, including doors, sidelites, and windows. Such glazing is available with fire ratings ranging from 20 to 180 minutes, with varying impact safety ratings. Since it does not block the transfer of radiant and conductive heat, it is subject to area and size limitations under the applicable building code and/or authority having jurisdiction, specifically the International Building Code (IBC).

Fire resistive: Fire-resistive glazing provides the same defense against flames and smoke as fire-protective glazing, and adds further protection by blocking the transfer of radiant and conductive heat. It is tested to the stringent fire-resistance test standards for walls, including ASTM E119: Standard Test Methods for Fire Tests of Building Construction and Materials and Underwriters Laboratories (UL) 263: Fire-resistance Ratings. While numerous fire-rated building materials are capable of providing this extra safeguard, many are opaque, preventing people from viewing nearby hazards and restricting views within a building. Fire-resistive glazing can serve as a clear alternative.

The product is generally a multilaminate that incorporates several layers of glass with fire-resistive interlayers. The interlayers react during a fire to keep the temperature rise on the non-fire side of the glass below approximately 250 degrees Fahrenheit for the duration of its fire rating. This helps ensure people can safely pass through corridors, stairs, and other areas of egress during a fire. It also helps prevent rapid-fire buildup, which can be catastrophic in high-rise buildings, schools, and other facilities where large numbers of people may be present during a fire.

Given these performance benefits, fire-resistive glazing assemblies are typically suitable where building codes require an assembly designated “fire resistant” to enclose a space. Examples include wall applications requiring a 60-minute or greater fire rating that must meet temperature-rise criteria, such as stairwells, exit access corridors, or other fire barriers dividing interior construction. Due to its heat-blocking characteristics and classification as fire-resistive wall construction, it is not restricted to 25 percent of the wall area. This provides design teams with great flexibility when working to create light-filled and inviting spaces that meet strict fire and life safety criteria.

Where codes deem it necessary, fire-resistive glazing can also protect against the spread of fire between buildings. Its classification

as nondirectional fire-resistive construction (meaning it can maintain the same fire rating from both sides) indicates that it can prevent a fire from traveling to or from neighboring buildings for its designated fire rating. Its transparent form allows it to do so without restricting visibility.

VALUE OF BUILDING WITH FIRE-RESISTIVE GLAZING PRODUCTS

Fire-resistive glazing systems have seen the most number of innovations in recent years. This is due in part because they meet the stringent temperature-rise criteria described above and also pass the test standards for fire-rated wall construction. The fact that they are not limited to 25 percent of the total wall area expands design use.

Additionally, in the last decade, manufacturing advances have given rise to new ways to retain fire-resistive glazing, giving professionals a wide degree of creative design freedom in meeting fire and life safety goals, and providing effective building compartmentation.

TRENDS AND IMPROVEMENTS

Numerous fire-rated glass and framing industry advancements in recent years have set the stage for innovative solutions to be implemented. Before we look in depth at some of those key innovations, let's take note of some of the trends and challenges that led to the need for those innovations.

- Improved optical quality of fire-rated glazing has stemmed from a transition from traditional wired fire-rated glass to clear fire-rated glass that matches the look of nonrated glazing. Fire-rated glass used to be wired (i.e., it had institutional wires in the glass). As such, the product was simply not as attractive as float glass and also had performance limitations. The wires help hold the glass together under high heat from building fires; however, they do not provide high impact resistance. Injuries can result from people breaking through the glass and getting snagged on the wires. Due to these concerns, the 2003 IBC prohibited traditional wired glass in hazardous locations (e.g., doors, sidelites, windows near the floor in schools, daycares, and athletic facilities). In 2006, the IBC extended this restriction to hazardous locations in all facilities. Over the past two decades, all fire-rated glass manufacturers have worked on creating new, clearer, larger, oversized fire-rated glazing that matches the aesthetic of nonrated glazing and provides critical impact safety.
- Fire-rated frame advances have included the transition from bulky, wraparound, hollow metal steel frames to narrow steel fire-rated frames. For inspiration, manufacturers started looking at how European manufacturers were using precision engineering—that is,

taking long steel frames and rollforming them into tubes instead of sheets into very custom-tailored framing systems. Fire-rated frames developed in this way can be much narrower, have crisp edges, and vertical-to-horizontal framing joints without visible weld beads or fasteners. Advanced frames made with thermal insulation and isolation concepts can even earn fire-resistive classifications. So, now they are still fire-rated but also are slender and exceptionally strong due to the strength of steel material.

These improvements have given us stronger frames and larger, clearer fire-rated glass lites, allowing manufacturers to combine the two in a range of different applications in order to create innovative solutions critical to the industry.

For example, designers were once limited to smaller sequences of fire-rated glass, such as doors, sidelites, transoms, and windows. Now, with various fire-resistive glass options and slender, fire-resistive frames at their disposal, they can specify full-lite doors, walls, and floor assemblies, as well as glass installations that exceed 25 percent of the wall area. This includes sophisticated assemblies, such as fire-rated glass floor systems that use a fire-resistive steel framing grid with fire-resistive glass to serve as a code-approved fire barrier between floors and provide sufficient strength to support live, dead, dynamic, and seismic loads.

In addition, fire-resistive glazing products are now multifunctional, providing impact safety, bullet resistance, and even hurricane-resistance.

FIVE INNOVATIONS CHANGING THE FUTURE OF FIRE-RESISTIVE GLASS AND FRAMING

While design professionals need to be aware of both fire-protective and fire-resistive product categories, as previously noted, many recent industry innovations have occurred within the fire-resistive arena as opposed to fire protective. This is due in part to the fact that fire-resistive products pass more codes and give designers more flexibility on the whole.

The following will highlight five innovative solutions in fire-resistive glass and framing systems, including case studies to illustrate each system type.

Narrow-Frame Profiles

Modern fire-rated frames have a slender profile and sleek aesthetic that allow for smooth visual integration with neighboring nonrated applications. Manufacturers are now able to apply thermal insulation and isolation concepts to these fenestration systems, creating narrow frames that earn fire-resistive classifications. When paired with fire-resistive glass, they allow for sophisticated, unlimited areas of glazing in fire separations.

THE EVOLUTION OF FIRE-RATED GLAZING ASSEMBLIES

Spurred by architects' demand for fire-rated materials that maintain visual consistency with non-fire-rated materials, manufacturers set out to improve the optical quality of fire-rated glazing. By the late 20th century, they were producing fire-protective and fire-resistive glazing with color and surface quality comparable to ordinary window glass. While these tough-yet-transparent materials proved a significant improvement over their wired predecessors, design professionals quickly realized they were only as attractive and functional as the framing members holding them in place. Fire-rated frames that are thick and bulky can cause aesthetic discrepancies, impede sightlines, and limit transparency.

The fire-rated frame problem led to advances such as new-generation steel fire-rated frames. Unlike the bulky, wraparound form of traditional hollow metal steel frames, these fire-rated frames have a slender profile and sleek aesthetic. They are available in a wide range of narrow-mullion profiles that feature well-defined corners and crisp edges (rather than rounded profiles). Some products can even incorporate custom cover caps and surface finishes to match surrounding curtain wall and door applications.

Although revolutionary, modern fire-rated frames were only the starting point for innovation. In the past decade, manufacturing advances have given rise to new ways to retain fire-rated glazing, expanding the opportunities for design-forward building compartmentation. From advanced fire-rated curtain wall options with a smooth, frame-free exterior to stunning fire-rated glass floors, design professionals can now select from a number of sleek systems that carry fire ratings up to 120 minutes and pass the tests for solid walls (ASTM E119 and UL 263).

Source: Excerpted with permission from "What's New in Fire-Rated Glass?" by Jeff Razwick, Life Safety Digest, Winter 2016.

Photo courtesy of Technical Glass Products (TGP)

As these innovative updates have taken hold in the industry, today's fire-rated glass systems have been able to sideline a key design challenge that has traditionally vexed designers in areas requiring fire resistance: creating and maintaining visual harmony between fire-rated and non-fire-rated materials. As previously stated, historically, fire-rated glazing tended to have much thicker frames and glass in order to ensure the required fire protection. Although functional in blocking fire and keeping people safe, they lacked the sleek aesthetic commonly available with non-fire-rated frames. This created visual discrepancies with neighboring nonrated curtain walls, windows, and doors. Fortunately, the advancements we've seen in fire-rated frame manufacturing offer solutions to this design challenge. Steel fire-rated frames that are shaped in an extrusion-like process similar to that of other advanced steel frames feature sharp, crisp corners and narrow frame dimensions, enabling a visual match with surrounding applications.

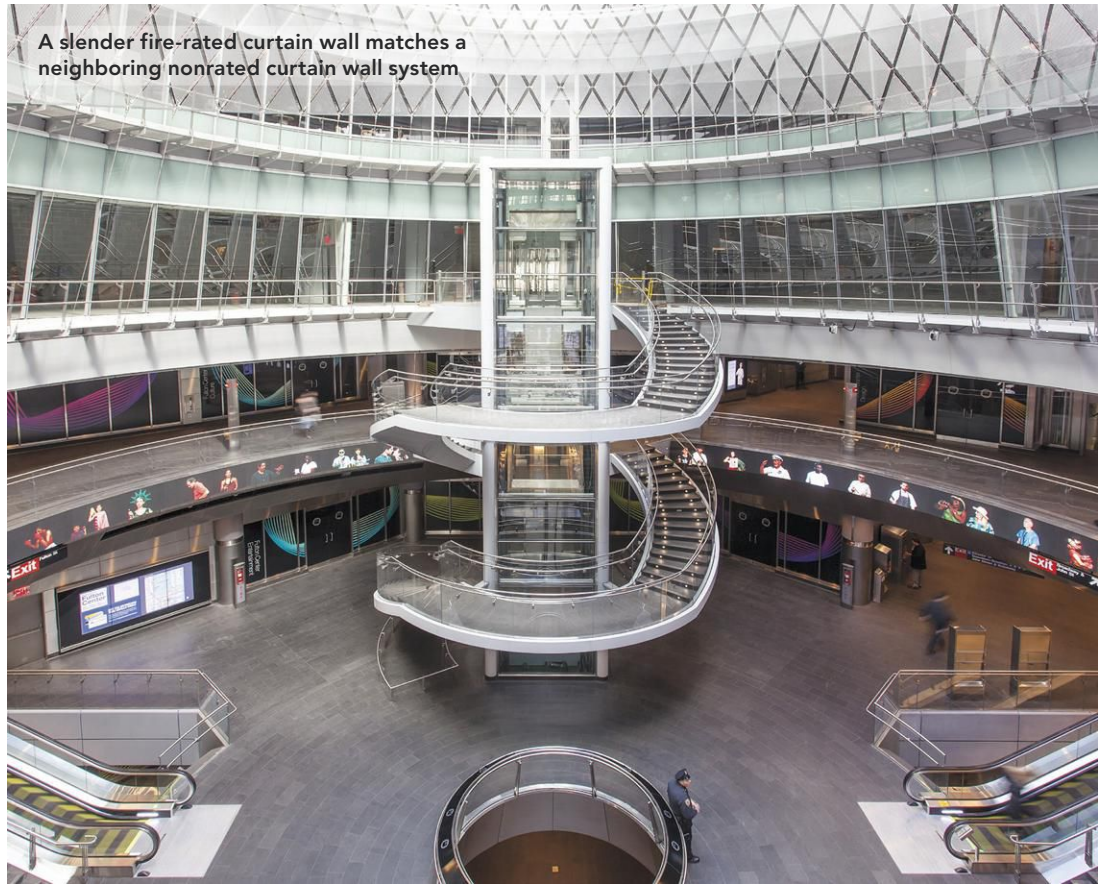
The sleeker aesthetic of steel fire-rated frames is particularly beneficial when the fire-rated glazing is in a highly visible location and can be readily compared to other building elements, such as an expansive curtain wall in an entryway, lobby, or atrium. Crisp frame profiles can also increase internal viewing areas and accentuate the external appearance of modern curtain wall applications, which feature minimalist designs.

Taking integration one step further, some manufacturers are now offering SG fire-rated curtain walls. Such systems feature silicone-sealed glass that provides a smooth, frame-free exterior surface that visually ties with neighboring structural SG curtain wall systems (as discussed later in the course).

Whatever fire-rated frame is selected to match the aesthetic of nonrated systems, it is important to note fire-rated glass requires stiffer frame deflection criteria (under wind load) than nonrated glass. It can also weigh between 100 to 350 percent more than nonrated glass. As a result, design teams may need to increase the framing member size, or reinforce smaller profiles, to limit deflection. This is particularly important when designing fire-rated curtain walls for exterior applications. In instances where a larger profile may restrict the design intent, another viable option is to reinforce the profiles.

▶ Continues at ce.architecturalrecord.com

A slender fire-rated curtain wall matches a neighboring nonrated curtain wall system



CASE STUDY: FULTON CENTER TRANSIT HUB, NEW YORK CITY

Challenge: Located in the Lower Manhattan Financial District, the 180,000-square-foot (16,700-square-meter) Fulton Center integrates five subway stations served by nine subway lines, and includes retail and office space. The Metropolitan Transportation Authority predicts the center will serve as many as 300,000 transit riders daily.

One challenge of the project was matching the aesthetics of the fire-rated curtain walls on the doughnut's upper level and in a prominent elevator core with the non-fire-rated curtain wall system on the doughnut's lower level. To achieve a seamless aesthetic, the designers chose a matched curtain wall system.

Solution: To create matching curtain walls in the Fulton Center, steel framing members were used. Steel frames can be roll formed into tubes instead of sheets and shaped in an extrusion-like process that allows for a wide range of narrow mullion profiles. Because the same manufacturing method can be applied to fire-rated frames using steel back members, it was possible for the fire-rated curtain wall to match the slender frame profiles of the nonrated system used.

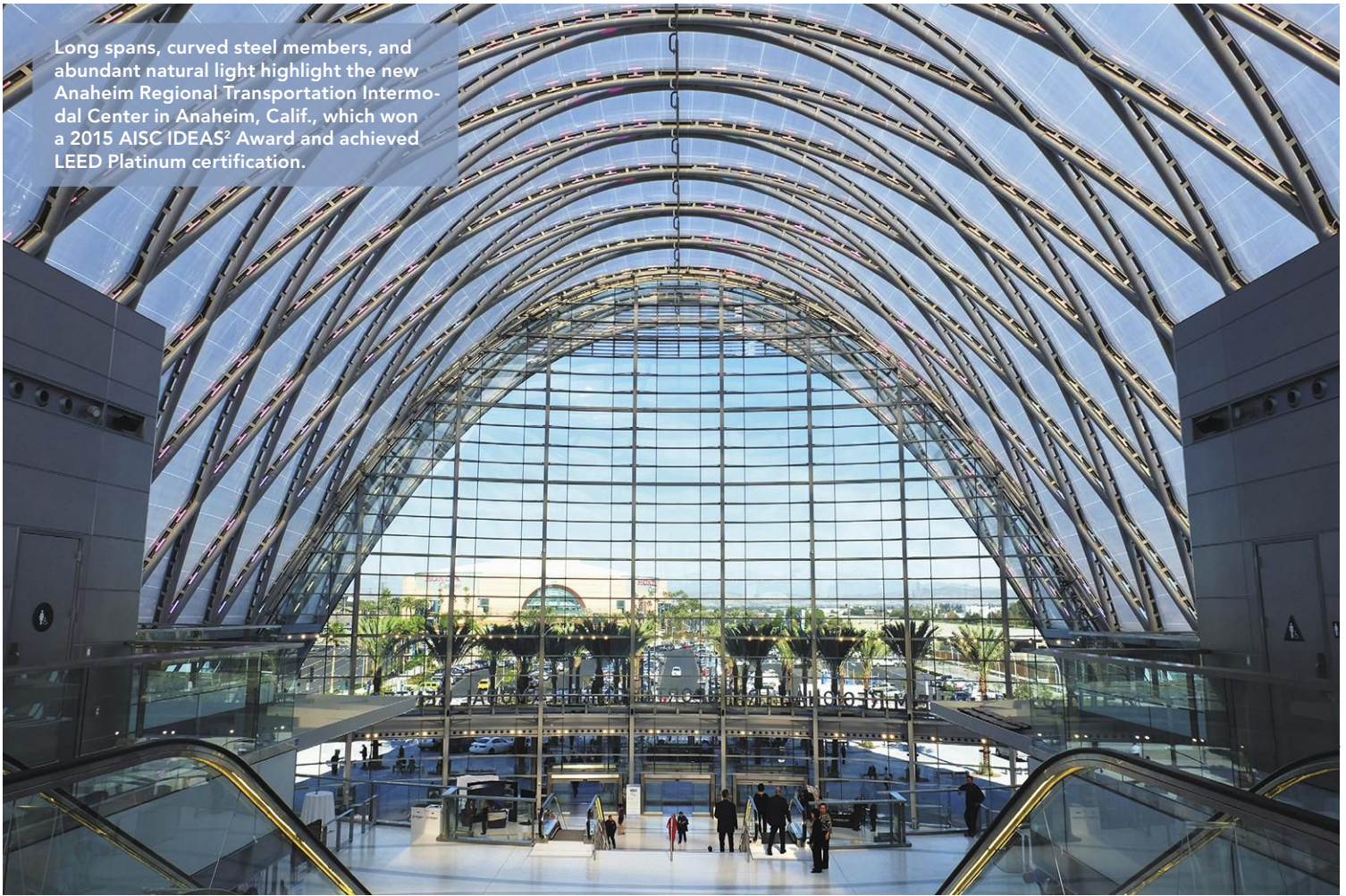
"Because the interior spaces are flooded with light, a crucial part of the design aesthetic was glazed curtain walls with clean sightlines," says Andrew Anderson, associate principal, Grimshaw Architects. "That's easy enough to achieve with nonrated curtain wall assemblies, yet the fire-rated curtain walls we used provide the same crisp, modern look."

Further maintaining the uniform appearance between the two systems, the manufacturer worked with the design team to develop fire-rated insulated glass units (IGUs) using fire-rated glass with the same decorative custom frit pattern used on the non-fire-rated glass.



Technical Glass Products (TGP) is a recognized leader in the fire-rated glass and framing field, offering the FireLite® family of ceramic glazing, Pilkington Pyrostop® transparent wall panels, and Fireframes® fire-rated framing. The company provides AIA-registered continuing education, project consultation, product specifications, BIM models, CAD drawings, and rapid-response quoting. www.fireglass.com

Long spans, curved steel members, and abundant natural light highlight the new Anaheim Regional Transportation Intermodal Center in Anaheim, Calif., which won a 2015 AISC IDEAS² Award and achieved LEED Platinum certification.



Sustainability and Structural Steel: A Closer Look

Sponsored by American Institute of Steel Construction | By Barbara Horwitz-Bennett

While commonly recognized for its high recycled content, structural steel is a multi-attribute building material, the use of which can significantly reduce the environmental footprint of a building.

The steel industry in the United States recycles more tons of waste than any other domestic industry, with 81 percent of all steel products being recycled back into new steel products. Of all steel products, an impressive 98 percent of all structural steel is actively recovered and recycled or reused. The result is that the recycled content of domestically produced and fabricated structural steel used for structural framing systems is greater than 93 percent.

“The production of steel from recycled material can use less than one-third the amount of energy needed from starting with raw ore only,”

states Donald W Davies, PE, SE, president, Magnusson Klemencic Associates, Seattle. “It’s huge when buildings can take advantage of this type of recycling.”

Steel’s recyclable attributes are only part of the story, as there is a larger storehouse of sustainability benefits provided by structural steel. Today we know that steel is much more than a single-attribute material, and we recognize the many attributes of steel that contribute to sustainable construction in many ways.

Consider the following:

- Domestic structural steel mill capacity exceeds current and foreseeable domestic demand, with more than 75 percent of current demand being met by domestic producers.
- Hot-rolled structural steel mills in the United States do not use iron ore, coke, or

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1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. List numerous sustainable characteristics of structural steel.
2. Establish an appropriate methodology for comparing the environmental impacts of structural framing materials.
3. Examine the cradle-to-cradle supply chain for domestically produced and fabricated structural steel.
4. Identify strategies for minimizing the environmental impacts associated with structural steel.
5. Locate available resources for additional information on structural steel sustainability.

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AIA COURSE #K1707G

Photo courtesy of Nucor



This beam blank is exiting the caster prior to reheating and rolling into a structural section.

limestone as primary feedstock materials; no mining operations are required.

- Unlike the legacy steel mills of the early 20th century, today's structural steel mills have highly sophisticated systems to minimize emissions. They are highly automated, environmentally conscious neighbors in the communities where they are located.
- Steel does not lose any of its metallurgical properties when recycled. Consequently, the quality and properties of recycled steel are the same as virgin steel.
- Iron is a nondepletable resource, as all steel can be recycled, and any increase in demand beyond the available supply of scrap can be met by the earth's abundant supply of iron, which comprises 35 percent of the earth's mass.
- Structural steel mills recycle all of the water they use through a closed-loop recycling system. Less than 70 gallons of water is consumed per ton of steel produced.
- There are close to 2,000 steel fabricating firms located throughout the United States that detail, cut, drill, bolt, and weld structural steel for building projects, providing local employment and economic stimulus.

COMPARING STRUCTURAL STEEL TO CONCRETE AND WOOD

In comparing structural steel to concrete and wood, Rob Still, PE, senior structural engineer at T.Y. Lin International, Lindbergh, Charleston, South Carolina, points out that wood is subject to mold, mildew, rot, and termite damage, so while it may be considered sustainable, its life expectancy is generally less than steel or concrete structures.

Compared to concrete, structural steel is a lighter, stronger material, allowing for dimensionally smaller columns, longer spans, greater openness, and reduced foundation requirements.

Of the major framing materials, only structural steel is regularly recycled back into new structural framing material. Some concrete members are down-cycled into road base. The rest goes into landfills, like wood, which cannot be recycled. Structural steel members can also be reused in place or in new building projects.

"The steel advantage really comes from its light weight, speed and ease of installation, and resistance to corrosion and deterioration," summarizes Still.

Furthermore, the steel industry is actively working on new technologies and materials, such as buckling restrained brace frame systems and high-strength steels, to further lighten steel structures. "Both of these advancements are leading to lighter, more efficient, and more sustainable structures," he adds.

Pointing out another advantage of steel over wood, Alison Kung-Kellerer, LEED AP BD+C, associate, Carrier Johnson + CULTURE, San Diego, notes that steel is noncombustible with a high melting point, making it fire resistant and able to be exposed to view. "Wood, on the other hand, most often has to be covered with gypsum wallboard or plaster to be fire resistant," she explains. "Steel is also ductile, rather than brittle, so it can be used more efficiently than concrete when considering seismic forces."

Steel framing also offers the most long-term flexibility in that it easily can be strengthened in the field by welding on stiffening elements should loading needs change over the life of a building, she says.

Another example of the efficient use of structural steel is that it can be used for both the required support of structural loads and as a finish material, according to Tim Keil, RA, associate principal, Studio Ma, Phoenix.

He also adds that "the ability to create seamless members and exploit the material's high

strength through welding is a major benefit over other structural materials."

In a nutshell, if building teams are looking to reduce their carbon footprint, the real secret in the sauce, says Davies, is in making building choices that stand the test of time. "Steel solutions can achieve both resiliency and adaptability for the future in ways other materials can't on their own," he asserts. "The steel industry has always been building hundred-year buildings."

And it remains true as well that domestically produced structural steel is a highly recycled and recyclable material. The recycled content of domestically produced, hot-rolled structural steel is greater than 93 percent. The variation is the result of small amounts of ferrous and nonferrous materials being added during the production process to achieve the proper chemical balance for the specific grade of steel being produced.

Unlike other materials, such as concrete, which is typically down-cycled into road base, steel is 100-percent recyclable, without any loss of the metallurgical properties. Structural steel is a true cradle-to-cradle building framing material.

Of course, it's one thing to be fully recyclable, in theory, but another to actually be recovered and recycled or reused. Industry wise, 81 percent, by weight, of all steel products are recovered, with an impressive 98 percent of structural steel recovered for recycling or reuse. This compares to aluminum's recovery rate of 65 percent and a rate less than 40 percent for wood. Steel, by far, has the highest recovery rate.



Shown during the erection of the structural steel frame, the new 33-story LEED Platinum Tower at PNC Plaza sits on a five-story podium and houses more than 800,000 square feet of commercial office, auditorium, lobby, cafeteria, parking, and amenity spaces. The superstructure is entirely steel framed using composite steel beams with a steel-braced lateral system. In all, the project uses 8,000 tons of structural steel and 200,000 bolts.

PROPERLY COMPARING THE ENVIRONMENTAL IMPACTS OF STRUCTURAL FRAMING MATERIALS

The construction industry, as a whole, consumes a significant percentage of the world's natural resources and energy.

“As architects and designers, we believe that it is our professional responsibility to minimize the impact of the structures we design and build,” states Kevin Nasello, AIA, LEED AP BD+C, senior associate and director of sustainability, Ce-traRuddy, New York. “Analysis of the embodied energy and other environmental impacts associated with each material is an imperative first step to a sustainable building design.”

However, performing a true comparison is a complicated endeavor. Unfortunately, it is not uncommon for building teams to mistakenly evaluate a framing material's sustainability characteristics based upon CO₂ emissions per unit of mass alone. On the contrary, a material's contribution to the environmental impacts of a project are a function of the amount of material used, the process utilized to make the material, and the impacts directly associated with the material. You have to adjust the mass-based numbers to account for the differences in the amounts of each material that would actually be used in the building.

“Framing materials cannot be compared directly to each other,” states John Cross, PE, LEED AP, vice president, American Institute of Steel Construction, Chicago. “Simply put, the same square footage in a building does not require equal amounts of steel, concrete, or wood. Structural steel is a stronger, more durable material, and less structural steel is required to carry the same structural load as would be required of concrete or wood.”

In order for these factors to correctly be evaluated, a more comprehensive life-cycle comparison is in order. For example, building teams must consider factors like the time to construct the building, the carbon footprint required to produce a specific quantity of material, the impact of other systems such as increased foundations in concrete buildings, and the thermal qualities of the materials, says Still.

Adding to the list, Nasello asks the following questions: How is the material extracted at its source? How is it manufactured, including use of raw materials, recycled content, and pollution, as a result? What is the method of transportation to the construction site? What are the means and methods of construction? What about on-site and off-site waste management, use, and maintenance? And if it is demolished, how is it recycled?

Taken together, Davies points out that the longest standing, most durable buildings typically have the potential for the lowest overall carbon footprints because they are correctly evaluated



Photo courtesy of Pragnesh Parikh/MKA

At the Seattle Central Library, the design of a steel diagrid eliminates 90 percent of the aluminum that would typically go into a facade mullion system.

over time. “Those findings get even better when our building materials that are taken out of a deconstructed project are able to be reused for a next-generation design,” he adds.

As opposed to a single-attribute comparison, a whole building life-cycle assessment (LCA) produces a more objective, thoroughly evaluated comparison based upon multiple factors. A word of caution, though, as building teams might mistakenly believe that all a LCA comparison requires is a schematic design of a building, a list of the environmental impacts associated with all of the materials that will be used in the building, and a simple drop-in of the numbers into an estimation tool to create a legitimate building comparison.

“Pushing a ‘smart’ button and receiving a list of comparative environmental impacts for two building alternatives is not possible. In fact, nothing could be farther from the truth,” states Cross.

FOR A MORE ACCURATE LCA

In order to truly conduct a whole building LCA, the project team must answer the following questions:

- What portions of the building are to be considered in the analysis?
- How are the building alternatives selected?
- What is the basis of comparison between the two building alternatives—materials or design?
- At what stage of design should the comparison be performed?

- How will the quantity of materials used in the two alternative building designs be determined?
- How accurate are the material quantities being used?
- Is operating energy to be included in the evaluation?
- What was the scope of the collection of the impact inventories?
- Are all product inventories consistently using the same scope?
- What methodology and assumptions were used in determining the environmental impact inventories for each product or material?
- What is the veracity of the environmental impact inventories used for each material or product?
- What environmental impact categories will be evaluated?
- What level of environmental improvement is desired for each category?
- What level of environmental detriment will be tolerated in each category?
- How will impact categories be prioritized against one another?

While the environmental product declarations (EPDs) furnished by a growing number of building product manufacturers and industry associations can help building teams fill in some of these blanks, they are limited in their contribution toward this end.

“EPDs often measure different variables at the start and end-use stages, and it is a bit of an

apples and oranges comparison,” reports Davies. A better comparison “is a long-term goal, but our industry is simply not there yet.”

As a case in point, MKA was recently commissioned for a project where the client wanted to pursue an all cross-laminated timber (CLT) design. To thoroughly vet the option, MKA created comparative options and analyzed various options, in detail. In the end, the structural engineers parametrically combined the options in optimized building choices.

“Even with the optimized mass timber frame, it was not a clear, low-carbon winner over efficiently designed composite steel or other frame alternatives, when all comparative building requirements, including acoustics and vibration, were taken into account,” he reports.

Ultimately, an efficiently designed composite steel frame showed a slightly lower total cradle-to-grave carbon footprint, but the variability between the EPD data didn’t allow for declaring any one winner on a material-only basis.

“During design, I would argue that true sustainability comparisons are not practical with today’s available material information,” he suggests. “The most sustainable solutions, though, will often come from architects and engineers using materials for what they are most efficiently suited, exposing the materials to limit

secondary finishes, and finding opportunities where more than one function is achieved for each material used. Most importantly, looking for the options that give the greatest chance for the building to remain standing for the longest period of time is key.”

On that note, Christopher Alt, RA, principal, Studio Ma, Phoenix, states that building with steel typically results in more openness and transparency, taking up less space within the floor plate. Overall, this usually yields a higher net-to-gross ratio, freeing up more usable space within the same footprint. Or, conversely, it allows for smaller buildings with the same amount of usable area.

ADDITIONAL LCA RECOMMENDATIONS

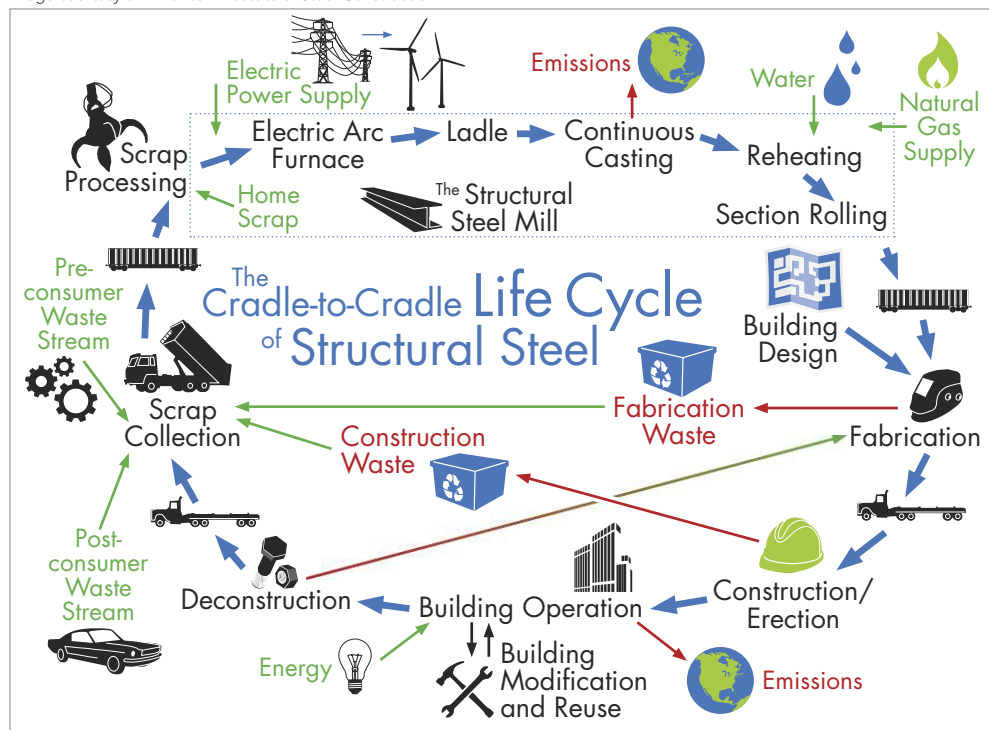
To assist building teams with performing whole building LCAs, the following key points are recommended:

- While simplified tools that estimate environmental impacts may be interesting, they should not be relied upon to accurately determine the relative environmental impacts of two alternative building designs.
- Any whole building LCA comparison must be based on structural quantities determined by a licensed design professional competent in the practice of structural engineering using an analytical design tool, not parametric estimates of material quantities generated by a simplified LCA tool.

neering using an analytical design tool, not parametric estimates of material quantities generated by a simplified LCA tool.

- Just as a competent structural engineer should be determining material quantities, a competent professional skilled and experienced in the performance of whole building LCAs should perform the LCA. This task should not be assigned to a member of the design team who is unskilled in the use and interpretation of LCAs.
- At this point in the evolution of whole building LCAs, the comparison of iterative designs using similar products and materials is much more instructive, reliable, and worthwhile than attempting to compare buildings with dissimilar materials and products.
- Evaluation of building operating energy is best performed outside of the LCA by energy professionals using tools specifically designed for that level of analysis.
- Material producers and product manufacturers should be encouraged to publish environmental impact inventories for their products that clearly delineate the scope and methodology used to determine those impacts.
- Any comparison of materials, products, or combinations of materials and products into assemblies and/or the whole building should only be performed when all products and materials are using consistent scopes and methodologies.
- Rather than rely on a cookbook approach to determining the relative importance of increases and decreases in environmental impacts, the design team should evaluate a broad range of impacts in the context of global, regional, and local priorities.

Image courtesy of American Institute of Steel Construction



Shown is the cradle-to-cradle supply chain of sustainable structural steel.

THE CRADLE-TO-CRADLE SUPPLY CHAIN OF STRUCTURAL STEEL

To truly appreciate the sustainability of structural steel, it is necessary to understand the unique cradle-to-cradle life-cycle journey it takes, a journey that results in the WorldSteel Association referring to steel products as “the permanent material in the circular economy.”

Continues at ce.architecturalrecord.com

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



The AISC Steel Solutions Center provides a wide range of technical information and support services for building teams, including information on the sustainable attributes of structural steel. To learn more about structural steel and sustainability, the Steel Solutions Center can be reached at 1-866-ASK-AISC or solutions@aisc.org.



Exterior porcelain panels show the versatility of ceramic as a durable, sustainable material in this Spanish “lattice house” designed by Emiliano López & Mónica Rivara Architects.

Photo courtesy of Tile of Spain

Innovation and Industry: Ceramic's Sustainable Story

Innovations in the ceramic tile industry have developed a product truly sustainable in every sense of the word: cost effective, durable, and healthy for buildings and occupants

Sponsored by Tile of Spain | *By Celeste Allen Novak*

At the American Institute of Architects (AIA) 2017 Conference, as a response to the nation's unprecedented challenges in the areas of “equity, human rights, sustainability, climate awareness, economic opportunity, and architecture that strengthens community,” 4,436 architects reaffirmed their own “Hippocratic Oath” to care for the planet. This recent powerful statement confirms the idealism and commitment to making a difference in the world through design. In the past decades, the AIA has taken numerous steps to celebrate and encourage advancements in sustainable design from the Committee on the Environment (COTE) to the AIA 2030 commitment design data exchange. These initiatives are driven by powerful environmental data both from the United States and abroad, which shows that not only do buildings change their users, but they also can change their communities as well as larger surrounding ecosystems.

Architecture 2030, a nonprofit organization, began sounding the alarm about climate change with statistics identifying buildings as one of the main culprits in the waste of electricity, natural resources, and a major contributor of greenhouse gas (GHG) emissions.

According to the European Commission, buildings are responsible for 36 percent of the total carbon emissions released into the atmosphere, with urban construction representing around 60 percent of the extractions of raw material in the world, and their consumption of water is equivalent to 12 percent of the total consumed in developed areas, although this can rise to over 60 percent in highly urbanized areas. In addition, the energy consumed in buildings represents 40 percent of the total energy consumption of the European Union, and within this amount, 70 percent is used for heating or cooling.¹

CONTINUING EDUCATION

1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss ceramic's sustainability story through a review of industry standards and research initiatives, such as how life-cycle analysis (LCA), standardized environmental product declarations (EPDs), and product category rules (PCRs) dictate value choices.
2. Compare competitive materials based on lifespan by the amortization of values over time.
3. Develop a shortlist of criteria to select sustainable building materials based on common attributes like durability, maintenance requirements, and performance characteristics.
4. Describe the difference between slip resistance and the dynamic coefficient of friction (DCOF), and specify tiles that can be used in universal design and meet ADA barrier-free requirements.

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

AIA COURSE #K1707E

Not only architects were paying attention to alarming data concerning climate change and the destruction of the planet's natural resources, but owners, contractors and manufacturers of building products are also engaged. As numerous green building rating systems have proliferated, each year brings us closer to developing products that are green from cradle to grave. Industries are beginning to investigate in a life-cycle analysis (LCA) of their products. LCA requires that a producer assess the environmental impacts associated with all of the stages of a product's life from the extraction of a raw materials through processing, manufacturing, use, repair, maintenance, and eventually the re-purposing or recycling of the product (cradle to cradle) rather than the landfilling of materials.

For decades dismissed as a "fad," mere "tree hugging," and a "fashion that would quickly fade," a new building genre is now driving a permanent environmentally conscious sustainability market. "The Drive Toward Healthier Buildings," a 2016 report by Dodge Data & Analytics, documents the benefits and metrics for measuring healthier building impacts.² It reports that 30 percent of all surveyed building owners would like more transparency on product information. According to this survey, in the next five years, 64 percent of the respondents will expect that construction materials and construction techniques will enhance air quality.

New approaches to environmentally friendly buildings will include products that are labeled with LCA product declarations, are chemically safe for the environment and the occupants with no off gassing of harmful chemicals, and improve environmental indoor air quality. Professionals and owners will be requesting materials and processes that find and maintain a balance between construction and the environment. The goal expressed in the United Nations 1987 Brundtland Commission continues to be a valid mandate. Sustainability is development that "meets the needs of the present without compromising the ability of future generations to meet their own needs."

The ceramic tile industry is one vivid example of how an industry is examining and changing its environmental footprint. In addition, these changes are also providing increased manufacturing savings in production and energy. The size of the ceramic construction tile market in the United States is forecast to grow at a rate of almost 10 percent over the next decade.³ Ceramic tile is one of the most widely used flooring materials in the world.

- Ceramic tile is inherently sustainable because it:
- is manufactured in various levels of slip resistance for improved safety on exterior or interior surfaces;
 - is made from 100 percent plentiful and natural raw materials;
 - is recyclable;
 - remains in service up to four times longer than other products;
 - is easily repaired by replacing individual tiles rather than entire installations;
 - is easily cleaned and does not require toxic products, such as detergents, waxes, solvents and shampoos, to maintain, only neutral cleansers and water;
 - contributes to improved indoor air and the reduction of allergies;
 - is not absorbent of smoke, paint fumes, contaminants, or other odors; and
 - is chemically inert and inhibits the growth of mold, mildew, fungus, and other organisms.

As this industry has investigated sustainability initiatives, it has also found new markets. New products include advancements in tiles to meet universal design criteria, new solid countertops, half-inch-thick exterior pavers, and large exterior surface cladding. The industry is now using the

term "gauged" as a new term for a thin tile or porcelain product and there is a vast array of new gauged porcelain and gauged tile products. The ceramic industry is taking a lead in the midst of a major change and approach to healthy, sustainable building materials.

A LIFE-CYCLE INITIATIVE

In Europe, and particularly in Spain, from ancient Alhambra to today's architects who are using ceramics in Passive Haus and LEED projects, ceramic tile has been a prime building material known for its durability and aesthetics. As a response to 21st century environmental initiatives, a new study titled "Sectoral Life-Cycle Analysis of Ceramic Tiles" was initiated in order to offer real and transparent information about the manufacturing, production, and material content of ceramic tiles and their impact on the environment. This analysis developed new sustainability goals for the ceramic industry.

► Continues at ce.architecturalrecord.com

Celeste Allen Novak, FAIA, LEED AP BD+C, is an architect, writer, and planning consultant in Michigan. Her firm concentrates on sustainability, universal design, and rainwater collection systems.



New ceramic markets include these new gauged porcelain slab countertops, which provide an elegant, durable, heat- and stain-resistant alternative to the use of natural stone or laminates.

Photo courtesy of Tile of Spain



A strong global leader, Tile of Spain is the international brand representing 125 ceramic tile manufacturers belonging to the Spanish Ceramic Tile Manufacturers' Association (ASCER). Its objective is to support and promote Spain's tile manufacturers and industry worldwide. www.tileofspainusa.com

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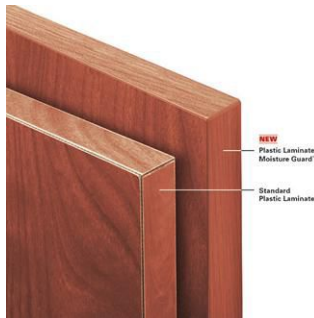
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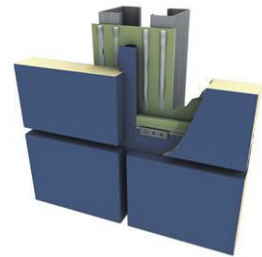
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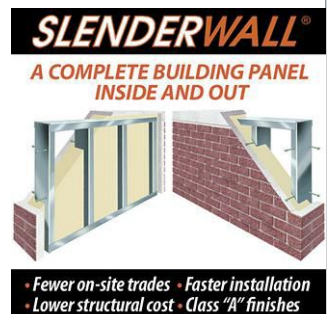
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2017 CALL FOR ENTRIES

Design Vanguard



The editors of ARCHITECTURAL RECORD are looking for the best emerging architecture firms from around the world to feature in our **2017 Design Vanguard** issue. Although we do not have an age limit, we try to select architects and designers who have had their own practices for less than 10 years. Winners will be featured in the December 2017 issue.

There is no fee to enter. For full details and to submit your entry, visit: architecturalrecord.com/call4entries.

Submissions are due September 2, 2017.



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2017 CALL FOR ENTRIES Record Products



The editors of ARCHITECTURAL RECORD are currently accepting submissions for the **2017 Record Products** competition.

Manufacturers and designers may submit items introduced in the U.S. between September 2016 and September 2017. A panel of architects and specifiers will judge the entries on criteria including innovation, functionality, and aesthetics. Winning products will be featured in the December 2017 issue.

The fee is US\$25 per entry. For full details and to submit your entry, visit: architecturalrecord.com/call4entries.

Submissions are due September 2, 2017.

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New and Upcoming Exhibitions

Noguchi's Playscapes

San Francisco

July 15–November 26, 2017

This exhibition, organized by the Museo Tamayo for the San Francisco Museum of Modern Art, will revisit artist Isamu Noguchi's designs for several playgrounds and stand-alone play structures. Observing that playgrounds offer a physical and social interaction not typically seen in a museum, Noguchi designed public spaces where visitors could physically and actively engage with art. Through models, sketches, set designs, and archival images, the exhibition will show Noguchi's visions for new experiences of art, education, and humanity through play. For more information, visit sfmoma.org.

Found in Translation: Design in California and Mexico, 1915–1985

Los Angeles

September 17, 2017–April 1, 2018

This exhibition accompanies a book about design dialogues between California and Mexico. The show will focus on four main themes—Spanish colonial inspiration, pre-Hispanic revivals, folk art and craft traditions, and modernism—and explore how modern and anti-modern design movements defined both locales throughout the 20th century. At the Los Angeles County Museum of Art. For more information, visit lacma.org.

Ongoing Exhibitions

El Helicoide: From Mall to Prison

New York City

Through July 13, 2017

This exhibition, which accompanies the publication of the book *From Mall to Prison: El Helicoide's Downward Spiral*, illustrates the history of an abandoned project in Venezuela known as El Helicoide. Conceptualized in the 1950s as a state-of-the-art mall, El Helicoide was never completed and now remains a ruin in Caracas, mirroring the utopian dreams and dystopian reality of modernity. At the Center for Architecture in New York. For more information, visit cfa.aiany.org.

Young Architects Program 2017:

Jenny Sabin Studio

New York City

Through August 2017

MoMA PS1 hosts an annual competition that fosters innovative architecture by challenging participants to develop creative designs for

temporary outdoor installations that provide shade, seating, and water. This year's winner, Jenny Sabin, conceptualized a piece called *Lumen* that evolves over the course of the day, employing environmentally responsive materials that emit color and cooling mist during the day and glow at night. At MoMA PS1. For more information, visit moma.org.

Temple of Manufacturing

New York City

Through August 5, 2017

This multimedia exhibition traces the travels of Helsinki-based design practice COMPANY (Johan Olin & Aamu Song). The pair journeyed to remote sites around the world to learn crafting processes unique to particular industries and places. Over the past decade, they have collaborated with a variety of communities to rethink the processes and knowledge embedded in these places. The current installation at the Storefront for Art and Architecture features raw materials, drawings, objects, designs, and process documents—as well as a series of frescoes painted in situ—that structured their research. Visit storefrontnews.org.

Hansel & Gretel

New York City

Through August 6, 2017

Pritzker Prize-winning architects Jacques Herzog and Pierre de Meuron team up with artist and activist Ai Weiwei for a large-scale installation commissioned for the Park Avenue Armory. Referencing the story of Hansel and Gretel, the interactive exhibit explores the meaning of public space in a surveillance-laden world. For more information, visit armoryonpark.org.

5x5: Participatory Provocations

New York City

Through September 9, 2017

This exhibition showcases 25 architectural models by 25 young American architects, curated by Original Copy's Kyle May and Kevin Erickson. The projects take various approaches to popular issues, often adopting a stance on topics like our growing income gap, immigration, globalization, technology, surveillance, and power. At the Center for Architecture. For more information, visit originalcopy-nyc.com.

Timber City

Washington, D.C.

Through September 10, 2017

This exhibition explores cutting-edge methods of timber construction, which have led to strong, fire-resistant, and sustainable interpre-

tations of the allegedly antiquated material. Curated and designed by the founding partners of Boston-based architectural-design firm ikd, the exhibition highlights several U.S.-based projects that showcase cutting-edge timber technology like cross laminated timber. This progressive material plays an essential role in moving toward reducing carbon emissions and building more sustainable cities. At the National Building Museum. For more information, visit nbm.org.

Frank Lloyd Wright at 150: Unpacking the Archive

New York City

Through October 1, 2017

Marking the 150th anniversary of the American architect's birth, this exhibition at the Museum of Modern Art comprises approximately 450 works made from the 1890s through the 1950s, including architectural drawings, models, building fragments, films, television broadcasts, prints, furniture, tableware, textiles, paintings, photographs, and scrapbooks, a number of which have rarely or never been publicly exhibited. Visit moma.org.

Lectures, Conferences, and Symposia

The New York Times: Cities for Tomorrow

New York City

July 10–11, 2017

Cities for Tomorrow explores a question often considered by architects, politicians, and city planners alike: how do the greatest cities succeed? Experts, policymakers, developers, creative visionaries, entrepreneurs, and others come together to identify and assess the formulas that lead to flourishing cities and explore rapidly emerging challenges. At The Times Center. Visit nycitiesfortomorrow.com.

Architectural Record's Record on the Road

Washington, D.C.

July 11, 2017

RECORD's Record on the Road event brings together leaders in design to showcase their recent work. Editor in chief Cathleen McGuigan will lead a panel discussion and Q&A on Multifamily Housing Design. A cocktail reception will follow. At The Loft. For more information, visit recordontheroad.com.

IDSA International Design Conference 2017: Design IS Business

Atlanta

August 16–19, 2017

Industrial design strives to improve mass-manufactured products through design. Whether the topic be digitization, electrification, au-

tonomy, or connectivity, industrial designers attempt to surmount barriers, leveraging them as elements. This conference formally brings the strategic advantage of ID into the business world, and will feature speakers who sit at the intersection of design and business. At the Atlanta Marriott Marquis. Visit idsa.org.

Competitions

URBAN SOS 2017: hOUR CITY

Submission deadline: July 17, 2017

Presented by AECOM and the Van Alen Institute, with 100 Resilient Cities, this global competition challenges multidisciplinary student teams to propose solutions to urban issues and support more equitable access to resources, improve the built environment, and enrich quality of life. Students are encouraged to propose policy strategies, business models, and other solutions to address their chosen challenge, but these proposals must be accompanied by a physical intervention at a specific site in a city within the 100 Resilient Cities network. Visit aecom.com.

International Student Tall Building Design Competition

Submission deadline: July 24, 2017

This competition from the Council on Tall Buildings and Urban Habitat (CTBUH) aims to shed new light on the meaning and value of tall buildings in modern society. Participants are free to site their projects anywhere in the world. Proposals should show evidence of a clear understanding of how considerations of structure, environment, servicing, etc., are as vital to the success of a tall building as the form, materials, and aesthetics. Visit ctbuh.org.

YAC Observatory Houses

Submission deadline: July 26, 2017

The Observatory Houses project, launched by the Rimini Fair and the Italian government, is creating “observatory houses” – “places of spirituality and meditation” – in Italy, near the castle of Roccascalegna. Participants can submit designs of a hotel-observatory that is sustainable and allows for observation and gazing at the sky. For more information, visit youngarchitectscompetitions.com.

Planetarium: The Experience of Space

Submission deadline: August 11, 2017

Eleven magazine’s latest challenge invites creatives around the world to imagine a new typology of planetariums, one that reflects today’s renewed interest in space

as well as an emerging understanding of our world. Visit eleven-magazine.com.

SHOWING—Alternative Designs for Museums

Submission deadline: August 28, 2017

This competition aims to develop a design proposal for new ways to experience the museum. Participants are urged to combine considerable programmatic innovation and design tools to conceptualize a device, piece of furniture, interior design project, pavilion, building, or urban plan that is unconventional. For more information, visit nonarchitecture.eu.

Duravit Designer Dream Bath Competition

Submission deadline: September 8, 2017

For its fifth year, this competition invites designers and architects to reimagine their own bathrooms to feature a range of Duravit’s top collections and design solutions, Luv and DuraSquare. The competition also features a Built category, in which designers and architects may submit their completed residential, commercial, small-space, or hospitality projects featuring any Duravit products. For more information, visit duravit.us.

AIANY COTE Awards

Submission deadline: September 15, 2017

The AIA New York Committee on the Environment established the AIANY COTE Awards in 2014 with the goal of redefining how design excellence is evaluated, sharing new thinking and techniques, and inspiring creative thinking about design. This year’s awards will recognize achievement in designing results-oriented buildings in the urban context. Visit aianycoteawards.org

Amber Road Trekking Cabins

Registration deadline: September 27, 2017

The Amber Road Trekking Cabins architecture competition, in partnership with the Latvia Nature Conservation Agency, is calling for designs for a series of cabins to be situated along a new trekking path that will span the full length of Latvia. The Amber Road trekking path will run along the Baltic Sea beaches, allowing hikers to traverse the entire country. For more information, visit amberroadtrekkingcabins.beebreeders.com.

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



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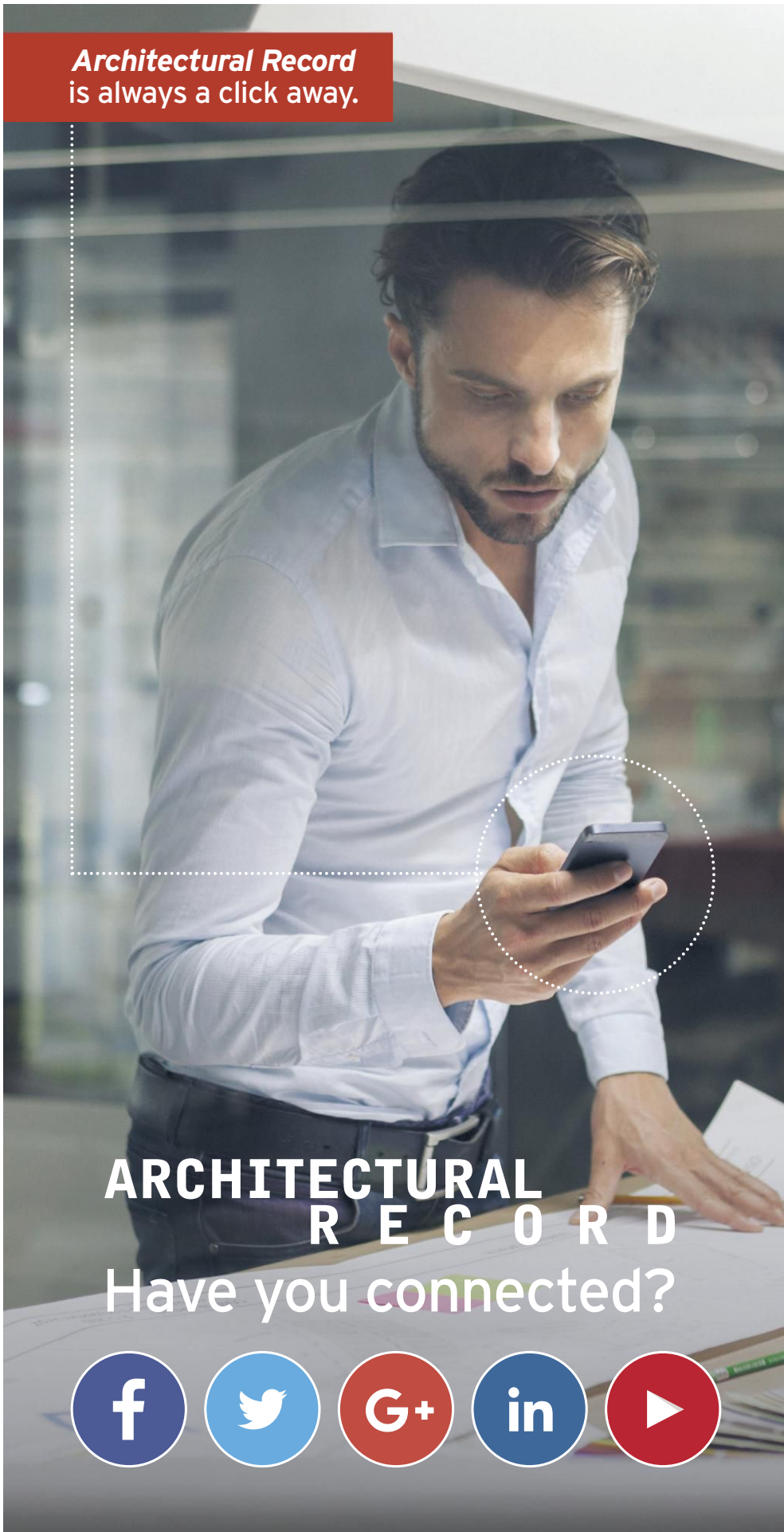
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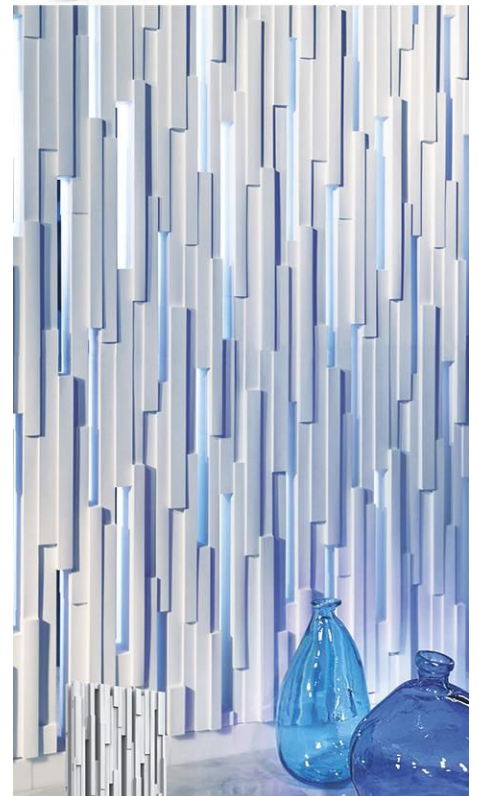
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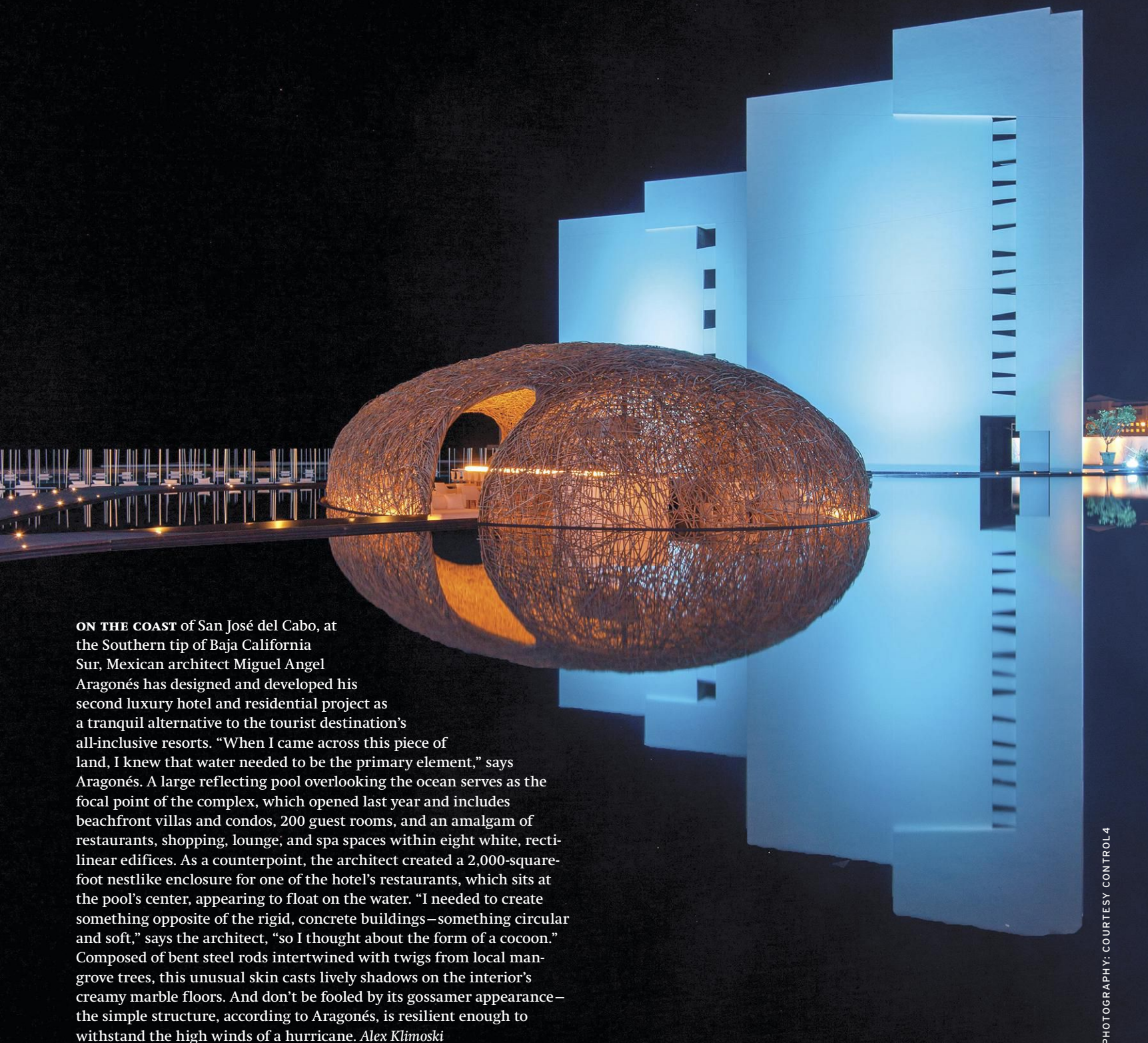
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PROJECT HOTEL MAR ADENTRO
 LOCATION SAN JOSÉ DEL CABO, MEXICO
 ARCHITECT MIGUEL ANGEL ARAGONÉS



ON THE COAST of San José del Cabo, at the Southern tip of Baja California Sur, Mexican architect Miguel Angel Aragonés has designed and developed his second luxury hotel and residential project as a tranquil alternative to the tourist destination's all-inclusive resorts. "When I came across this piece of land, I knew that water needed to be the primary element," says Aragonés. A large reflecting pool overlooking the ocean serves as the focal point of the complex, which opened last year and includes beachfront villas and condos, 200 guest rooms, and an amalgam of restaurants, shopping, lounge, and spa spaces within eight white, rectilinear edifices. As a counterpoint, the architect created a 2,000-square-foot nestlike enclosure for one of the hotel's restaurants, which sits at the pool's center, appearing to float on the water. "I needed to create something opposite of the rigid, concrete buildings—something circular and soft," says the architect, "so I thought about the form of a cocoon." Composed of bent steel rods intertwined with twigs from local mangrove trees, this unusual skin casts lively shadows on the interior's creamy marble floors. And don't be fooled by its gossamer appearance—the simple structure, according to Aragonés, is resilient enough to withstand the high winds of a hurricane. *Alex Klimoski*

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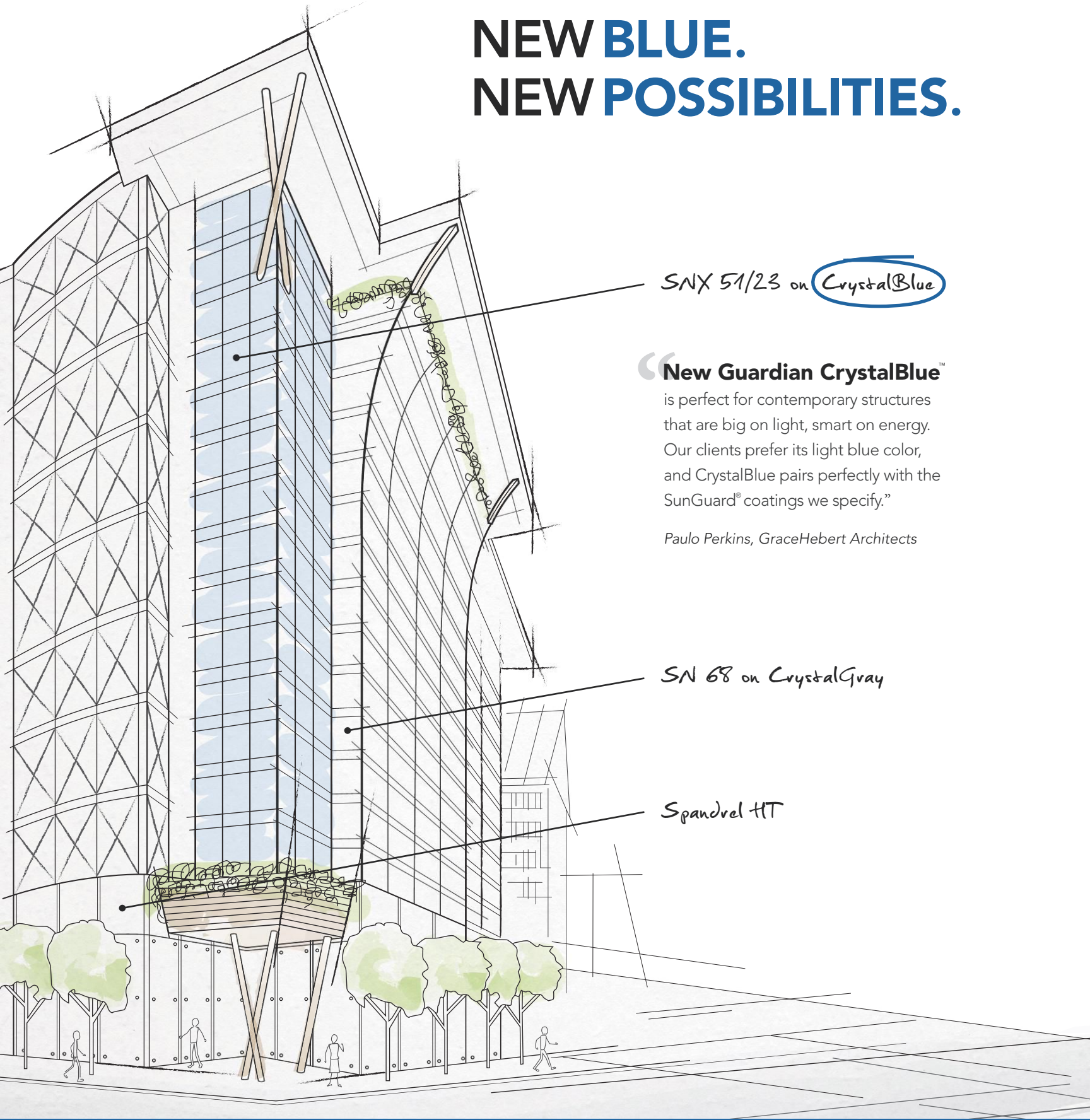
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