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Instant Replay

With four consecutive Stanley Cup victories in its history, the **Nassau Veterans Memorial Coliseum** is a beloved fixture of Long Island life. When the owner of the 1972 arena decided to reward fans with a renovation worthy of its storied past, it reimagined the venue with an overcladding that would bring new life to the facility. With a design by **SHoP Architects** and **Thornton Tomasetti**, the new folded-ribbon facade of composite aluminum fins connects to the original structure with a minimum of intervention, ensuring thoughtful reuse of a venue that still has a lot of wins in its future. Read more about it in **Metals in Construction** online.

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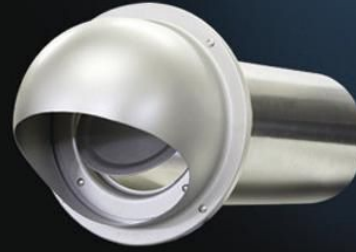
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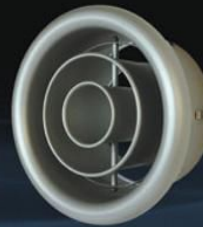
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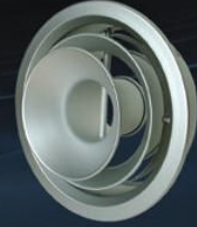
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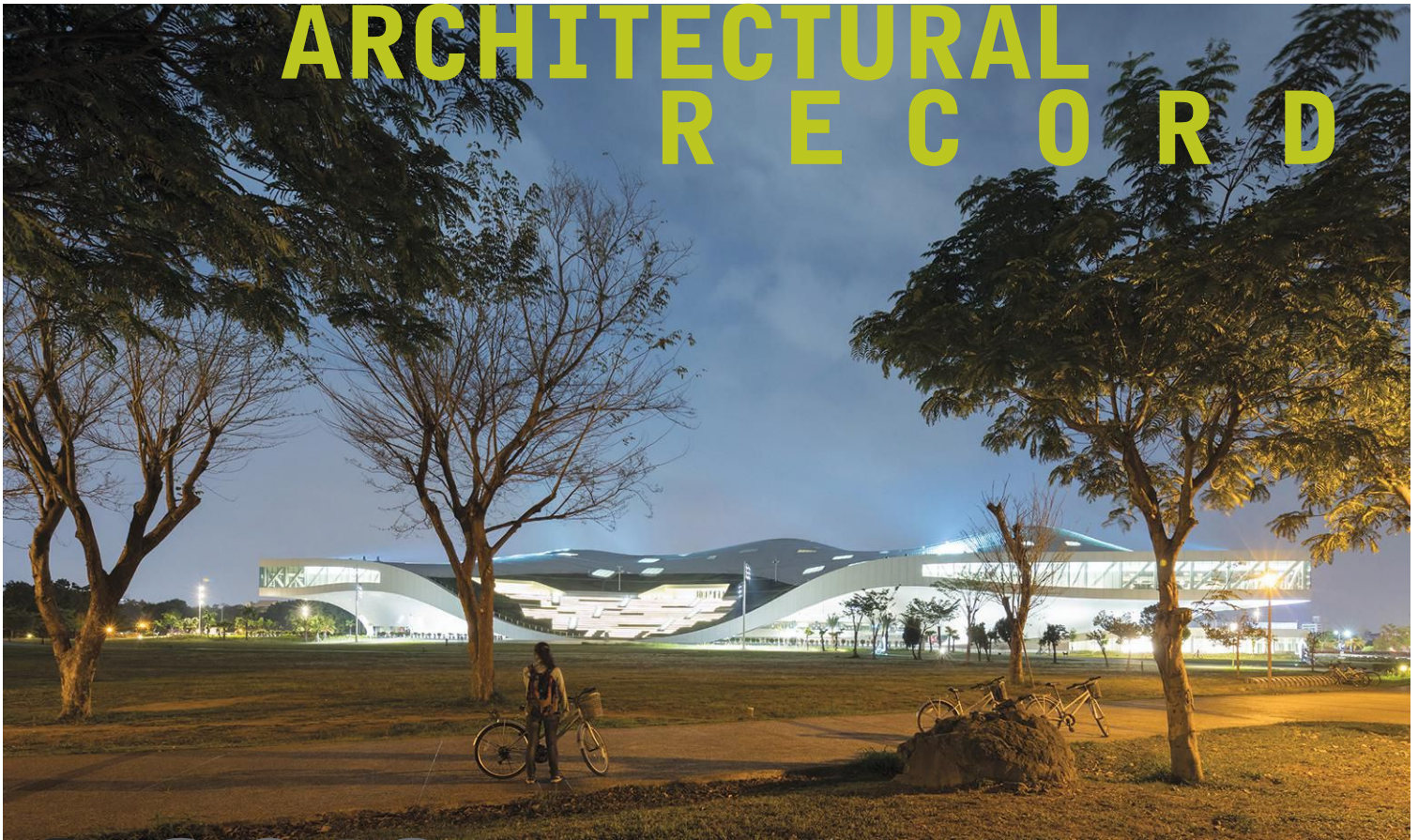


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the Year**

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THIS PAGE: NATIONAL KAOHSIUNG CENTER FOR THE ARTS, TAIWAN, BY MECANOO. PHOTO BY IWAN BAAN.

COVER: UCCA DUNE ART MUSEUM, CHINA, BY OPEN ARCHITECTURE. PHOTO BY WU QINGSHAN.

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for the RECORD

Beyond the printed page: highlights from our website, live events, and other happenings.



RECORD PRODUCTS JURY

The seven jurors of this year's Record Products competition spent a full day at our offices in the Empire State Building, going through hundreds of entries.



ON-CAMERA ARCHITECT

Watch a new video interview with architect John Ronan, who stopped by the Architectural Record studio to discuss his new project on the campus of IIT in Chicago, featured in our November issue.



AMAZON ANNOUNCES HQ2

In mid-November, Amazon named the locations for its two new corporate offices: Long Island City in Queens, New York (above), and Crystal City in Arlington, Virginia. Read our coverage of this developing story online.



RECORD EVENTS

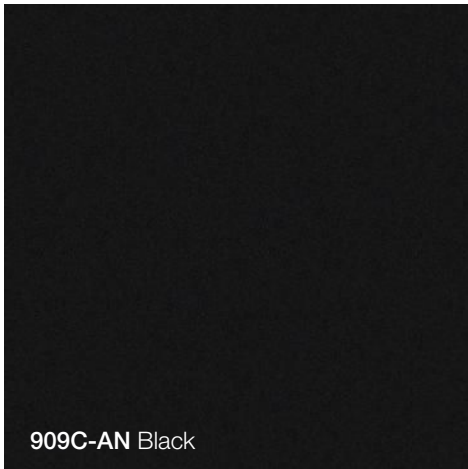
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Innovation and Resilience

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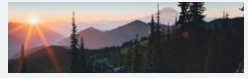
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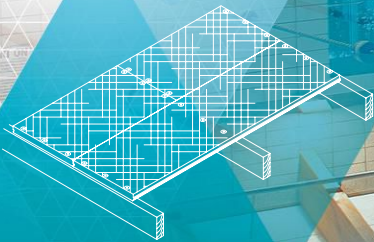
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Beyond Eye Candy

Photography has become essential to the culture of architecture.

RECORD, AS EVERYONE KNOWS, is an architecture magazine, but, you could argue, it is actually a photography magazine on the topic of architecture. Yes, our editors and contributors report and write extensively on architectural projects and provide deep knowledge about construction, site conditions, materials, and technical particulars. We include drawings of plans, sections, and details. Yet it is hard to imagine ARCHITECTURAL RECORD without pictures, almost always in color—the ubiquitous language for translating the world of three dimensions into two.

In this issue, we bring you stunning photographs of new projects, as usual—in this case, cultural centers from Taiwan to Ohio, with reports by writers who visited all of them. But in a special feature, we also explore the power of the architectural image, which shapes “the understanding of the work across time, positioning it in the universe of references that makes up the history of the field,” as Pierluigi Serraino writes in “Partners in Time,” an essay that looks at the impact of the great 20th-century photographers—Ezra Stoller chief among them—on how we have come to view the work of the Modernists who commissioned them (page 44).

Since its very first issue 127 years ago, RECORD has been part of that universe of references, fixing photographs into our collective image banks where architectural culture is stored. Today, we continue in that role, curating pictures from the best photographers for the pages of the magazine. Their work interpreting contemporary architecture is as critical as ever, especially in a world flooded with every kind of image, good and bad, on Instagram and the Web.

Architectural photography remains an intensely personal enterprise. Stoller methodically charted every shot of a building in advance, like a filmmaker crafting a storyboard, and today’s top architectural photographers each have their own approach. For RECORD’s Portfolio (page 46), we talked to a number of photographers—as well as architects—to learn how they like to capture buildings. RECORD contributor Iwan Baan, who has been hugely influential in depicting human activity and the urban context when he shoots structures, doesn’t even like being called an architectural photographer. “Buildings and cities are the backdrops now,” he says, “but I’m still focused on how people live.” On the other hand, Roland Halbe, another RECORD contributor, creates images that are more formal—what he terms “a mix of documentation and emotion.”

Almost all photographers today use digital cameras, of course, though some told us about the days of shooting on film—a “very unforgiving medium,” recalls Jeff Goldberg. He likes the spontaneity of working with his small Canon DSLR, and rarely needs artificial lighting because of the ability to correct tonality on the computer—and “to remove small pieces of garbage, which I used to pick up by hand.” But



the London-based Hélène Binet, who has shot extensively the work of Zaha Hadid and Peter Zumthor, is a purist—she mostly shoots black-and-white and uses an Arca-Swiss 4x5 film camera. “It’s like a performance,” she says. “You have to be very good in the moment; you don’t get a chance to fix it later.”

Despite the varied moods and methods of the photographers we spoke with—as well as many others whose work we regularly publish in RECORD—they are all devoted to the enormous challenge of capturing not only the details of architecture but expressing the experience of space and scale.

For RECORD, photography is a tool to convey what editors or writers have encountered firsthand. With that knowledge, we assemble a collection of images—almost always by a single photographer for each project—to bring the reader a sense of a singular experience. And that visual expression of architecture becomes part of the universe of references for the history of our time.

A photograph can be a beautiful thing in itself, of course. But it can’t substitute for being there. It is only, to paraphrase Stoller, the next-best thing.

Cathleen McGuigan

Cathleen McGuigan, Editor in Chief

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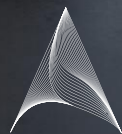
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—New York governor **Andrew Cuomo**, affirming that Amazon's selection of Long Island City as the location for its new headquarters will be a net benefit for New York. The company will get at least \$1.7 billion in incentives from the state and city.

Acts of Hate Highlight Architecture's Role In Framing History

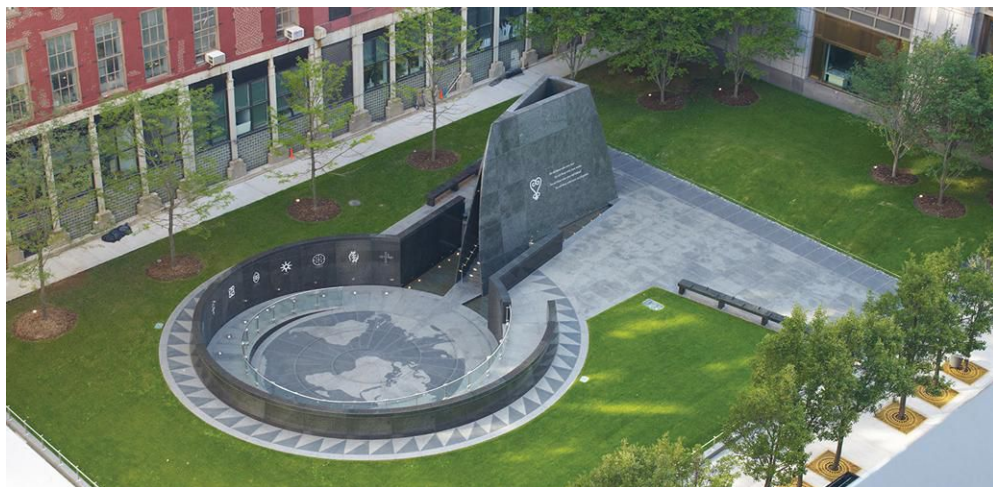
BY HEATHER CORCORAN

THIS NOVEMBER, a racist message was scrawled on a sign at the African Burial Ground National Monument (ABG) in lower Manhattan. Occurring just days after the massacre at Pittsburgh's Tree of Life Synagogue and the murders of two black people in a Kentucky supermarket, the vandal's violent message ("kill" followed by a racist slur), defacing the country's largest national monument dedicated to African people, underscores the United States' ongoing struggle with racism and bigotry. Before the month was through, the FBI revealed that some 7,000 hate crimes—about 60 percent of which were motivated by the victim's race, and 20 percent by religion—were reported in 2017, representing a 17 percent increase from the year before.

"These are the kind of things that are on people's minds right now, and that's because of the atmosphere that's been created," said City Council member Jumaane Williams at a news conference after the ABG incident. "Cleaning it off doesn't erase the pain, and it doesn't erase what's happening." Given the public nature of the sacred site (ABG isn't just a national monument—it's also a burial ground), the crime, and the community response that followed, has served as an important reminder of the role architecture should play in shaping historical narratives and healing the wounds of the past.

"The memorial was designed as a place of remembrance, but it was also designed as a place of reconciliation and gathering," says Rodney Leon, project architect of the memorial, dedicated in 2007. In the decade since Leon's memorial opened to the public, Leon has created other projects that honor the history of people of African descent in America, including the *Ark of Return*, a memorial to the victims of the transatlantic slave trade, at the United Nations Headquarters in New York.

The ABG site, which today is the resting place for the remains of more than 400 free Africans and slaves from the colonial period, was discovered in 1991 during the construction of a federal office building. Activists immediately rallied to preserve the historic



The African Burial Ground National Monument serves as the final resting place for more than 400 individuals.

site—which is among the oldest and largest African burial grounds in the nation, with some remains dating back to the 17th century—by writing letters and standing vigil to protect the space. Ultimately, a plan was devised to re-enter the excavated remains after study by a team from Howard University, placing the bones in wood coffins, with heads oriented to the west, in keeping with the tradition of the original burials.

"This building is a headstone for 20,000 bodies buried in downtown Manhattan," says architect and activist Pascale Sablan, who worked on the ABG project as an intern—an eye-opening experience for the young professional. "When you're in school, you learn about making beautiful projects, architectural wonders. This kind of project makes a difference for a larger story," she adds, speaking to the monument's symbolic role of "providing justice to many, both alive and dead."

A similar impulse was behind the creation of the National Memorial for Peace and Justice, which opened in Montgomery, Alabama, earlier this year after nearly a decade of work by the Equal Justice Initiative (EJI), a nonprofit that challenges racial and economic injustice while fighting to end mass incarceration. Designed in collaboration with MASS Design

Group and located in a city where Confederate monuments remain a common sight, the memorial honors and acknowledges victims of lynching in the United States, as well as the terror that violence created, while providing a forum to address the lasting effects of this shameful heritage. Looking to Holocaust and Apartheid monuments for inspiration, the Montgomery memorial attempts to give visitors a sense of the scale of these killings as a way to "expose the false narratives that have been told to justify what's been done," says EJI senior attorney Sia Sanneh, and to help contextualize the injustices that persist as a result of systematic racism.

"As much as [these spaces are] about memorializing the past, they're really about, 'What are we doing now?'" Leon says of the ABG and others of its ilk. "We all need to acknowledge our collective history, and then we can ask: What are we leaving behind for future generations? Who do we really want to be, in the future?"

While the graffiti at the African Burial Ground were quickly washed away, the call to action the act inspired is a reminder of the important role of these memorial spaces, not just as symbols of recognition and remembrance, but as forums for the conversations to move things forward. ■

Sagrada Familia to Pay City of Barcelona \$41 million

BY DAVID COHN

WHEN ANTONI GAUDÍ began working on the Sagrada Familia in 1883, it was located in an undeveloped area outside Barcelona. In 1885, he received a letter authorizing construction from the town of Sant Martí de Provençals, before it was annexed by Barcelona, as the city grew. This document has been the only official building permit—until this October.

The builders who continue to work on Gaudí's unfinished masterpiece and Barcelona mayor Ana Colau recently reached an agreement to end more than 130 years of legal limbo, while construction proceeded without a proper license. This “administrative silence” was tolerated by previous mayors, but in recent years, as local architecture journalist Llàtzer Moix told *RECORD*, the protests of neighborhood residents over the impact of the church's surging tourist traffic—some 4.5 million visitors per year—prompted the mayor of the Catalan city into action.

The terms of the agreement include a payment to the city, over 10 years, of 36 million euros (\$41 million) by the building's Construc-

tion Junta, overseen by the Catholic Church. The funds are not a fine, municipal officials say, but will address the impact of the project on public services. Twenty-five million (in U.S. dollars) will go to improving public transportation citywide, \$8 million for a new access point from the local metro station to the church, \$4.56 million to reconfigure the surrounding streets, and \$3.4 million toward their maintenance.

The metro stop and pedestrianized streets will be designed in consultation with the residents.

With an estimated annual income of U.S. \$90 million from ticket sales and an annual



With roughly 4.5 million visitors each year, the Sagrada Familia is the most popular tourist destination in Spain.

construction budget of roughly \$60 million, according to data from the Sagrada Familia, the payments will not affect the rhythm of construction. Work is scheduled to finally finish in 2026, on the centennial of Gaudí's death.

But the agreement will not include Gaudí's proposal to extend a monumental stair and avenue from the main “Glory Facade” through two city blocks, which would mean destroying hundreds of apartment units. This controversial idea—if ever pursued by the Sagrada Familia—would require further negotiations.

PHOTOGRAPHY: © NICHOLAS GEMINI

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2018 Innovation Conference Focuses on the Evolution of Cities

BY FRED A. BERNSTEIN

FOR THE HUNDREDS of architects and others who gathered at New York University's law-school auditorium on November 1 for ARCHITECTURAL RECORD's annual Innovation Conference, the day served as a crash course, of sorts. Titled "Urban Futures: Architecture at Every Scale," the event showcased the insights and work of a diverse group of professionals, presenting a wide range of ways that technology is set to transform cities across the globe.

Kicking off the conference, Andy Cohen, co-CEO of Gensler, focused on the reality of a future with fewer cars (attributable to the rise of autonomous vehicles and services like Lyft and Uber) and the implications for the built environment. For example, buildings will soon need larger pickup and drop-off areas but far fewer parking spaces; Gensler is already advising clients who require parking to build aboveground structures that can be converted to hotels or offices. On an urban scale, millions of acres now devoted to parking will also be repurposed, potentially as green space. Given the design possibilities, Cohen said, "This is a crucial moment for everyone in the room."

Gensler's extensive investment in research is one example of how architects can get ahead of technological change. Michael Green, principal of Vancouver firm Michael Green Architecture, presented another way at the conference. Observing how giant tech companies are beginning to revolutionize architecture and construction, "we decided we wanted to be insiders," said Green, who in May sold his firm to the Silicon Valley start-up Katerra. Katerra, valued at \$3 billion, plans to reduce building costs by 30 percent by bringing the efficiencies of precision manufacturing to the construction industry. Green's experience working with mass timber is now part of the knowledge base that could help Katerra scale up.

Gordon Gill, founding partner of Chicago's Adrian Smith + Gordon Gill Architecture, knows about scale; his firm has designed some of the world's tallest buildings. But he spoke passionately about its efforts to improve life on the ground. In Astana, Kazakhstan, his team master-planned a world expo site that incorporates a large residential development. Gill spoke of details such as an app that lets residents know when a bus is coming, so they don't have to wait outside in the extreme cold. The firm, which in 2011 released a plan for the "decarbonization" of downtown Chicago, is about to publish a book about the relationship between residential densities of differing typologies and their respective carbon footprints.



Andy Cohen, co-CEO of Gensler, gave the keynote address at Innovation Conference 2018 in New York.

Several architects spoke of ways they are making big cities greener. Winy Maas, principal architect and urbanist at the Rotterdam firm MVRDV, helped turn a 1970s highway overpass in Seoul into an elevated park—a place, he said, "where you want to float over the traffic." Thirty feet wide and 3,000 feet long, the park owes a debt to New York's High Line; now MVRDV is planning elevated parks in Glasgow and Rotterdam while plotting the extension of the Seoul walkway into an urban-scale network of pedestrian spaces. Adam Greenspan, a design partner at PWP Landscape Architecture in Berkeley, is also part of the elevated-park "movement." In his talk, Greenspan showed the park he recently completed atop the new Sales Force Transit Center in San Francisco. Though the building and park have been temporarily closed—due to a cracked girder—the green space is still a refuge for "flying members of San Francisco society," he said, referring to the local bird and butterfly population. Similarly, Greenspan noted, his firm's new water court at Glenstone—a contemporary art museum set within a bucolic landscape by PWP in Potomac, Maryland—"was designed for the people who look at it, but also for the plants that live in it."

V. Mitch McEwen—principal of McEwen Studio, cofounder of A(n) Office (a collaborative of design studios in Detroit and New York), and a Princeton architecture professor—presented her ideas for treating empty lots in Detroit as communal green spaces, given, she said, that

the sharp divide between public street and private house "is no longer operative." John Ronan, founding principal of John Ronan Architects, discussed another binary: inside versus outside. "I'm interested in ambiguity," said Ronan, who has included sheltered open spaces in several Chicago projects. One is a building designed at the behest of Chicago mayor Rahm Emanuel, who had the idea to combine affordable housing with branch libraries. The residential portion of Ronan's building has a multicolored facade, a deliberate response to the typically dehumanizing, undifferentiated faces of the last generation of public housing. "We want people to be able to say, 'That green balcony, that's my home,'" said Ronan.

Carme Pinós, founder of Barcelona's Estudio Carme Pinós, also explored ideas of home with her competition-winning project for a school and housing block behind the city's Boqueria market. "I try to connect," she said, referring to the ways her site plan preserves pedestrian paths through the old city. Architecturally, her addition to the nearby market hall, she said, looks "as if it had been there already," while her new buildings echo the existing urban fabric. Pinós's work could be a case in point for author Sarah Williams Goldhagen, whose principles of "human-centered design" include using materials with rich patterns and textures.

By the time the Innovation Conference drew to an end, a shared message had become clear: new ideas can improve the world's cities, so long as they prioritize the human experience. ■

Fifth Annual Women in Architecture Awards Honors Trailblazers

BY ALEX KLIMOSKI

Last month, *Architectural Record* hosted its fifth annual Women in Architecture Awards. Conversations at this year's event, which had the largest turnout since the program's inception, highlighted women's contributions to the profession at a variety of scales and in diverse settings, recognizing five trailblazers in architecture who, despite the professional challenges women often face, have become leaders and role models for their peers and emerging designers alike. Awards were given in the following categories: Design Leader, New Generation Leader, Activist, Innovator, Educator

DESIGN LEADER

**Elizabeth Diller
Diller Scofidio +
Renfro**

Elizabeth Diller is no stranger to the spotlight: this year, she was the only architectural designer named to *Time* magazine's list of 100 most influential people. The New York-based firm that she leads with Charles Renfro and Ricardo Scofidio (her husband) has claimed a large stake in and around Manhattan's Hudson Yards development—an accomplishment that can be attributed in large part to the success of the High Line (which Diller Scofidio + Renfro worked on, with James Corner Field Operations leading the team). "Since we started working on the High Line in 2004, the city has totally transformed," Diller said at last month's awards ceremony. She discussed the park's "halo effect," which has catalyzed two soon-to-open projects on the far west side, both codesigned with the Rockwell Group: the Shed, a major cultural arts and performance space with a 2,400-ton movable shell, and 15 Hudson Yards, a 70-story residential tower. The firm's latest project in the area, in October, was the Mile-Long Opera—a theatrical performance piece produced with Pulitzer Prize-winning composer David Lang. "It was an enormous undertaking that took many years to pull off," she said. "And, for me, it was life-changing."



NEW GENERATION LEADER

**Lisa Iwamoto
IwamotoScott
Architecture**

Since cofounding IwamotoScott Architecture (with her husband, Craig Scott) in



2002, Lisa Iwamoto has taken on a robust roster of projects, primarily in the San Francisco area, where the firm, a 2011 Record Vanguard selection, is based. "The practice really began as an academic one," said Iwamoto at RECORD's November event. "We began with small one-to-one scale installations on one side and speculative proposals on the other. The installations were a way for us to work hands-on with materials." Material exploration is a key component of IwamotoScott's process; according to Iwamoto, who teaches at the UC Berkeley College of Environmental Design, the two architects are interested in "purposeful contradictions" between the expectations of a material and how it is ultimately perceived. This curiosity, along with interests in negative space and manipulating geometric forms, informs all their designs, from the headquarters of San Francisco tech companies such as Pinterest and Bloomberg to residential projects such as Portola Gardens, an upcoming multifamily development based on the model of "incremental housing" popularized by Pritzker Prize-winner Alejandro Aravena.

ACTIVIST

**Peggy Deamer
Peggy Deamer,
Architect**

Architect Peggy Deamer's role as an activist has been catalyzed by her experience as a professor, most recently at the Yale School of Architecture. "As an educator, I became increasingly disillusioned about sending graduates out to an unrewarding career," Deamer said last month. Her concern for the well-being of both designers and construction workers led her to found the Architecture Lobby in 2013, a nonprofit advocacy group that pushes for greater labor rights and equity in the field. "New value propositions need to be established to change practice, which is how firm owners structure their offices and understand their alliances with other people in the industry, and also to change labor—how employees understand their value and argue for their autonomy and better wages." Since its inception, the group has been vocal about political issues surrounding the profession; its efforts have included the organization of a walkout in protest of the proposed border wall, and the creation of the Solidarity Network, for victims of sexual harassment.



INNOVATOR

**Upali Nanda
HKS**

As the director of research at global firm HKS, Upali Nanda investigates how design affects the human body and mind, traversing topics ranging from visual art and neuroaesthetics to return-on-investment efficiency. Nanda's emphasis on systemic well-being has been particularly resonant in the field of health care: Some of her recent work has asked how future cancer facilities can be designed as nonpharmacological means to help fight the disease, and how the design of college campuses can avoid contributing to unhealthy habits that may lead to obesity and other negative medical conditions in students' post-graduate lives. In 2015, Nanda was named one of the 10 most influential people in health-care design by *Healthcare Design* magazine. "I spend a lot of time in disciplines completely foreign to mine," said Nanda, "because that's where I learn the power of taking the road less traveled."



EDUCATOR

**Ellen Dunham-Jones
Georgia Tech School
of Architecture**

Prior to her role as director of the urban design program at the Georgia Tech School of Architecture, Ellen Dunham-Jones led the school's architecture program. As an urban designer, she has brought attention to an often overlooked area of study with her book *Retrofitting Suburbia*, cowritten with June Williamson. "The suburbs are where half the population lives. It's where about 75 percent of construction is occurring," said Dunham-Jones. Through her research, the architect has identified suburban spaces that are being retrofitted as more sustainable facilities. "Our schools aren't really preparing students to be creative and critical when dealing with the suburbs." As an educator and mentor, Dunham-Jones has been an advocate for fair pay for students going into the professional world. As she tells her students: "I'm happy to be a reference for you when you go on your job hunt, but you must promise me that, when you are made your salary offer, you will counter it." ■



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Mohsen Mostafavi

BY JOSEPHINE MINUTILLO

DEAN OF the Harvard Graduate School of Design (GSD) since January 2008, Mohsen Mostafavi announced on October 24 that he would step down at the end of the 2018–19 academic year. His tenure saw the strategic expansion of several degree programs, along with a roughly 50 percent increase in the GSD's student body, according to *The Harvard Gazette*. His departure—just as new president Lawrence Bacow takes office—prompted questions about the motive. RECORD spoke to the dean on the telephone.

The timing of this announcement seemed rather abrupt, and came as a surprise even among some faculty.

All of these jobs have a certain duration. I've been working very closely with [former Harvard president] Drew Faust on the Grounded Visionaries fundraising campaign that was supposed to come to a conclusion this September. I had been thinking that when we complete the campaign—which we've done very successfully—is actually a good point to step down. The only

thing is that Drew Faust herself stepped down earlier than, to be honest, I had expected. By January, it will be 11 years that I'm dean. Before that, I did three and a half years at Cornell, so it's quite a long time doing this kind of work, which requires a lot of incredible efforts. I really am looking forward to having a sabbatical and also being able to do a little more of my own research and teaching. I think also for the institution, it's a good thing to have people with new ideas, with fresh ideas. I really am proud of what we have done, but, at the same time, after the campaign, you really need someone who's going to hang around for another five-plus years and do other kinds of projects.

No one would disagree that it's become incredibly complex to lead a school. That's why, in light of the #MeToo movement, which has touched the GSD, and the fact that a search committee to replace you was only named on November 8, your announcement, without a

clear reason, did raise speculation.

I think the whole question of #MeToo and other issues is incredibly important. This is part of the current situation that we face. One of the key lessons for us is to fundamentally question the organization of design—of office structures, how we work within the academy, but also outside. At the GSD, we have been incredibly supportive of the students who participate in these discussions. Our students are also among the best and the brightest, and they're the most vocal. I've been there with women in design, with our African-American student union, with the full student forum, constantly discussing ways in which we look at ourselves and the way we can really change the world.

Do you think it's an inevitability that your successor will be a woman?

It would be a really positive thing, but I don't think it should be a fait accompli. The most important thing is to find someone who can do the best job possible. But symbolism is also important, and so it may depend on who the candidates are and where the balance is between all of these things, while not undermining or underestimating the importance of symbolism.

Many credit you with helping to bring Rem Koolhaas to Cornell to design Milstein Hall, and Herzog & de Meuron with Beyer Blinder Belle to the GSD to revamp Gund Hall. Are those important parts of your legacy?

I really would love for people to focus on the kinds of intellectual projects that we have engaged with, the interactions that we've had with people around the world, the studio-abroad program, the people that I've hired or we've hired together, the kind of events that have gone on here, the lectures, the evenings, the conversations, the exhibitions, the publications, the kinds of models that we've built. What is really important is the everyday. Of course, for someone who doesn't know the nuance and the details, they might say it's those two building projects. And we do have a very extraordinary project by Herzog & de Meuron, which I hope will be realized soon. But those are just symbolic representations of a legacy. ■



National Academy of Design Inducts Nine Architects

The 2018 class of National Academicians includes architects and designers Marlon Blackwell, Merrill Elam, Kathryn Gustafson, Jennifer Guthrie, Shannon Nichol, Stephen Kieran, James Timberlake, Fumihiko Maki, and James Wines. The organization, which aims to promote American art and architecture through exhibition and instruction, was founded in 1825.

National Museum of Qatar Announces Opening Date

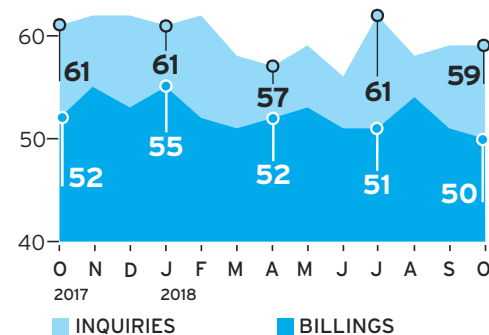
The new 430,000-square-foot cultural institution in Doha will open on March 28, 2019. Designed by French architect Jean Nouvel, the museum—which includes the restored historic Palace of Sheikh Abdullah bin Jassim Al Thani—was originally scheduled to open in 2016 but was delayed.

Zaha Hadid Architects to Design Major Development in Russia

ZHA and Russian firm TPO Pride Architects have been selected as one of three consortiums to design the new 1,100-acre mixed-use Rublyovo-Arkhangelskoye neighborhood, situated to the west of Moscow.

Foster + Partners' Mexico City Airport Scrapped Mid-Construction

In a public referendum called by Mexico's president-elect, Andrés Manuel López Obrador, voters chose to abandon building the Mexico City airport, designed by the British firm with Mexican studio FR-EE. The project has been under construction since 2015 and was expected to cost \$13.3 billion.



Billings Continue to Rise

The AIA's most recent data show that architectural billings rose for the 13th consecutive month, even though the Architectural Billings Index dipped from 51.1 in September to 50.4 in October. (Scores over 50 indicate an increase in billings.) The projects inquiries index fell 0.2 point, while the design contracts index dropped 1.3 points.



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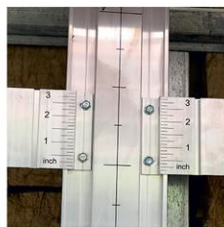
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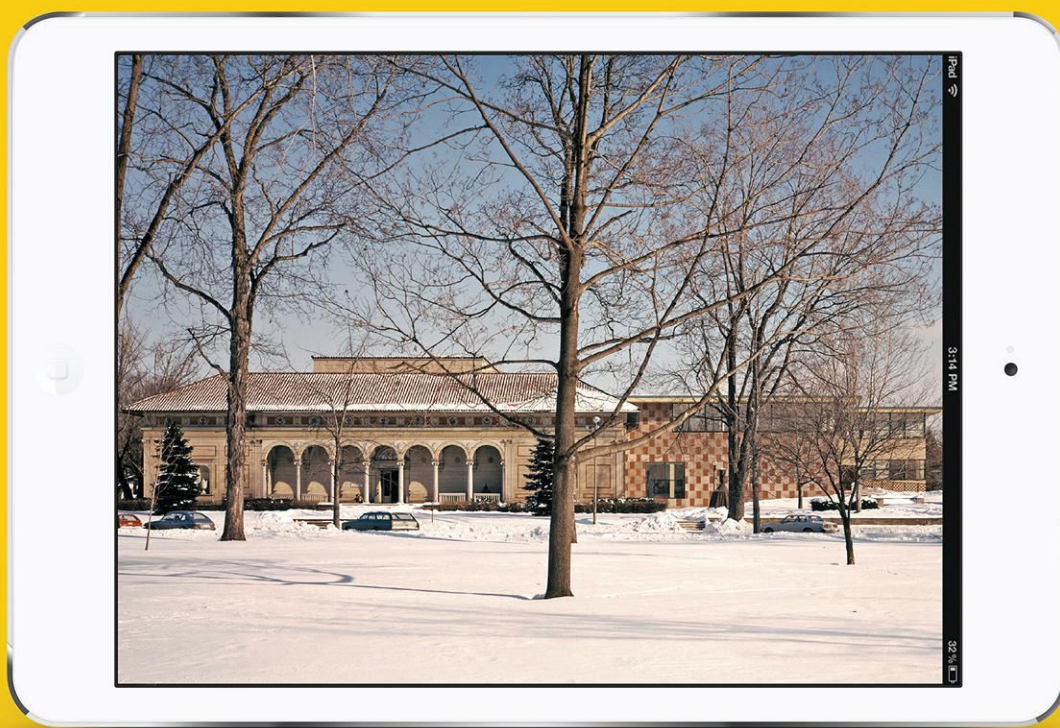
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AN ACCESSORY DWELLING UNIT IS THE STAR OF THE SHOW IN A DENSE LOS ANGELES NEIGHBORHOOD. BY DEBORAH SNOONIAN GLENN



TAKING ADVANTAGE of Los Angeles zoning that allows two single-family residences to sit on one parcel of real estate, 2017 Vanguard firm FreelandBuck designed Second House to take cues from the Culver City property's original structure, while also completely departing from it. The angular, 1,500-square-foot dwelling presents a study in how to shrewdly carve out living space on a stingy footprint.

The owners, a couple, asked for a small, low-maintenance house with outdoor areas and a generous master suite, says L.A.-based principal David Freeland. (He met New York-based principal Brennan Buck in graduate school at UCLA.) The clients also wanted the design to shield them from neighbors on either side as well as from the original house, which will be leased to tenants. That 1938 structure is set back from the street on its narrow lot, making a small site even smaller, and it features a hybrid roof design, with steep gables and complex pitched surfaces.

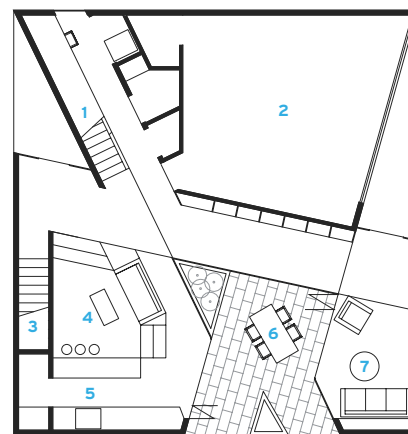
These conditions gave rise to Second House's unusual form, a multifaceted two-level structure composed of three distinct volumes that fully express the indoor spaces and surround a central courtyard. The craggy exterior and its cladding of custom cement panels are a nod to the quirky, asphalt-shingled roof next door.

On the main level, entry alcoves on the west and east sides open into a kitchen/dining area and a snug living room, respectively. These rooms spill into the courtyard, a year-round gathering spot. Here, floors and finishes subtly define the alternating indoor and outdoor spaces in a cohesive open floor plan. In contrast, the second-floor master and guest bedrooms are entirely separate, each accessible by a dedicated stair.

High, sloped ceilings and variable ceiling heights make for an airy, dynamic interior, and operable windows on upper walls offer privacy but enable natural lighting, cross-ventilation, and oblique sight lines through the house and to the surrounding sky and rugged hills. These moves, and outdoor spaces that boost the usable floor area by a third, liberate Second House from the tight suburban fabric that hems it in on all sides. It lives like a much larger home—a feat enabled by its unexpected and clever design. ■



The dwelling's unusual form was inspired by the roofline of the adjacent house (top, left). A central courtyard serves as a year-round gathering spot (top, right). The master suite features sliding glass doors that open onto a balcony overlooking the courtyard (above).



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- 2 GARAGE
- 3 STAIR TO GUEST BEDROOM
- 4 DINING AREA
- 5 KITCHEN
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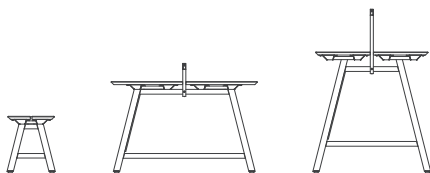
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JUNYA ISHIGAMI CREATES A DREAMLIKE LANDSCAPE FOR A JAPANESE ARTISTS RESIDENCE. BY ALEX KLIMOSKI





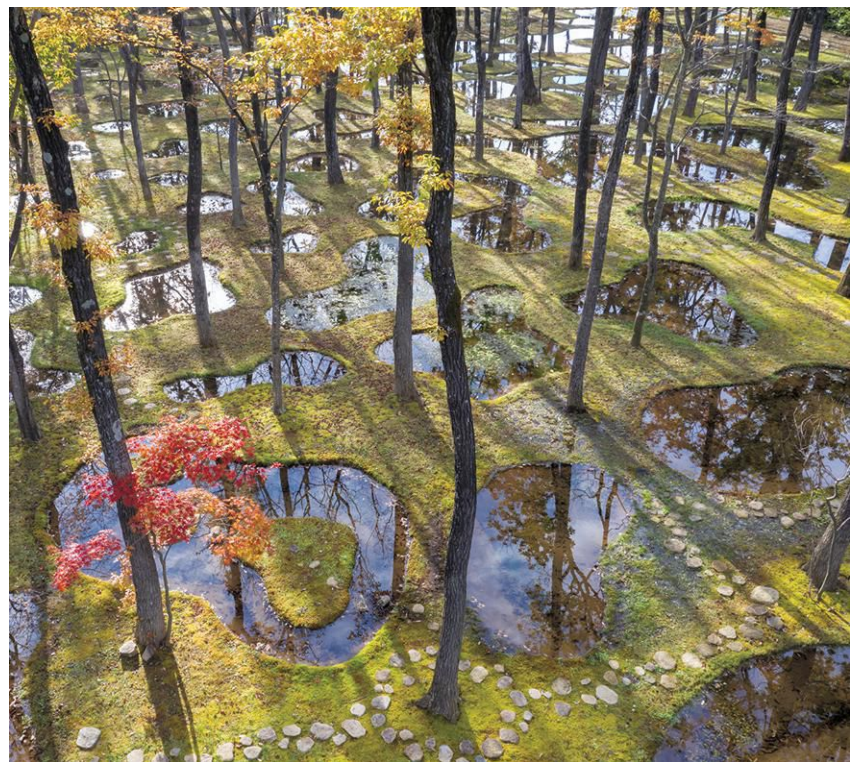


A ONCE-OPEN MEADOW in Japan's Tochigi Prefecture is now a forest of seemingly countless trees and a maze of ponds. Designed by architect Junya Ishigami, this "water garden" is an addition to Art Biotope, an artists residence and hotel nestled in the town of Nasu, known for sightseeing, hot springs, and ski resorts.

The water garden's design is a product of circumstance: when it was determined that hundreds of trees in a nearby site should be felled to make room for a new hotel, Ishigami proposed replanting them in the adjacent meadow. The resulting landscape, a place of reflection and meditation for Art Biotope residents, has the uncanny and almost fantastical quality that characterizes some of Ishigami's conceptual work such as the House of Peace, a cloud-shaped building that floats in the ocean, where the water's surface serves as the floor, or the design for Kids Park, in which a playground is built in the way that a city is planned, populated by large animals instead of buildings.

The garden teeters between the natural and man-made: the architect positioned the trees in precise locations for a controlled randomness that can appear infinite. Hundreds of amorphously shaped ponds—distinct, yet all connected to an existing irrigation system that maintains water levels—snake between the trees, forming meandering passages between them, traced by simple stone paths.

According to Ishigami, the water garden takes into consideration the history of the site, which had previously transitioned from a mossy forest to a paddy field to a meadow before being transformed into its current dreamlike state; the trees and the ponds are like overlapping layers of the past. The outcome, writes the architect, is "a new nature never before seen." ■





Dior's groundbreaking first collection, known as the New Look, is displayed on serpentine podiums separated by river-like paths (above). Dresses by current Dior creative director Maria Grazia Chiuri are set against a backdrop of off-the-shelf corrugated-aluminum panels (left). A selection of gowns made famous by the women who wore them are arrayed beneath projections of those celebrities (opposite).

Dior on Display

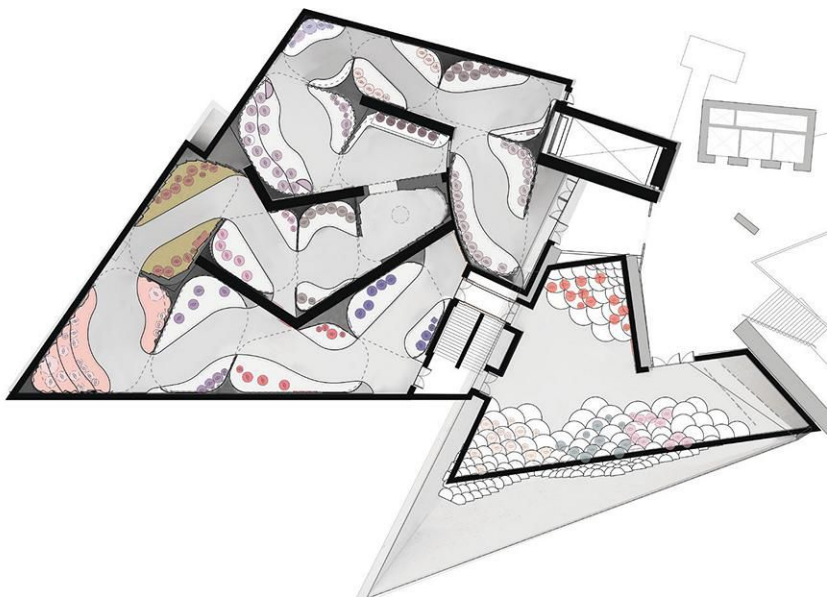
OMA New York's curvalicious exhibition design dominates a sharp-cornered space.

IN 1947, Christian Dior revolutionized fashion with a collection whose sexy silhouettes and dropped hemlines celebrated femininity just as Europe emerged from years of the gravity and gloom of war. An exhibition commemorating seven decades of the house's creations at Paris's Musée des Arts Décoratifs was a sensation last year. Now, a modified version of that show, with a completely new presentation by the New York office of OMA, has opened at the Denver Art Museum (DAM).

For *Dior: From Paris to the World* curator Florence Müller, the choice of exhibition designer was simple. As she recalls, she was "totally captured by the beauty" of OMA's design for *Manus x Machina* (RECORD, June 2016), the Costume Institute's 2016 spring show at New York's Metropolitan Museum of Art. "The studio dealt with the architecture of the museum in a subtle and surprising manner."

In the case of the Met, the challenge was transforming an atrium not generally used as a gallery. Daniel Libeskind's shardlike, titanium-clad Hamilton Building at DAM, whose galleries zig and zag and point in every direction, presented a whole other set of display problems, but also served as inspiration.

"My first instinct was to ignore the architecture," says OMA New York director Shohei Shigematsu. "Then it became fun to react to it. We ultimately decided to bring the outside in, but with a different texture and form." The building's titanium facades translated into expansive metal paneling throughout most of the 13,700 square feet of galleries, as well as 134 petal-shaped platforms in the final room of the exhibition (see floor plan), which Shigematsu likens to a *wunderkammer*. Within that entire backdrop are arrayed over 200 mannequins outfitted in signature early-Dior dresses and colorful couture garments by later creative directors Yves Saint Laurent, Marc Bohan, Gianfranco Ferré, Raf Simons, John Galiano, and Maria Grazia Chiuri, in addition to artworks, accessories, jewelry, photographs, sketches, videos, and other archival material.



FLOOR PLAN



Shigematsu did, however, defy the angular spaces by creating organically shaped cells that meander through the kinked rooms like the garden path in Christian Dior's beloved country estate, now a museum, in Granville, France. Many of the 10- to 15-foot-high aluminum vertical panels—most retaining a hazy mill finish, though some are powder-coated white or pink respectively for the Office of Dreams and Impressionist Gardening areas—are custom-bent to mimic the sinuous curves of the soft shoulders, accentuated busts, narrow waists, and large skirts for which the couturier's designs were known. Some panels feature off-the-shelf corrugations whose rigid linearity contrasts with the flowing ensembles. As a whole, the undulating "chain of curves," as Müller calls it, which surrounds visitors on both sides, creates an immersive environment where the materiality of the display armature enhances, rather than competes with, the fashion. *Dior: From Paris to the World* is on view until March 3, 2019. —Josephine Minutillo



Ballet Memphis, Memphis, TN — Architect: archimania — General contractor: Grinder, Taber & Grinder, Inc. — Installing contractor: Ralph Jones Sheet Metal
Profile : Snap-Clad, perforated Snap-Clad, perforated Corrugated — Color: Zinc, natural copper material — Photo: courtesy of archimania

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“We wanted to make the project dynamic and energized. The copper screen looks more solid during the day and perforated at night when lights are on behind it—enhancing the urban experience within the entertainment district.”

-Todd Walker, FAIA, Principal, archimania



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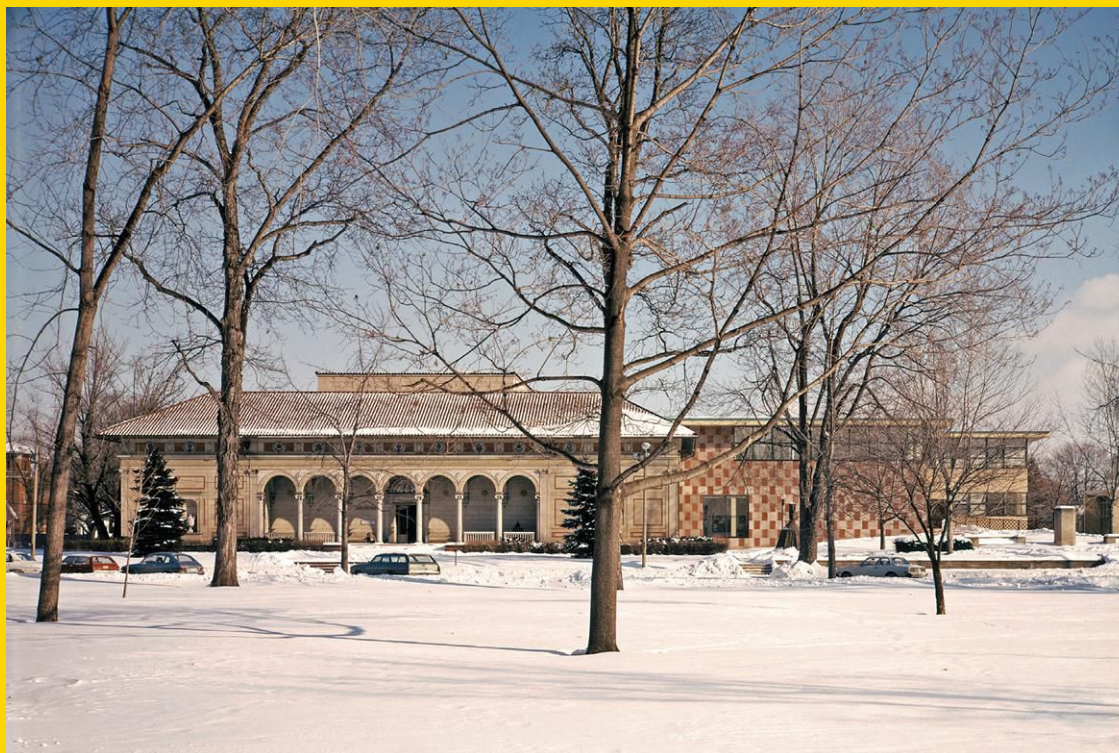


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The architect for the Sterling Memorial Library at Yale University shown in the November issue is **James Gamble Rogers**. After studying at Yale, he trained in architecture at the École des Beaux-Arts in Paris. Subsequently, he completed a number of buildings for his New England alma mater in the Collegiate Gothic style, including the library, which opened in 1930.

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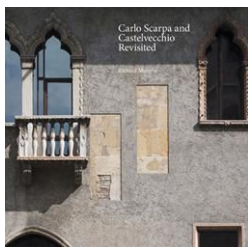
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The Editors Select

We suggest the following recent books as holiday gifts.

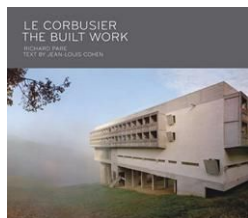
AMONG THE many architecture and design books published throughout the year, *RECORD* receives a number we would like to peruse at leisure or delve into to better understand significant contributions to the discipline. In the following pages, four editors briefly highlight books about historic architects (**Suzanne Stephens**), living ones (**Alex Klimoski**), interiors (**Linda Lentz**), and landscape design (**Justin Chan**) to guide our readers in choosing gifts for architects, clients, students, or interested lay people.



Carlo Scarpa and Castelvechio Revisited, by Richard Murphy; foreword by Kenneth Frampton. Breakfast Mission Publishing, 384 pages, \$95.

This fastidiously documented analysis brings out splendidly the clarity and complexity of the renovation and conversion of the Castelvechio Museum in Verona, Italy, undertaken by Carlo Scarpa in the 1960s and '70s. Murphy, a Scarpa scholar and an Edinburgh-based architect and educator, has much revised and expanded his 1990 book on the subject with more photos, sketches, plans, sections, and details. It is required reading even for those familiar with Scarpa's interventions that use the modern idiom in historic buildings. His layering of planes in walls, ceilings, and floors, and the design of doors, handrails, and easels for paintings or pedestals for sculpture create an "orchestration of experience," in Kenneth Frampton's words.

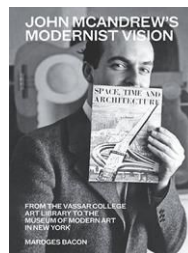
Le Corbusier: The Built Work, photography and afterword by Richard Pare; text by Jean-Louis Cohen. Monacelli, 480 pages, \$125.



Most extant works of the 77 completed by the legendary 20th-century pioneer (who died in 1965) are captured in these masterful and poetic photographs by Richard Pare. Commentary by architectural historian and Corbusier specialist Jean-Louis Cohen on the 57 subjects highlights the history and significance of such landmarks as Sainte Marie de La

Tourette (1960), near Lyon, which appears on the cover. While Corbusier's own eight-volume *Oeuvre Complète*, produced from 1929 to 1970, elucidates the modern master's vocabulary with plans, sections, and black-and-white photos to illustrate some 400 unbuilt and built projects, this publication does something else: it clarifies not only what remains of Corbusier's architecture—in color—but how it appears with the patina of time.

John McAndrew's Modernist Vision: From the Vassar College Art Library to the Museum of Modern Art in New York, by Mardges Bacon and others. MIT Press, 192 pages, \$45.



Although John McAndrew is one of the lesser-known figures active during the rise of modernist architecture in the U.S. in the early to mid-20th century, this authoritative and engaging exploration brings to light his contributions as an architect, educator, and curator. Mardges Bacon illuminates his achievements as part of a fascinating sociocultural moment. McAndrew studied at Harvard at about the same time as future International Style architecture proponents Henry-Russell Hitchcock, Alfred Barr, and Philip Johnson, and then designed the library in the new Bauhaus-influenced approach at Vassar College, where he taught. From 1937 to 1941 he acted as the curator of Architecture and Industrial Art at the Museum of Modern Art in New York, following Johnson, who had left the post in 1934. At MoMA, Bacon argues, McAndrew introduced a more inclusive, American approach to the modern and International Style ethos, and in later years helped bring Mexican art to the attention of the U.S.

McKim, Mead & White: Selected Works 1879-1915, introduction by Richard Guy Wilson; essay by Leland M. Roth. Princeton Architectural Press, in association with the Institute of Classical Architecture & Art, 428 pages, \$100.

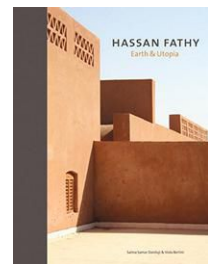


The august four-volume collection dedicated to McKim, Mead & White's work that was published in installments from 1915 to 1920 here

coalesces into one handsome book. The black-and-white plates of architecture in American Renaissance and colonial-revival styles (among others) distill their moment, showing the buildings pure and uncluttered—helped by crisply delineated elevations, plans, and sections. It is a feast for the eye in classical proportion, scale, rhythm, and ornament.

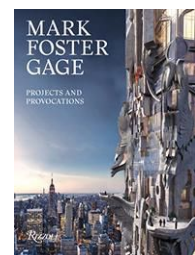
Hassan Fathy: Earth & Utopia, by Salma Samar Damluji and Viola Bertini. Laurence King, 368 pages, \$85.

The Egyptian architect Hassan Fathy (1900–89) was influential in his use of earth architecture, vernacular forms, and designing housing for the poor. In this compendium, the authors—one of whom, Salma Samar Damluji, worked for Fathy, the other, Viola Bertini, an architect who wrote her Ph.D. thesis on his work—create a scrapbook of sorts, featuring essays, interviews, and memoranda elaborating on his vision. Photos, drawings, and watercolors well illustrate the architect's arguments: that cultural identity was being lost in modern architecture, and that it was oriented neither to human experience nor any but the rich. His works—such as the entire village of New Baris in his country's Al-Kharga Oasis (1965)—draw you in, even if the book's loose structure causes some overlapping of topics.



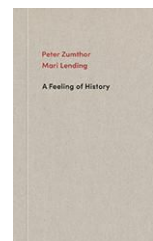
Projects and Provocations, by Mark Foster Gage; foreword by Robert A. M. Stern; afterword by Peter Eisenman. Rizzoli, 272 pages, \$70.

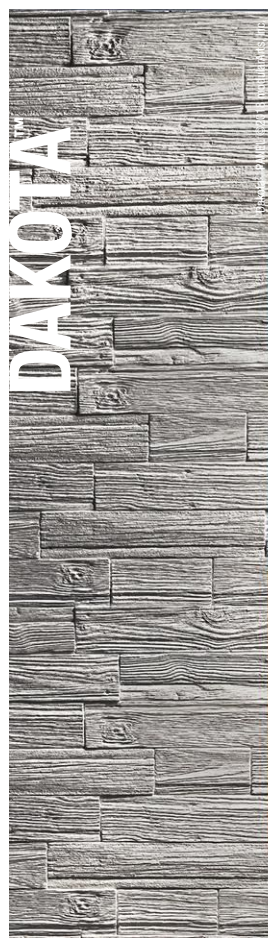
Those with a penchant for philosophy will relish this collection of essays, conversations, and phantasmal renderings from digital provocateur Mark Foster Gage. (Even the book's font, Atlas Grotesque, provokes). The classically trained architect who is now, according to Peter Eisenman, a "leading teacher in the present-day avant-garde," discusses aesthetic theory, debates Patrik Schumaker on parametricism, and pays tribute to Zaha Hadid.



A Feeling of History, by Peter Zumthor and Mari Lending. Scheidegger & Spiess, 84 pages, \$33.

This little book of conversations between Peter Zumthor and architectural historian and writer Mari Lending,





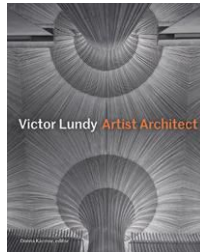
perspective**books**

joined to make a narrative, is as unassuming as Zumthor's work; you won't find any images of his buildings here. Instead, a series of black-and-white photographs by H el ene Binet—images that capture light bouncing off textured stone paving—accompany a meandering discussion on time, memory, and architecture.



Kengo Kuma: Complete Works, by Kengo Kuma; essay by Kenneth Frampton. *Thames & Hudson*, 352 pages, \$75. As Kenneth Frampton notes in the opening essay of this monograph, the architect looks at

his work phenomenologically, regarding it as “anti-photographic.” Ironically, this hefty book is light on text and heavy on images. It may be hard to understand the essence of Kuma's architecture without experiencing it from different vantage points, but what comes across is a studied exploration of craft, materiality, and space via layering, weaving, and breaking components down to particles.



Victor Lundy: Artist Architect, edited by Donna Kacmar; foreword by Nader Tehrani. *Princeton Architectural Press*, 240 pages, \$55. This is an impressive attempt to bring greater recognition to nonagenarian architect Victor Lundy, who “lets the natural grain of raw matter . . . determine the aesthetic sensibility of his buildings,” as Nader Tehrani writes in his cogent and incisive foreword. A pupil of Gropius and contemporary of Paul Rudolph, Lundy—also a talented painter and sculptor—advocated modernist principles with big sweeping gestures, as in his “wood curtains.” A mix of essays, sketches, and photographs shed light on this overlooked architect.

Whether in New England farm country or the Arizona desert, Tucson-based architect Rick Joy has built works on some of the most arresting sites imaginable. Drawing from the surrounding landscape, each of Joy's mostly residential structures has a unique form and texturally rich material palette, reflecting a deep study of place. Vibrant photographs zoom

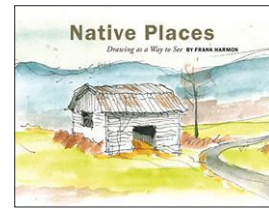


Studio Joy Works, by Rick Joy; essay by Michael J. Crosbie. *Princeton Architectural Press*, 208 pages, \$55. Whether in New England farm country

or the Arizona desert, Tucson-based architect Rick Joy has built works on some of the most arresting sites imaginable. Drawing from the surrounding landscape, each of Joy's mostly residential structures has a unique form and texturally rich material palette, reflecting a deep study of place. Vibrant photographs zoom

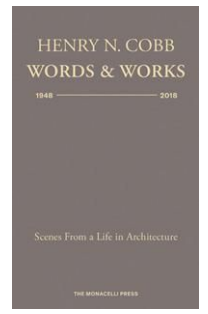
in to highlight refined details and out to show the buildings at home in their environments.

Native Places: Drawing as a Way to See, by Frank Harmon, foreword by Tod Williams. *Oro Editions*, 168 pages, \$24.95.



Frank Harmon is “an architect's architect,” Tod Williams writes in his foreword, as shown by Harmon's book of sketches and essays in what could be considered his travel journal. From the barns of his native North Carolina to the streets of London, these dozens of observations and reflections are an ode to the architecture he espouses: the everyday.

Henry N. Cobb, Words & Works 1948-2018: Scenes from a Life in Architecture, by Henry N. Cobb. *Monacelli*, 548 pages, \$45.

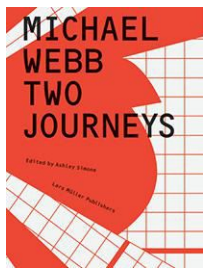


This graphically appealing volume, small enough to fit in your hand, is much more than an examination of this modernist's built works. Seventy years of conversations, lectures, writings, and photographs provide a wide view of Cobb's thoughtful practice, pedagogy, and theory, including ardent defense of his Hancock Tower in Boston (1976), notorious at the time for its swelling costs, delayed construction, and glass panes that popped out.

Elemental, by Alejandro Aravena, Gonzalo Arteaga, Juan Cerda, Vitor Odd o, and Diego Torres. *Phaidon*, 256 pages, \$89.95.



This monograph is an effort by Santiago-based Elemental, led by Pritzker Prize-winner Alejandro Aravena and his partners, to give an understanding of the firm's work beyond “social” architecture. A variety of informally pulled-together photographs, drawings, and text demonstrate the architects' rugged creations and forceful geometries, along with the firm's anthropocentric, use-oriented process and democratic philosophy. Graphically, *Elemental* is an attempt to go back to basics, using the plain Courier font that mimics a typewriter's and the name stacked as a three-tiered block pressed into a plain burlap cover. The book is simple but strong.



Michael Webb: Two Journeys, by Ashley Simone, editor, and Kenneth Frampton, Michael Sorkin, Mark Wigley, Lebbeus Woods. Lars Müller, 206 pages, \$45. The founding member of Archigram, the London-based 1960s-avant-garde architectural firm, describes the two journeys, fast and leisurely, that he has taken in a career of imagination and drawing mesmerizing images. He came to New York in 1965, where he taught at Columbia University and Cooper Union, among other schools. His plan and perspective projections, photo montages, and collages are all here in full panoply, accompanied by illuminating commentaries.

New York Splendor, by Wendy Moonan; introduction by Robert A.M. Stern. Rizzoli, 320 pages, \$85.

Complete with engaging written reportage, this personal survey of outstanding rooms in New York's most luxurious apartments, by architecture and design journalist Wendy Moonan, provides a richly illustrated overview of interior design, decoration, and architecture during the past half-century. Architects are well represented, with nearly half of the 112 projects, by such notable talents (past and present) as Paul Rudolph, Philip Johnson, Annabelle Selldorf, WORKac, and including RAMSA, whose founder is Robert A.M. Stern.

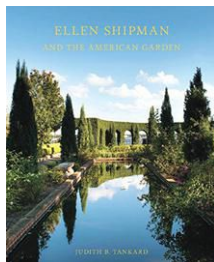


Architectural Digest: Autobiography of a Magazine 1920-2010, by Paige Rense; foreword by Mario Buatta. Rizzoli, 320 pages, \$65.

Discover the roots of the "high-end-residential" phenomenon that began with *Architectural Digest*, in Paige Rense's photo-rich, tell-all account. Editor-in-chief of the magazine from 1975 to 2010, Rense reveals its beginnings in 1920 (before her watch) and her subsequent calculated conversion of this regional residential magazine into the legendary "bible for decorators and architects," in the words of late designer Mario Buatta. Rense takes us through the decades of her dominance in which she and the identity of the magazine became one. Celebrity clients have precedence over designers, but some architects, including Stanley Tigerman, Margaret McCurry, and Alexander Gorlin, make a showing in Paige's pages.

Ellen Shipman and the American Garden, by Judith B. Tankard. University of Georgia Press, 298 pages, \$39.95.

In this biography, historian Judith B. Tankard charts the life and career of one of the most prolific American landscape architects, whose work was characterized by "domesticity, intimacy, and sensual seclusion" in comparison to her colleagues' "grander, self-consciously European schemes." Though Ellen Shipman designed well over 650 gardens in her lifetime, the book focuses on 50 of her seminal works, including the impressively variegated Sarah P. Duke Gardens in North Carolina, through plans and glossy photographs. ■



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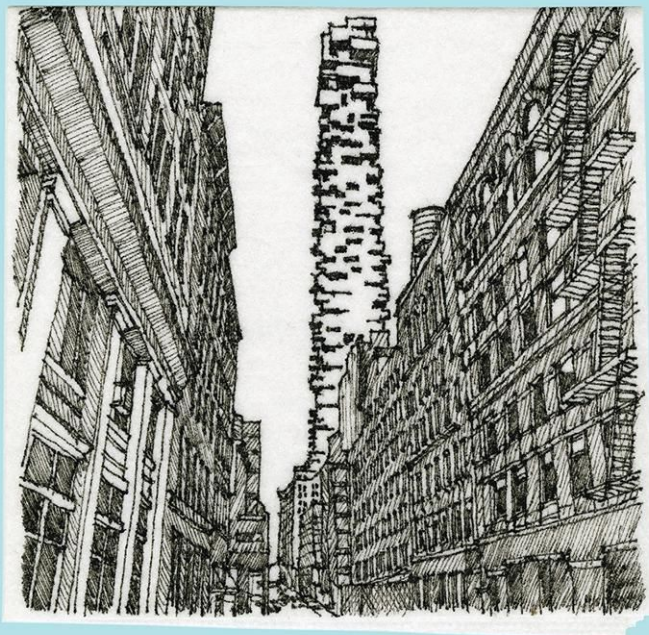
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ARCHITECTURAL RECORD Announces the Winners and the Runners-up of the 2018 COCKTAIL NAPKIN SKETCH CONTEST

More than 400 architects, designers, illustrators, and students submitted sketches to this year's Cocktail Napkin Sketch Contest, which, now in its eighth year, showcased the passion and skill of a diverse group from the field. Record editors sifted through upward of 2,000 individual napkins to select the two winners, six runners-up, and three individuals representing the best firm submission.

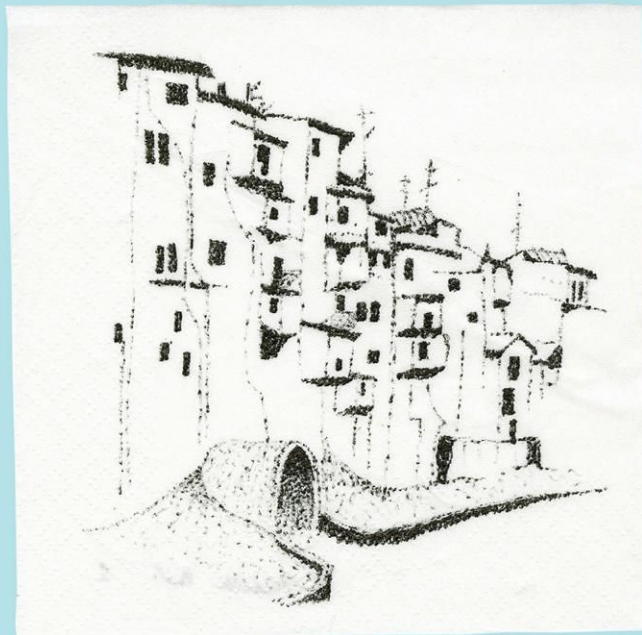
WINNER, REGISTERED ARCHITECT



KEVIN UTSEY, CLARK NEXSEN, CHARLOTTE, NC
NAPKINS OF NEW YORK II: CORNER OF LEONARD AND HUDSON STREETS

Whenever architect Kevin Utsey lands a project, he uses the drawing table to sketch his concepts. "The sketch is still, in my biased view, the best way to explore and share ideas," he says. Even when he's not working, Utsey carries a sketchbook and draws the places he visits. "Over the years, I've saved the drawings and have made a few efforts to have them published," he says. "I'm still crafting the story to go with them." This spring, Utsey went to the AIA National Convention in New York, where, one morning, he marveled at how Herzog & de Meuron's Jenga-like tower at 56 Leonard Street soared above the surrounding historic streetscape. He couldn't resist the urge to draw it. Says Utsey: "It was a contrast I had to capture."

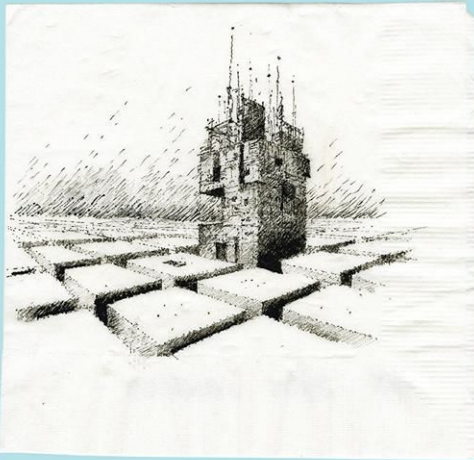
WINNER, NON-REGISTERED ARCHITECT



MICHELLE EAST, WALT DISNEY IMAGINEERING, GLENDALE, CA
ZAGAROLO, ITALY

While an architecture student at the University of Southern California, Michelle East studied abroad in Italy, where she visited Zagarolo, a town outside of Rome. "I was fascinated with how clearly you could read the layers of history, as new structures, pathways, and utilities climbed up the medieval town walls," she recalls. Recently, the designer looked again at a photo she had taken during the trip. With her sketch, East tried to capture the beauty in what she remembers as a "chaotic patchwork." Realizing that the pen she used was too sharp to make clean lines on a napkin, East opted for a different method: pointillism. "That style ended up forcing me to slow down and be intentional with each dot," she says.

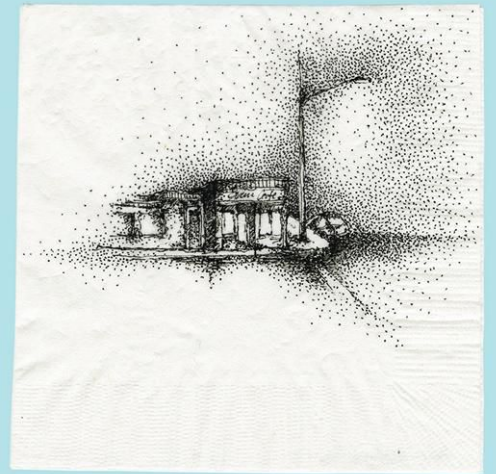
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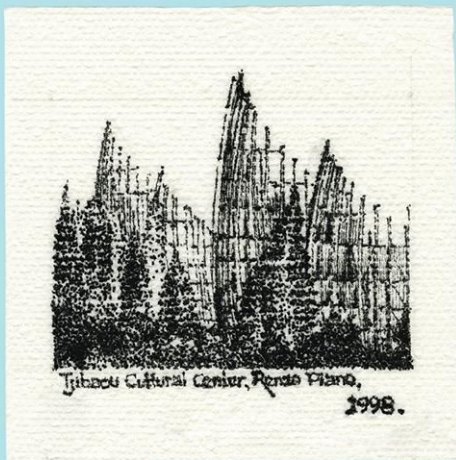


MICHAEL POPE, MODUS STUDIO, FAYETTEVILLE, AR
HWANGE BUSH TOWER

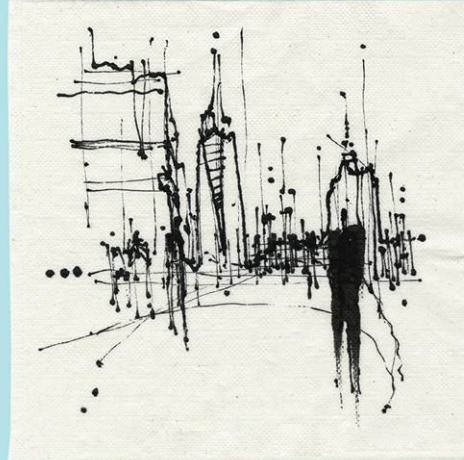


AMY SHOUDER, ZGF ARCHITECTS, SEATTLE
3AM

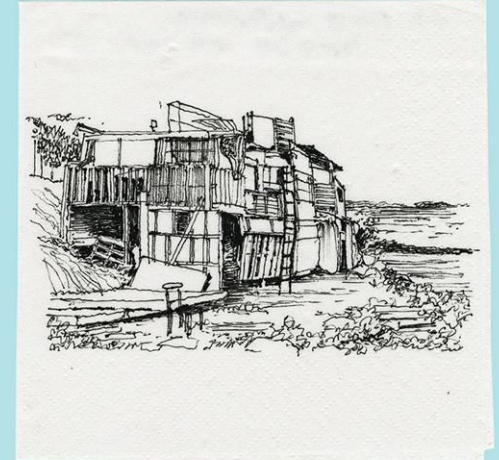
RUNNERS-UP, NON-REGISTERED



JOSE ROSADO, JUAN C. PENABAD, AIA,
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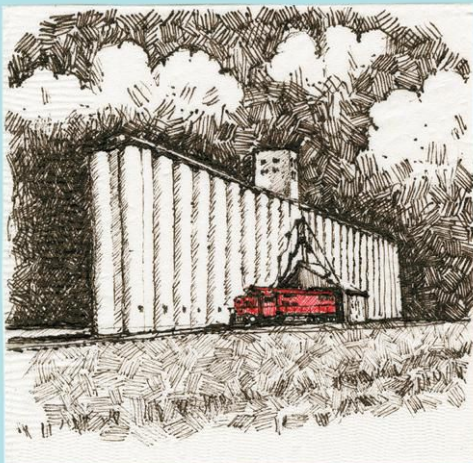


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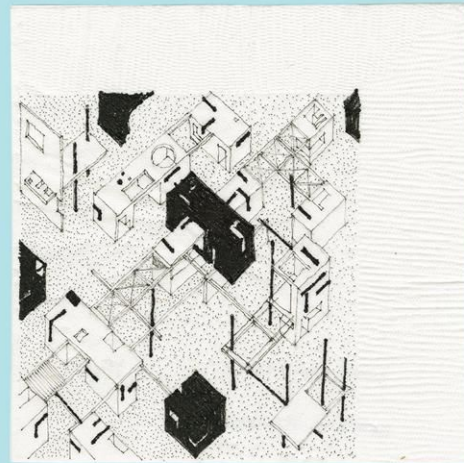


DAVID LIEBERMAN, DESIGN DEVELOPMENT,
AGOURA HILLS, CA
HOMELESS CASE STUDY 2

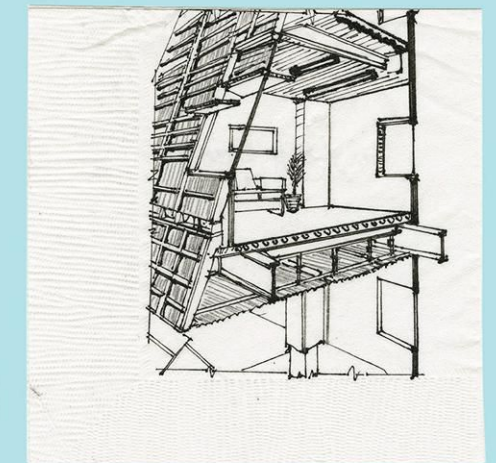
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Architecture and Photography

Across history, people have attempted to capture the essence of the built environment through images. The advent of photography greatly expanded the depiction of architecture and, as this field has evolved, so too has the powerful symbiotic relationship it shares with the discipline of design. In this special section, we examine how architects and photographers approach each other's craft and work together, shining light on the ways that these two art forms have shaped one another over time.



Partners in Time

The 20th Century's leading photographers have shaped our perception of the era's iconic modernists.

BY PIERLUIGI SERRAINO, AIA

Architecture exists in the absence of photography, but its vicarious experience through photography is the predominant way we learn about buildings and their unique attributes. Images are mobile; buildings are not. So of course, there is a correlation between the quality of the picture capturing a work of architecture and how the viewer comes to perceive it. Whoever photographs a work of architecture can make or break it, celebrate or condemn it. The image-maker leaves an imprint on the observer, shaping the understanding of the work across time, positioning it in the universe of references that makes up the history of the field.

Though architecture is inherently experiential—cinematic and fourth-dimensional—photography fixes the viewpoint: it cuts off the peripheral field of vision and frames space within the technological limits of its era. Those are objective facts of photography, but subjectivity is at play as well. The photograph carries the signature of its maker, who creates it to have a particular effect, which can reverberate far into the future.

Which photographer is commissioned has significant implications for both a building's and an architect's identity. When an architect hires a photographer, there is a high level of trust and a shared vision. The style of a photographer's approach can have a profound impact on the architect's future in the profession and the culture at large. The architect embraces the photographer's ability to create the definitive architectural identity of the building. In many cases, the architect's and the photographer's legacies



Gilbert Tompkins House, by Marcel Breuer (top and above). Photos by Ezra Stoller, 1947.

become intertwined.

In the 20th century, significant partnerships of architects and photographers have left a collection of images through which the greatest examples of modernist architecture are embedded. In the postwar era, Ezra Stoller (1915–2004) was the most influential image-maker in the United States. The design literature of that period is filled with iconic Stoller photographs. Hiring him in his heyday meant the architect would become integrated in Stoller's own history—which included photographing the work of Marcel Breuer and Walter Gropius, and other legendary Modernists. It elevated the work of many of Stoller's clients into the elite.

Stoller photographed much of the architecture of Wallace Harrison, Gordon Bunshaft, and Paul Rudolph, among others. Their projects, memorialized in pictures, are inseparable from Stoller's craft. They were unofficial working partners. Other notable pairs of photographers and architects include Julius Shulman and Richard Neutra, Pedro Guerrero and Frank Lloyd Wright, Balthazar Korab and Eero Saarinen. The list expands, of course, around the world to such pairings as Lucien Hervé and Le Corbusier and, more recently, Yukio Futagawa and Tadao Ando.

Stoller's photography reached for universal values in architecture, downplaying the fleeting desire for the excitement of the moment. His images are filled with pause, temporal suspension, contemplation, and emotional detachment. The gravitas of the building and the convictions of the architect's design intent were the targets of his photography. His

was an intense exercise in distilling the essence of the architecture before him. Absent was impulse, layering, and lighting effects superimposed on the existing space. When looking at the portfolio of the Tompkins House in Hewlett Harbor, New York, by Marcel Breuer, completed in 1946, Stoller's visual rhetoric becomes apparent. In 55 images, mostly taken using only natural light, Stoller carefully documents every corner of the architecture. With the exception of two color images, the job is all in black-and-white. People are present only in nine images, and primarily for the interior. His camera steadily records the design expression of the project. The architecture is represented naked, without celebrating its materiality but rather the simplicity and economy of the project.

Stoller would arrive at the site and quietly study the building, experiencing its changes throughout the day. Then, he would establish a chart of viewpoints, to be meticulously followed the next day in executing his picture plan. The scale of the job would determine the time needed to thoroughly document the space. He read the architecture as it was, limiting to a minimum the use of artificial light. There is an invisible space between the architecture and the viewer, who is not invited to be part of the scene. Documentation, rather than a suggestion of participation—of being there—is part of Stoller's approach to his photography. These visual hallmarks are traceable to grander projects too, such as his pictures for: the Gallery of Contemporary Art, at 2 Columbus Circle, New York, by Edward Durrell Stone; the St. Louis Airport, by Minoru Yamasaki; the Parking Garage, in New Haven, by Paul Rudolph; and the Banque Lambert, by SOM, in Brussels. These architects and their colleagues bought into the way Stoller saw architecture through his camera.

In counterpoint was the expressiveness of Los Angeles-based



Banque Lambert, by Skidmore, Owings & Merrill (top). Gallery of Contemporary Art, by Edward Durrell Stone (bottom). Photos by Ezra Stoller, 1965 and 1964 respectively.

Julius Shulman (1910–2009). Joyful hedonism was a central trait in his photography. Leisure, lifestyle, pleasure, and a genuine desire to connect the elitism of the modernists to the general public were primary drivers of his pictures. His assistants became part of the scene. Drinks, fruit baskets, and plants were added to what was often a complete rearrangement of the furniture. This staging all built up to an alluring spectacle; Shulman intervened decisively to rewrite the design message of his photographic subjects. Filing off the sharp edges of the Modernist ideology was his aim; he wanted to make this new architecture user-friendly to those who may not have understood the avant-garde but wanted to live in modern times. His images are full of panoramas, night scenes, people lounging or partying—all the cues of the California dream for which he became a powerful ambassador. Photographing the Frey House I in Palm Springs, California, by Albert Frey, Shulman pulled out all the stops to celebrate the mechanical character of the house against the rugged natural backdrop of the California desert. The architect himself appears in a number of images, as does Shulman's assistant, in swimming trunks, with a towel around his neck, next to the pool. The photographer's focus on people in a carefree atmosphere elicits in the viewer a desire to be included. He used infrared photography in a few instances to further accentuate the architectural massing against the landscape. This approach is a big part of his photographic legacy, and it shaped the perceptions of the architecture of Richard Neutra, Rudolph Schindler, and many who were in the Case Study House program, helping to bring them popular acclaim.

A sizable part of the iconography of Frank Lloyd Wright's late career can be credited to the pictures of Pedro Guerrero (1917–2012), who, for almost 20 years, recorded life in Taliesin West and in Wright's projects beyond.



Edgar J. Kaufmann House, by Richard Neutra (above). Albert Frey House I, by Albert Frey (left). Photos by Julius Shulman, 1947 and 1954–56 respectively.

Guerrero placed his camera in the midst of the architecture. The space is represented in its day-to-day existence, with the furniture arranged casually, and with few patterns of shadows. Architecture is depicted as friendly, lived-in space—antiheroic, anti-monumental—but the images are nonetheless rich in information. Absent is drama and the spectacularization of space via the camera. At Talie-

sin, Guerrero illustrated the actual story of an architect living in a design universe of his own creation, a portrait of a community gathered around a charismatic master.

Architectural photographer Yukio Futagawa (1932–2013) was for decades the visual vessel of modern architecture for his native Japan as well as for much of the rest of the world. Before he



David S. Ingalls Hockey Rink (above) and Trans World Airlines Terminal (above, right), both by Eero Saarinen. Photos by Balthazar Korab, 1956–59 and 1956–62 respectively.

founded the publishing house Global Architecture (GA) in the early 1970s, he had already achieved an iconic status through the Contemporary Architects Series, for which he photographed the best of postwar American and European architecture. It is through Futagawa's photography that the architectural cognoscenti witnessed the meteoric ascent of Tadao Ando. The architect's and photographer's sensibility were in alignment. Ando's elemental architecture was an ideal subject for Futagawa, whose dramatic shadows and highly contrasted blacks and whites were as raw in the impact of Ando's work as his renowned concrete surfaces. The photography was ascetic, confident, bold, invariably devoid of people, and focused in telling the story of an architecture founded on the certainty of Cartesian geometry. Absent is emphasis on cloud formations or hyper-attention on details, or acrobatic aerial views: the photographic narrative stays strictly with the architecture. Early projects like Rokko Housing One in Kobe, the Church of Light in Osaka, and the Church on the Water in Tomamu, Hokkaidō, were captured with a silent reverence for a modernity then in doubt under the wave of Postmodernism.

While photographs might be seen, by both photographers and their clients, as the visual record of the moment they were taken, they acquire a cultural status as beacons of a way of living or as reflections of an era that is increasingly independent of the circumstances that produced them. And photographs highlight the vulnerability of architectural memory. They are all that is left when a building is razed—but what happens to a piece of architecture when the building is destroyed and the photograph is damaged or lost? That architecture becomes unaccountable and, perhaps, for later generations, it is as if it never existed.

With the digital revolution and the ubiquitous use of smartphones to take pictures and post them on



"Teabreak #1." Frank Lloyd Wright. Photo by Pedro Guerrero, 1953.

social media sites such as Flickr and Instagram, photography's effects on the perception of architecture have grown exponentially. Along with the highly gifted photographers who continue to shoot the built environment today—many of them in continuous partnership with the same architects—an avalanche of snapshots

disseminate architectural knowledge, shaped through time-dependent technology and the varying abilities of the individual image-maker. Yet the fact remains that architecture depends on photography, as fragmentary as its representation may appear, shifting the focus of the design field to image as opposed to experience.

Still, Stoller posited that a photograph is the best approximation of the real thing. And it still is. ■

Pierluigi Serraino, AIA, is an architect, author, and educator with extensive knowledge of architectural photography. His next book, on Ezra Stoller, will be published in 2019.

Portfolio

Photographers and architects talk about their collaborative work.



NIC LEHOUX

Based in Seattle

Images are meant to open up a conversation. For the first 15 years, I shot on 4x5 film, with complex lighting—hot lights and strobes; technically, they were very involved shoots. I still have that in my DNA and apply some of those techniques in my current work. But I've always had a strong sensitivity to street photography; some of my heroes are documentary and war photographers, people who are looking to capture the soul of the culture we live in. It was harder to bring these instincts into 4x5 film work. However, the use of medium-format digital—I use Arca-Swiss

National Museum of African American History and Culture, by Adjaye Associates. Washington, D.C., 2017.

and Fuji GFX cameras with an assortment of esoteric German lenses and filters adapted from the cinema industry—has given me the freedom to be more exploratory and experimental in how I approach architecture with people. At the same time, there's a new openness on the part of my clients, who more and more are willing to have me tell almost a social story through their buildings.

My compositions are extremely rigorous: no excessively wide angles, always very concise one-point perspectives, very sectional and elevational in composition, and then I break this rigor visually by mixing in the

theater of people in the public space. It's about setting the proper composition and then waiting for the natural ballet of people to enter the space at the decisive moment. Sometimes the shot is done in 30 seconds, and sometimes it takes 45 minutes. I want to capture people enthralled by the space, as well as the subtleties of the space itself. Why are people captivated? What is magical about this space? The result is a studied composition with an incredible natural looseness of people in the space. We're lucky to be in an era where architecture is particularly interesting, aren't we?

ROLAND HALBE

Based in Stuttgart

I bring a mix of documentation with emotion to the assignment—I'm not as dry as some photographers, nor as glamorous as others. I have been photographing for Odile Decq for about eight years—we are a good team. I shot the Museum of Contemporary Art in Rome (2010) on spec, and she started using me. She knows I am reliable, dedicated, and I like being on a time schedule—it triggers my creativity. I've also been working with Jean Nouvel, who asked his client to hire me for the Louvre Abu Dhabi when it opened last year. For the last 15 years I've been shooting almost all Thom Mayne's projects, and I have recently photographed Richard Meier's newest work in Taipei, Bogotá, and Mexico City. I started getting a lot of work from Chilean architects through Alejandro Aravena in 2002. (It helps that I speak Spanish, along with English, Italian, French—and, of course, German.)

Travel to photograph newly completed buildings is hard in terms of timing: press conferences require photos when the building isn't complete. I believe in using natural light instead of killing the atmosphere with flash lights—but balancing light is hard. So the pressure mounts if the weather is lousy, since I just have to stay at the site, while my family is home in Stuttgart. My architect clients—who pay me—don't often have me return when the building is totally finished and installed. I use a large-format camera (ALPA, a Swiss camera) with very good lenses and a digital back. Basically, it is a similar way of working to the predigital era when I was using a 4x5 camera, correcting the perspective on-site, and shooting with film. Now you correct the perspective post-production with Photoshop. The digital age has resulted in photographers' being faster, less accurate, less profound. We all react to striking, eye-catching photos, and lines are blurred between professionals and amateurs.



Prada Foundation, by OMA. Milan, 2015.



JOHN RONAN

John Ronan Architects, Chicago

When I'm choosing a photographer, I look for someone who "gets" the firm's work and values. And I look for someone who's easy to work with, since I am typically on-site with the photographer for the entire shoot, which can go on for several days. We tend to shoot a building periodically while it's under construction, for project documentation and marketing purposes. Usually, we wait to shoot the finished building until after it is open and people are using it. Since a theme of our work is the integration of the building and site, I like to shoot at different times of the year, to show how the character and atmosphere of the spaces change from season to season. And after the building has been open for about a year, I will send in a "people" photographer to get candid shots of how people actually use the building; these photos tend to be more relaxed and genuine than the more formal building photos that typically show up in the design press. Another major theme that runs through my work is spatial layering, which is sometimes difficult to capture in a photograph (easier in a video). For photographs, I try to get figures in the foreground, mid-ground, and background to help communicate the layering; sometimes it works, sometimes it doesn't.

Poetry Foundation, by John Ronan Architects, Chicago. Photo by James Florio, 2017.

JEFF GOLDBERG

Based in New York

For the first 25 years of my career, I used a 4x5 camera and transparency film. The medium was very unforgiving. At the time of making the exposure, everything had to be perfect. To deal with subjects of high contrast, I used electronic flash or hot lights to balance tonalities. Now I use a small Canon DSLR camera, which lets me be more spontaneous. I only need a tripod for shots requiring long time exposures—otherwise, I prefer to hold the camera in my hand. And I don't usually need an assistant (though I'm happy if someone from the architect's office helps to organize things). And I rarely need lights—I can correct tonalities and color balance on the computer, using Adobe Camera Raw and Photoshop. I also use the computer to correct perspective and to remove small pieces of garbage that I used to pick up by hand. As for the architecture, my job is not to judge but to interpret and explain the architecture in photographs. I always find something to enjoy in every project I photograph.

American Copper Buildings, by SHoP Architects. New York, 2018.



PHOTOGRAPHY: © JEFF GOLBERG/ESTO

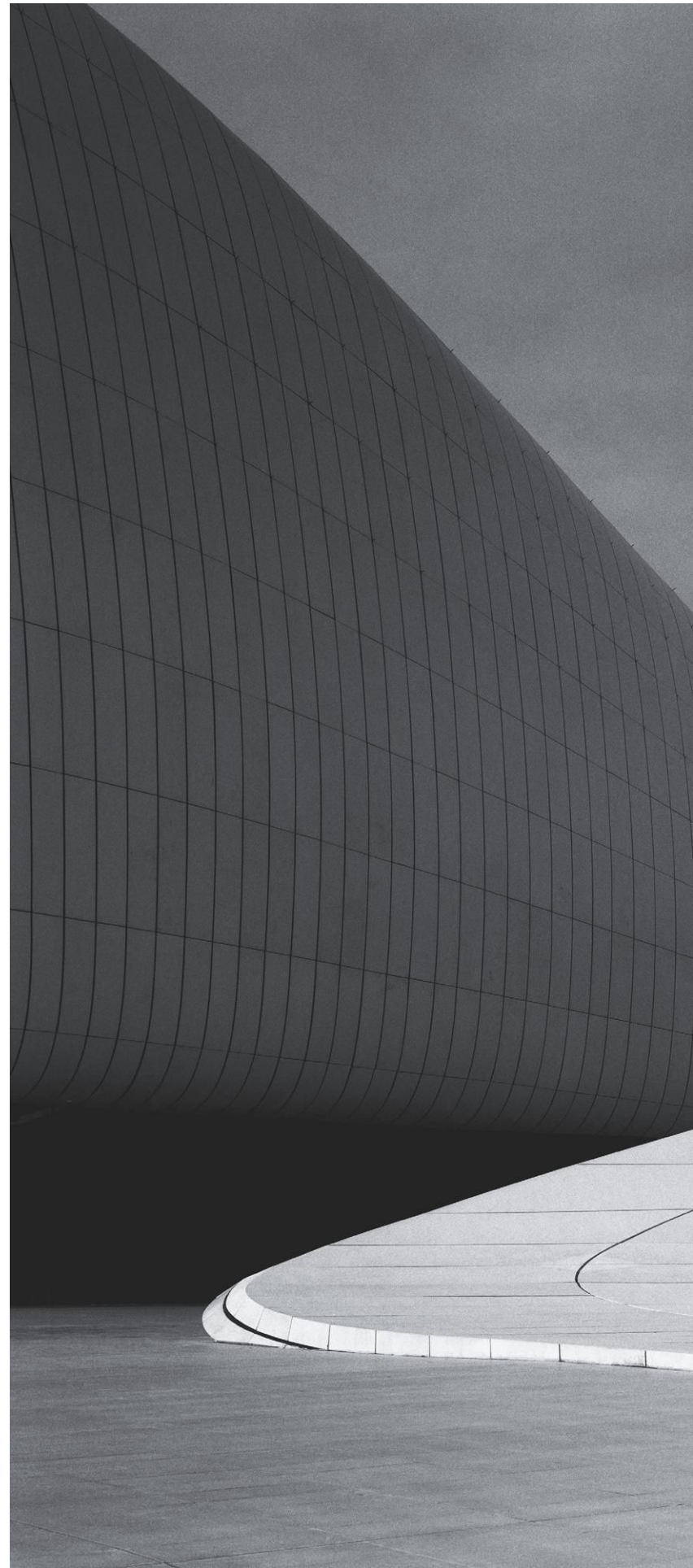
HÉLÈNE BINET

Based in London

I have been working for 30 years to capture architectural space in photographs. I spend about half my time in the commercial world and half my time doing personal work. Recently I've been photographing traditional Korean architecture, which is astonishing. The photos may become a book.

There are a few architects I've been working with for many years, including Peter Zumthor and Caruso St John. I like to have long relationships—I feel I grow with the architects; it's not just shooting and going home. Zaha Hadid was very important to my career. I shot all of her buildings starting with Vitra. There was something primordial about her work, something very deep, which I hope I brought out in my photos. She's often been misunderstood. Some people see her work as fashionable; I was never interested in that.

I shoot mostly in black-and-white. The way we experience space is a complex thing, and color can compete with that experience. I go in the other direction. I prefer silence. I shoot on film; I don't touch digital. I use a 4x5 camera called an Arca-Swiss—you put a film plate in and put a blanket over your head. It's expensive, and it's slow. Each image is a commitment. It's like a performance: you have to be very good in the moment; you don't get a chance to fix it later. I might make 20 images in a day, eight or nine that I'm happy with. I do all the printing myself, choosing everything: the paper, the contrast. The actual print is very important to me. A reproduction of the work is not the work.



PHOTOGRAPHY: © HÉLÈNE BINET, COURTESY AMMANN GALLERY





Tempelhof Airport, by Ernst Sagebiel. Berlin, 2018.

DANICA KUS

Based in Ljubljana and Amsterdam

I use a digital DSLR camera, a Canon EOS-1D X; I can't think of the last time I used artificial lighting. I generally use a Canon 24–70 millimeter lens as well as Canon tilt-shift lenses. I prefer to shoot in black-and-white—you can express more of your feelings—but for assignments, I have to shoot in color. I started my career working in a darkroom, and the black you get there is very different from the black you get digitally. But, either way, I try to capture that atmosphere of the space and the character of the building—it's my task to show how you feel in the building. I pay attention to the play of light, the sound, smell, temperature, structures, rhythm, materials, etc. Sometimes I try to create an imaginary and ambiguous space with my camera.

Recently I photographed a school in Brussels. It was quite difficult, because the architects wanted to show the space being used, but the school wouldn't let me show the students' faces. And I couldn't stay more than about 20 minutes, because I was interrupting classes. Once an architect asked me to shoot a new office building during the guided tour, which lasted less than an hour—it was the only way to get access to some of the spaces. It was difficult because there was not enough time and there were too many people, but, despite the stress and speed, in the end, I was satisfied. In fact, it was such a great experience that, last summer, I shot Berlin's Tempelhof Airport during the guided tour.

Sometimes, when I see the work of a great architect, I'm overwhelmed. But if the building isn't beautiful, I look for something else—how the light touches the walls and floors. I always find something.

TIMOTHY HURSLEY

Based in Little Rock, Arkansas

I've shot intentional architecture all over the world, but I also like to shoot less-intentional architecture. These days, I'm doing one series on the funeral homes of the South, and another on decrepit industrial buildings. If I'm on the road for a job, I extend my time. Whenever I can, I drive somewhere from Little Rock. I prefer to be out on a cloudy day. It makes things more photographable; you're not fighting the sun. In one town, I saw a dog food factory that was being taken down; it looked like something BIG would have designed. My photo ended up in the *Oxford American* magazine.

I started out when I was 17, as an apprentice to [Detroit-based architecture, art, and landscape photographer] Balthazar Korab; I just sort of fell into it. I've been shooting the Rural Studio [Auburn University's design-build program out of Alabama] since day one, and I shot things like the construction of Yoshio Taniguchi's MoMA from 2004 to 2008; they flew me up to New York 14 times for that. I used a view camera all my life. Now I use a Phase One back (which enables cameras designed to use film to take digital photographs): you put it on a technical camera, with Rodenstock lenses. If I want to shoot people in dimmer conditions, I pull out a Sony DSLR.

I recently found a funeral home with eight abandoned caskets; it was dark, so I used two iPhone flashlights, and I got a really cool shot. Not long ago, I bought a broken silo near the Rural Studio buildings in Alabama, and I put up a surveillance camera, which I set to shoot once every 12 seconds—I was getting thousands of images a day. It was great to find an interesting object and not have to be like Ansel Adams. Set it up and walk away.



Alabama Silo. Greensboro, Alabama, 2008.

ANNABELLE SELLDORF

Selldorf Architects, New York

We are very lucky to have a gifted photographer, Nicholas Venezia, working for us, shooting for internal use as well as for publication. He is so familiar with our projects and our process that his photography is practically an extension of our vision for the work. For our most recent book, the majority of the photographs were taken by Todd Eberle. Todd is not only a good friend but also an artist—he has a very different and truly proprietary way of photographing architecture, which I appreciate a lot. He has known our work for a very long time and picks up on certain similarities and strategies among different spaces and typologies that sometimes I am not aware of until he points them out. I love having photos taken as a project evolves and emerges during construction. Photos of empty buildings and photos of buildings with people in them serve different purposes. In the end, architecture is for people, and so I love seeing people use our buildings.



42 Crosby Street, by Selldorf Architects. New York. Photo by Nicholas Venezia, 2017.



National Stadium, by Herzog & de Meuron. Beijing, 2007.



IWAN BAAN

Based in Amsterdam

I don't like to be thought of as an architectural photographer. My background is in using photography to tell stories about people and places. Since I met Rem Koolhaas 13 years ago, I've been surrounded by architects and architecture, but my way of doing photography hasn't really changed. Buildings and cities are the backdrops now, but I'm still focused on how people live.

Even with a building I don't like, I can still tell an interesting story. For example, I don't find the Burj Khalifa, the tallest building in the world, particularly interesting, but the context—a row of buildings rising out of the desert, with one trying to be taller than the others—is compelling. I recently shot two projects by Herzog & de Meuron.

One is a cultural center in Hong Kong, in an incredibly dense setting. The other is a large new development near Moscow, in a vast, open landscape. The contexts couldn't be more different.

I divide my time between commissioned work and longer-term projects. Tatiana Bilbao and I have just completed a collaboration with 11 universities in the U.S. and Mexico in which we looked at various issues involving the border. It will be a book from Lars Müller and an exhibition at Yale—both called *Two Sides of the Border*.

I use Canon 35-millimeter handheld cameras with a range of lenses. I don't use tilt-shift lenses very much, because they're about taking a building out of context and framing it perfectly, which is exactly what I don't want to do. I use my iPhone a lot—I have more than 130,000 followers on Instagram—and I can't wait for the day when the phone is all I need to carry.



BILLIE TSIEN

Tod Williams Billie Tsien, New York

We have worked primarily with photographer Michael Moran. We admire his work and his eye and value his friendship. He knows the kinds of images we most appreciate: they are often frontal and stable rather than diagonal and dramatic.

They do not attempt to replace experiencing the work firsthand. We also love the images that we find on Instagram or Flickr—just people enjoying themselves in spaces we have made. We are looking for the play of light, the change of seasons, and the sense of inhabitation. At most, we hope that a hint of what it might feel like to be there is transmitted. Our best work is the least photogenic.



LeFrak Center at Lakeside, by Tod Williams Billie Tsien, Brooklyn. Photo by Michael Moran, 2013.

TOM KUNDIG

Olson Kundig, Seattle

The reason I like working with photographer Nic Lehoux is that he looks at a building the way an architect would—as line, plane, volume. His type of photography is crisp, clean, and edited—for architecture, it’s spot-on. We work with a couple of other photographers, too, because we’ve completed a lot of buildings recently. Different photographers have different ways of looking at a building, which is a good thing, but, for publication, you don’t necessarily want to mix them—if the shots are all by the same photographer, with the same instincts, the story holds together.



Meg Home, by Olson Kundig, Seattle. Photo by Nic Lehoux, 2016.

Picture Perfect

Capturing a project in photographs requires clear goals and careful planning.

BY JENNA M. MCKNIGHT

Photographs wield tremendous power. In the world of architecture, a captivating image can win editorial coverage for a project, attract a dream client, or lead to a prestigious award. In a larger sense, photographs can shape the perception of a building, influencing which works become icons or earn a place in the history books.

But getting the perfect set of photos isn't easy. Who to hire, how much to pay, and when to schedule the shoot are among the many questions architects face when seeking to document their work in photographs. Technological advances and the ever-changing digital realm have made these questions even tougher to address. To shed light on navigating this complex process, we spoke with a range of firms, photographers, and agents about issues to consider when commissioning a shoot—from costs and copyright to preventing problems on picture day—and how to maximize your resources to ensure a positive result.

CONSIDER YOUR NEEDS AND BUDGET

When setting out to photograph a project, the first step is identifying where the images will be used. Of course, firms typically need strong photos for proposals, presentations, and marketing materials. Photos might also be used in award submissions, editorial coverage, exhibitions, lectures, and books. And, in the digital era, firms should consider their websites and social-media channels—outlets that also use moving images like time-lapse films and drone footage. “Video is important if there is something

about the space that a moving image captures differently than a still photo,” says Greg Keffer, a partner at New York-based Rockwell Group. “In the Neue-House, we have chandeliers that move up and down to mark time throughout the day. And we’ve designed dynamic stage sets with a lot of movement.” Beyond moving images, firms say a wide variety of photographs can ensure that all needs are met. While the “hero” shot is always critical, images showing construction progress can be useful for social media, and detail shots can convey technical aspects. “The big

shots are really important, but details are also important—the hardware, the coffee cup sitting on the bar, whatever it may be,” says Keffer.

Next, determine the budget. The cost of commissioning a shoot and securing usage rights can vary widely, from a few thousand dollars to over \$40,000. A photographer’s invoice may include fees for time, travel expenses, and an assistant; processing and editing; and usage fees. Some firms opt for full usage and rights “in perpetuity,” with few to no restrictions on how and when they use imagery. Other

firms go with more limited (but cheaper) licensing. To help pay the bill, architects sometimes team up with clients, contractors, and suppliers. “When it’s applicable, I’ll ask other parties to join,” says Sean Airhart, the photography manager at global firm NBBJ. “When you’re spending \$20,000 on a shoot, it helps to have partners sharing in the costs.” Airhart also handles a lot of the shooting himself on smaller projects, along with construction and scouting shots, and employee head shots. He formerly worked as an interior designer for the firm and took on his current job 12 years ago. “I was always known as the guy with the camera,” he says. “I began by helping with portraits, and it blossomed from there.”

Misconceptions can arise about photo usage. In most scenarios, copyright is held by the photographer, even when a firm pays for the shoot. If a photo appears online—on an architect’s website, for instance—that does not mean it can be used by others. “The Internet has made it so easy to share and post pictures,” says Bill Hannigan, founder of the photo agency OTTO. “Unfortunately, it does not always occur to people that a license, or at least permission, is required to use an image.”

SELECTING THE RIGHT PHOTOGRAPHER

Perhaps the most important aspect of photographing a project is choosing the person behind the camera. To find photographers, architects can consult fellow designers and peruse magazines and websites. A photographer’s style, pace, and personality should all figure into the hiring decision. As for experience level, emerging



Lucas Blair takes to the skies to photograph lower Manhattan.



Matthew Millman (left) and his assistant shoot a house in Wyoming.

photographers may provide images at a reduced price; seasoned professionals may be more expensive, but they probably will be adept at handling complications and will have longstanding relationships in the media world.

Some architects gravitate toward a single photographer. Fayetteville, Arkansas-based Marlon Blackwell has worked with photographer Timothy Hursley (page 55) for two decades. “He ‘gets’ our work, and he ‘gets’ the places in which we work,” says Blackwell, whose projects dot the American heartland. Hursley’s respectful nature enables him to connect with people—important when he is shooting in underserved communities. “He makes people feel as if they are part of the environment,” says Blackwell, “rather than just a prop.”

At the other end of the spectrum, global firm Skidmore, Owings & Merrill (SOM) has a stable of regular photographers, but the office constantly searches for fresh talent. One key criterion: proof that a photographer can deftly manage light and shadow. “A lot of portfolios have a tremendous number of dusk shots,” says Lucas Blair Simpson, an SOM senior producer who oversees the firm’s photography. “They can be beautiful, but it’s an easy shot to

achieve. “We’re looking for a variety of conditions. We want to see if a photographer can get a great shot with direct sunlight, with sun and shadow part of the compositional conditions.” And Blair Simpson looks for a photographer who can handle unexpected challenges: “Even in the best-planned shoots, there’s going to be a hiccup,” he says.

That grace under pressure is a critical skill. For Eric Logan, a principal at Wyoming-based Carney Logan Burke, a photographer must be able to adapt and stay calm. The firm’s projects are typically situated in rugged settings, where nature’s whims are fully felt. One shoot, of a cabin, required a mile-and-a-half hike to the site wearing snowshoes. Another shoot was lined up for the perfect fall day, but the weather turned, and the leaves fell off the trees. “The photos are still amazing,” says Logan, noting that the bare branches make it look as if the project is under water. “Once everyone is there, and access has been arranged, planes have landed, and stuff is unpacked, it’s go time,” he says, adding that a good rapport with the photographer is essential, especially when assignments last several days. “We’re up early and out late with photographers,” says

Logan. The more we can laugh together and get the work done, the more the relationship endures over time.”

ENSURING A GREAT SHOOT

Problems are inevitable, but an architect can increase the chances of a successful shoot. Have conversations with the photographer about expectations; ideally, you can visit the site together to discuss the best features to capture. It can be helpful to develop a storyboard and a detailed shot list. Once shooting is under way, having a firm representative on-site is beneficial. “It’s great if someone from the architect’s office is there who knows how to work with the client,” says Erica Stoller, director of Esto, the photo agency started by her father, famed photographer Ezra Stoller. The representative can help with gaining access to spaces, controlling the lighting, and borrowing ladders, among other tasks. Moreover, last-minute requests for insurance certificates are not uncommon, says Stoller. “If the photographer has to do all this

and make the images,” she says, “it may either compromise the coverage or involve more time and money.”

To help avoid logistical snafus, Esto has developed a pre-shoot checklist. For instance: Will cars be parked out front? Are flags at full mast? Are the windows clean? One common problem: a photographer arrives to find a building still under construction and not yet ready for its close-up. “Recently, I had to shoot a swimming pool before it opened. There was construction up to the last minute,” says Ema Peter, a Vancouver-based photographer. “When I showed up, the workers were still inside painting. I had to ask everyone to move.” While every photo shoot comes with its own challenges, the end result can make it all worthwhile. “When my clients are happy and the photos help them get another project,” says Peter, “nothing feels better.” ■

Jenna M. McKnight, who writes regularly about architecture and design, is RECORD’s former news editor.



Ema Peter perches atop a hotel roof in Vancouver to capture the plaza below.

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ARCHITECTURAL
RECORD

CULTURAL CENTERS

Expressive structure makes a gallery, a performing-arts center, and two new museums stand out. This section highlights extraordinary construction and engineering achievements.

- 64 National Kaohsiung Center for the Arts
- 70 National Veterans Memorial and Museum
- 76 Wrightwood 659
- 82 UCCA Dune Museum

Continuing Education

To earn one AIA learning unit (LU), including one hour of health, safety, and welfare (HSW) credit, read the entire "Cultural Centers" building type study and complete the quiz at continuingeducation.bnpmmedia.com or by using the Architectural Record CE Center app available in the iTunes Store. Upon passing the test, you will receive a certificate of completion, and your credit will be automatically reported to the AIA. Additional information regarding credit-reporting and continuing-education requirements can be found at continuingeducation.bnpmmedia.com.

Learning Objectives

- 1 Describe the structural systems in the following portfolio of recently completed cultural buildings.
- 2 Discuss strategies for integrating mechanical systems into these expressive structures in ways that are unobtrusive and operationally efficient.
- 3 Discuss the engineering, formwork, and concrete-placement challenges presented by the buildings in this collection made of reinforced concrete.
- 4 For those projects located in seismically active zones, describe the features intended to limit earthquake damage.

AIA/CES Course #K1812A

WRIGHTWOOD 659, CHICAGO, TADAO ANDO

National Kaohsiung Center for the Arts | Taiwan | Mecanoo

Making Waves

Artificial hills are alive with the sound of music at this performing-arts center.

BY CLIFFORD A. PEARSON

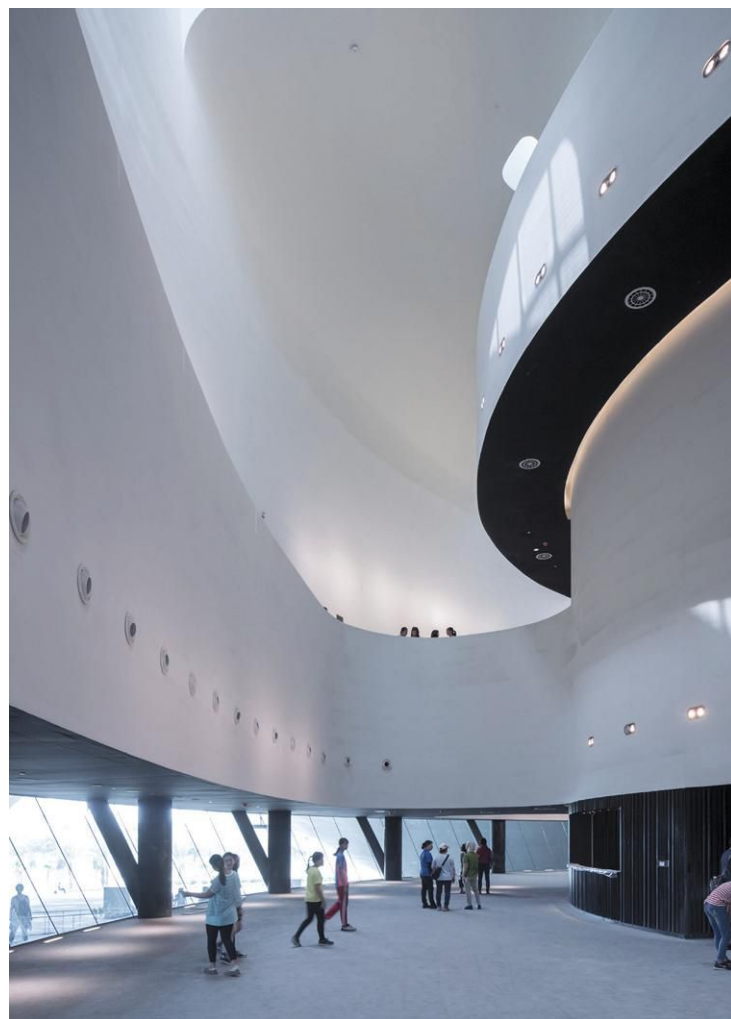




CURVE APPEAL The bulbous roof covers 35 acres. Interior passages allow visitors to move from one venue to the next (right).

Part landscape, part architecture, the 1.51 million-square-foot National Kaohsiung Center for the Arts tucks a collection of performance halls beneath a 35-acre artificial terrain that rolls like hills. Floating at one end of a park that had been a military base, the \$366 million complex—the largest performing-arts center under one roof—seems to ooze from below its immense lid, blurring the boundaries between indoors and out, solid and void. The Dutch architecture firm Mecanoo created an undulating middle realm between roof and ground that provides access to four indoor auditoria while remaining open to breezes and views of the park on all sides. Inspired by the large banyan trees that grow on the site and provide welcome shade, with their long, arching branches, the architects enveloped this interstitial space in a curving steel canopy that slides down to wrap around the elliptically shaped theaters. Called Banyan Plaza, it provides a cool retreat from the subtropical sun and frequent rains—a place where anyone can come to do *tai chi* in the morning, jog in the afternoon, or watch films projected on its underside in the evening.

In Kaohsiung, a city near the southwest tip of Taiwan, night markets and street performances animate the public realm after dark, when temperatures drop. The architects hope their Banyan Plaza works in the same way, luring people to dance, sing, and sketch, while others come to attend ticketed events indoors. “We wanted to capture the city’s wonderful mix of informal and formal,” says Francine Houben,





foundering partner and creative director of Mecanoo.

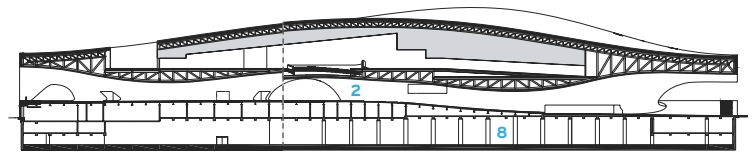
A built-up roof resting on a steel frame buffers the performance halls underneath from the sound of rain and outdoor noise while etching an eye-catching profile against the horizon and acting as the projects' fifth facade. On one side, it dips down to touch the ground and form an outdoor amphitheater with stepped seating that allows visitors to climb this part of the building. The indoor venues range from a 2,236-seat opera house to a 1,981-seat concert hall, a 1,210-seat playhouse, and a 434-seat recital hall. People attending performances enter the individual halls from the public plaza and can also circulate from one venue to another on the third level, a fully enclosed floor that connects all of the auditoria, offering spaces such as bars, cafés, and lobbies where audiences can relax during intermissions.

Referring to the way the building and the surrounding park merge, Chien Wen-Pin, the performance center's artistic and executive director says, "The design demonstrates that the arts should be a seamless part of people's lives, to be accessed without borders." Open 24 hours a day without charge, the sinuous spaces of Banyan Plaza, many of which offer peeks into rehearsal and performance halls, underscore that message. "We want the plaza to be Kaohsiung's living room, where anyone can come at any hour," says Houben.

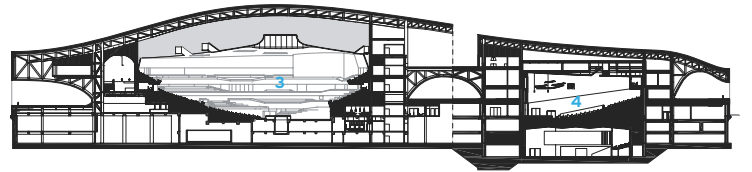
Called Weiwuying after the park in which it stands, the complex reflects Kaohsiung's transformation over the past 15 years from a



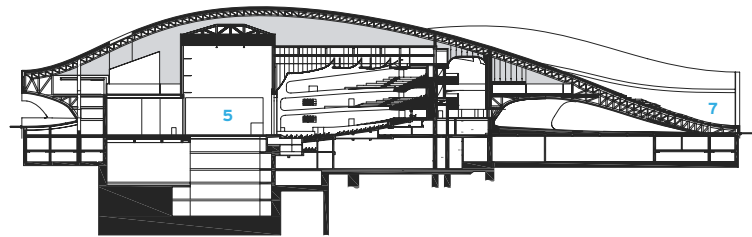
CONCEPT DIAGRAMS



SECTION A - A



SECTION B - B



SECTION C - C

0 100 FT.
30 M.

credits

ARCHITECT: Mecanoo – Francine Houben, partner in charge; Nuno Fontarra, project architect; Friso van der Steen, project director

ASSOCIATE ARCHITECT: Archasia Design Group

ENGINEERS: Supertech (structural); Yuan Tai (mechanical); Heng Kai (electrical)

CONSULTANTS: Xu-Acoustique (acoustics); CMA lighting (lighting); CDC (roof and facade); Theateradvies (theater)

CLIENT: Ministry of Culture

SIZE: 1.51 million square feet

COST: \$366 million (total); \$280 million (construction)

COMPLETION DATE: October 2018

SOURCES

ROOFING: Bemo

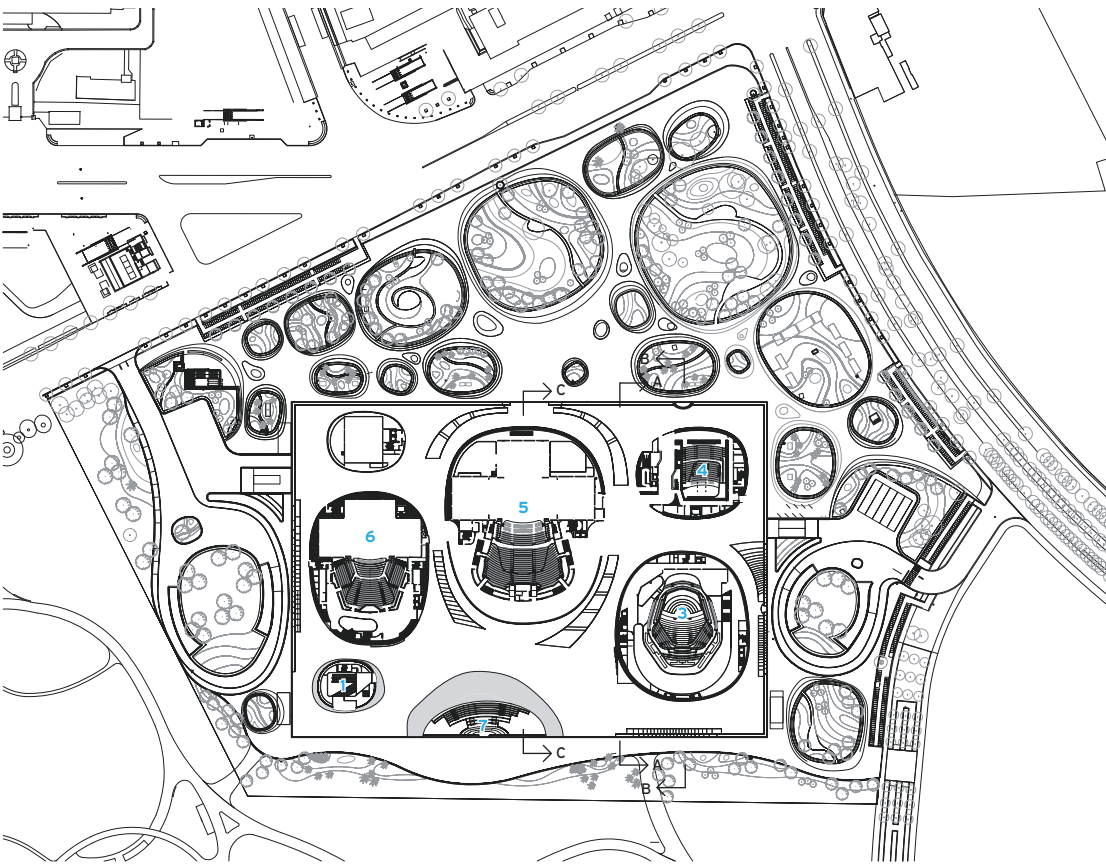
STEEL SKIN OF BANYAN PLAZA: CIG, Ching Fu Shipbuilding

STAGE SYSTEMS: Waagner Biro

THEATER SEATING: Kotobuki Seating



IN THE WORKS The steel panels range in size from 3 1/4 by 10 feet to 13 by 20 feet; they were assembled on-site into larger modules and backed with rectangular steel stiffeners (opposite). The undulating roof comprises a tubular steel space frame (here).



SITE PLAN

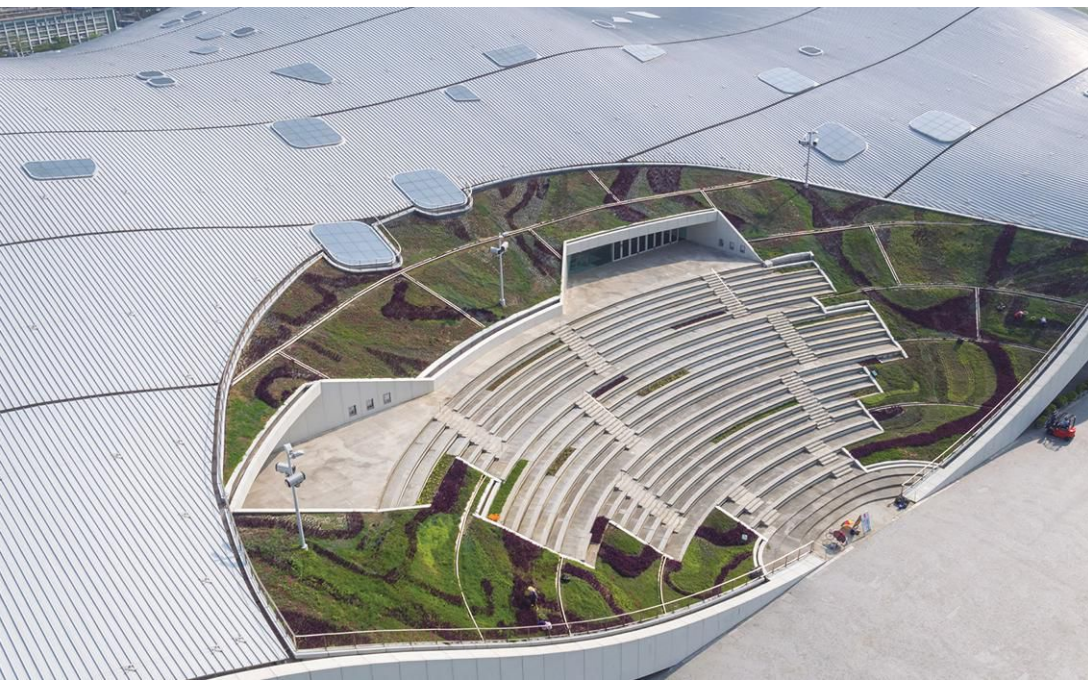
- 1 MAIN ENTRANCE
- 2 BANYAN PLAZA
- 3 CONCERT HALL
- 4 RECITAL HALL
- 5 LYRIC THEATER
- 6 PLAYHOUSE
- 7 OUTDOOR SEATING AREA
- 8 PARKING



harbor city with a mostly industrial economy to a more diverse metropolis, where parks and cultural facilities attract well-educated Taiwanese and offer tourists a reason to visit. During the 12 years it took to design and build Weiwuying, the local and national governments have connected the city to the capital, Taipei, and to Taichung, the country's second-largest city, via high-speed rail, and opened a subway system for Kaohsiung. The first phase of a new transit station, also designed by Mecanoo, officially opened the day after the arts center and features extensive landscaped areas and a covered public plaza that express some of the same ideas but in different form.

Part of a network of national performing-arts centers, this latest one joins Taipei's National Theater and Concert Hall, which opened in 1987; the National Taichung Theater, designed by Toyo Ito, which debuted in 2016 (RECORD, December 2016); and the Taipei Music Center, by Reiser + Umemoto, opening next year. As both a major arts center and a piece of architecture, Weiwuying serves as an element in Taiwan's effort to assert its "soft power" as a cultural magnet in the region.

Houben calls it a "sandwich building," with the negative space of the open plaza being as important as the enclosed elements above and below it. Visitors roaming this interstitial realm experience the complex as if it were a giant sculpture by Rachel Whiteread, the British artist who often creates concrete or plaster casts of building facades and rooms. Like Whiteread's work, Weiwuying plays with our sense of positive and negative,



ALL THE WORLD'S A STAGE One performance hall features champagne-hued oak (top). A large chunk of the roof is scooped out to provide an outdoor amphitheater (above). In Banyan Plaza, circular chandeliers equipped with LED fixtures supplement daylight supplied by light wells (opposite, top). Film screenings on the plaza's steel-wrapped surfaces are popular events (opposite, bottom).

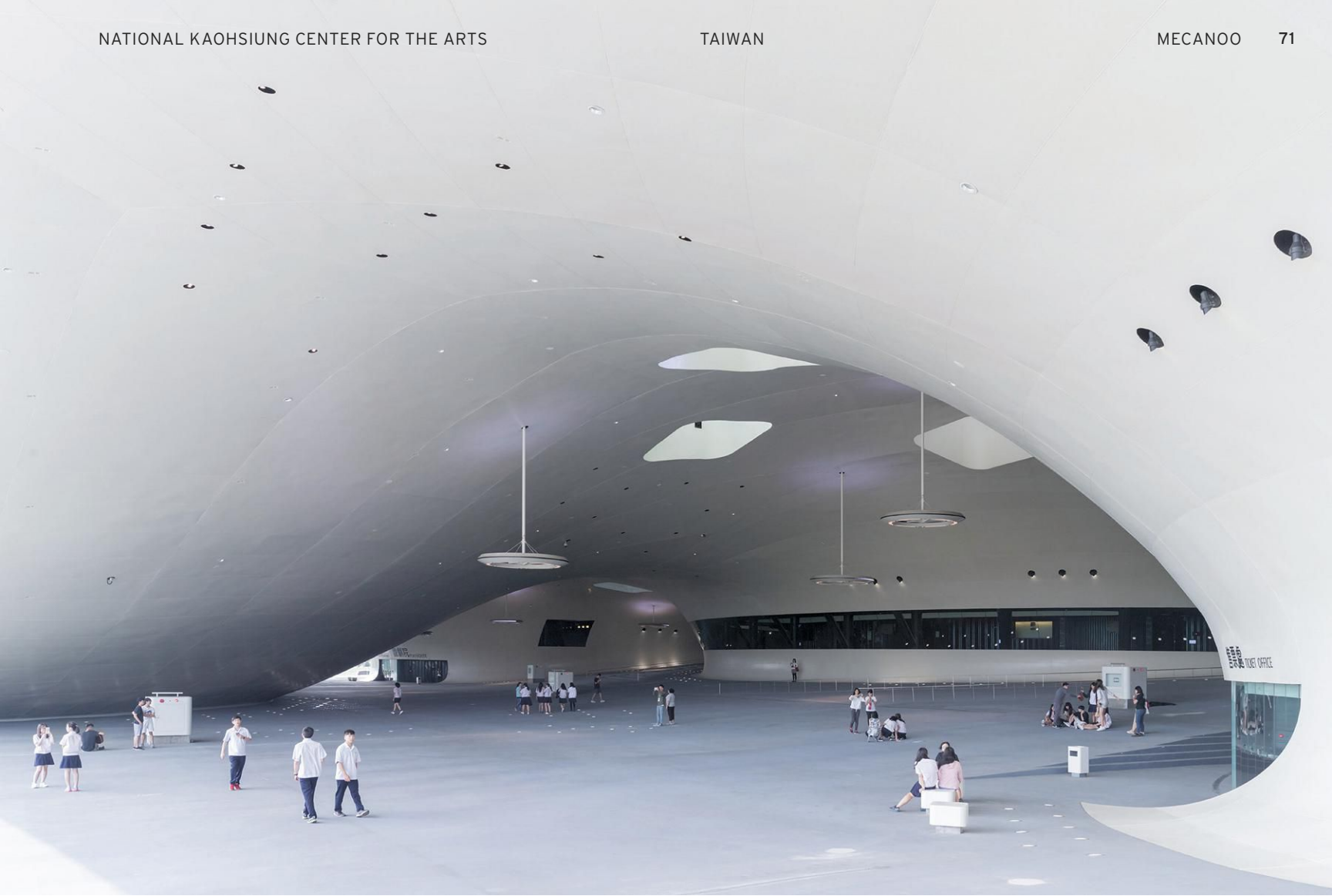
constructed and leftover.

Mecanoo, however, decided to use steel plates rather than poured-in-place concrete to envelop Banyan Plaza's curvaceous spaces and enclose the performance halls. The quarter-inch-thick plates, which acknowledge Kaohsiung's history as a shipbuilding center, are welded together and painted a grayish white to retain the rugged look of a "cargo ship, not a yacht," says Houben.

"We wanted a pure, 'single' material, not something molded by forms that are then thrown away," says Friso van der Steen, Mecanoo's technical director and a partner at the firm. The panels, cold-bent in shipyards in Taiwan and the Netherlands, range in size from 3½ by 10 feet to 13 by 20 feet and were assembled on-site into larger modules and backed with rectangular steel stiffeners. Then they were hoisted into place and welded into a continuous, seamless surface. "That's the way ships are built, so they don't leak," says van der Steen.

Suspension rods and fork-shaped steel brackets connect the modules to the building's underlying structure, which combines a tubular-steel space frame with poured-in-place concrete foundations and vertical circulation cores. Large steel springs behind the steel skin act as dampers and allow the building envelope to move independently of the structure during seismic events and storms. Using steel panels in the high-traffic public plaza also reduced maintenance issues. "They're basically indestructible and won't crumble or chip," says van der Steen. Like Banyan Plaza's skin, the building's giant roof has no expansion joints and was designed to "float like a ship" during earthquakes, says van der Steen.

Because visitors enter the performance halls from different parts of the rolling plaza, which can vary in altitude by as much as 16 feet, the architects were able to eliminate some stairs and simplify circulation. Each of the halls has its own character, with specific materials and colors, such as champagne-hued oak, maple plywood, and seat fabrics that range from opera-hall red to a bright blue. Paris-based Albert Yaying Xu served as the acoustic consultant for all of the halls, working with the architects to create the right reverberation time and sound for each one. Glass-fiber-reinforced gypsum panels on the walls and ceilings help shape the acoustics for each hall. A mechanical plant for the entire complex is placed underground to reduce noise. For the same reason, engineers specified a displacement ventilation system, with ducts in the floors supplying conditioned air at low ve-



locities to cool the space around theatergoers. An underground story connects all of the auditoria, providing areas for moving sets and equipment, circulating people, and parking cars.

To bring daylight into such a sprawling building, Mecanoo punched large openings into the roof above the third-floor crown that connects all the halls, and through the steel-plate enclosure above Banyan Plaza. Some of the third-floor apertures are skylights, while others create outdoor terraces where visitors can bring drinks and snacks from adjacent bars and cafés during intermissions.

By carving out a variety of spaces from the bulk of the enormous building, Mecanoo toys with our perception of scale, making the gargantuan seem accessible, even intimate in places. And the project's visual vocabulary of fluid forms and seaworthy volumes undermines standard notions of what's solid, what's empty, what's open, and what's closed. Navigating such a complex can be challenging and requires an exploratory state of mind, but it engages users with the building in a way that will reward repeat visits. ■



National Veterans Memorial and Museum | Columbus, Ohio | Allied Works

Monument to Valor

An inventive circular structure is home to a new institution celebrating veterans.

BY JOANN GONCHAR, FAIA



It is amazing we got it built,” says architect Brad Cloepfil of his design for the National Veterans Memorial and Museum (NVMM), which recently opened on the banks of the Scioto River, in Columbus, Ohio. Now, nearly six years after his firm, Allied Works, won an invited competition for the \$75 million project, Cloepfil still seems incredulous—largely because of the 53,000-square-foot building’s demanding structure. The roughly circular NVMM comprises a series of exposed concrete arches that are curved in plan and overlap to create three intersecting rings and a spiraling circulation path, both inside and out. The behavior of the unusual form was tricky to analyze, and its construction was labor-intensive, according to Thorsten Helbig, a partner of Knippers Helbig, the project’s New York- and Germany-based structural engineer. The poured-in-place structure was so challenging that, after participating in a design-assist phase, the preselected concrete contractor declined to bid on the building’s construction. It took two months to find another qualified contractor. “I had never designed a building that no one wanted to build,” Cloepfil says wryly.

The idea for what would become the NVMM was first conceived by the late U.S. senator and astronaut John Glenn, who was also a Marine Corps fighter pilot. Although Glenn’s initial goal was recognizing veterans from Ohio, the project’s ambitions ultimately expanded to include all of the country’s servicemen and -women. At its core, however, the primary goal remained consistent: to celebrate veterans and honor their service and sacrifice. The new entity is distinct from other military museums, which are typically dedicated to a single branch of the armed services or one particular conflict. “There is no other institution like this,” claims Amy Taylor, COO of the Columbus Downtown Development Corporation. The NVMM is part of a larger effort to revitalize the Scioto Peninsula, directly across the river from downtown.

In order to create a home for the NVMM, which is part shrine and part civic-engagement initiative, Cloepfil decided on arches since “they are somewhat ceremonial.” But his

SANCTUARY IN THE SKY The NVMM, conceived as a series of intersecting arch-supported rings (here and right), is wrapped by an exterior ramp that leads to an amphitheater-like plaza with views of the Columbus skyline.

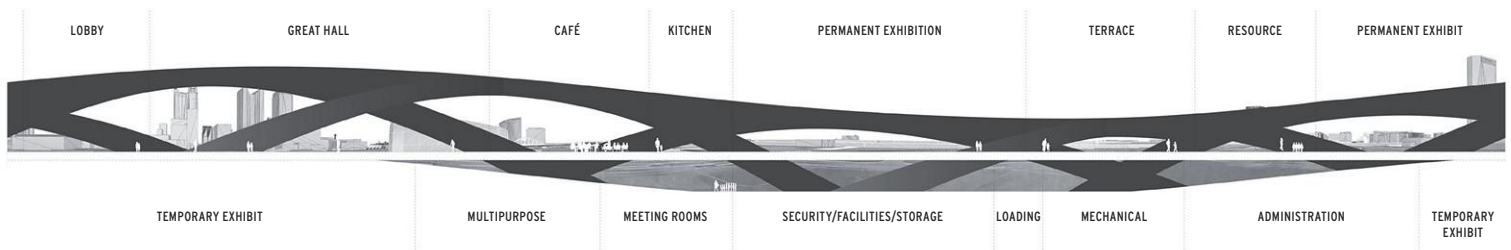
PHOTOGRAPHY: © JEREMY BITTERMANN, EXCEPT AS NOTED; AERIAL IMPACT SOLUTIONS (RIGHT)



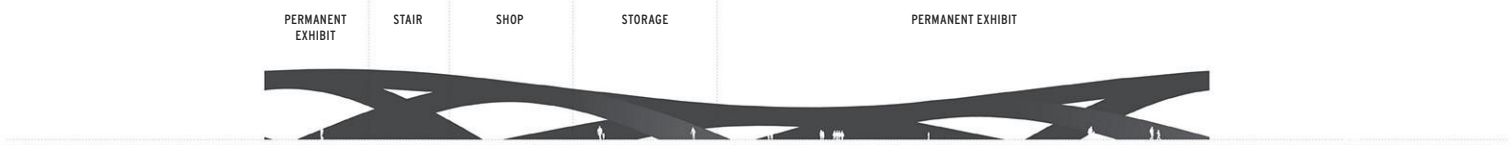


INHABITABLE SCULPTURE

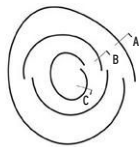
The rings, which were explored in a number of ways, including concept models (left) and as unfurled elevations (below) define interior spaces, such as the double-story great hall (opposite, top), for dinners and other functions, and the permanent exhibition area (opposite, bottom).



A- OUTER RING



B- MIDDLE RING



UNFURLED INTERIOR ELEVATIONS

chief desire was to “consecrate or set apart” a place for veterans on the seven-acre site, which at the time of the competition was home to an outdated conference facility slated for demolition. His inventive structure seems to emerge from a grass-covered hillock. It supports an ascending serpentine ramp that culminates in an amphitheater-like plaza encircled by a swath of green roof. “It is as though we lifted the earth and inserted the museum underneath,” he says. This “sanctuary in the sky” is intended for memorial services or other ceremonies, and as a place where visitors can take in views of the downtown skyline, watch runners and cyclists pass by on Columbus’s recently revamped river walk, or appreciate the surrounding landscape designed by OLIN, which features a grove of elm trees and a reflecting pond.

Inside, where the exposed muscular structure and the helical circula-

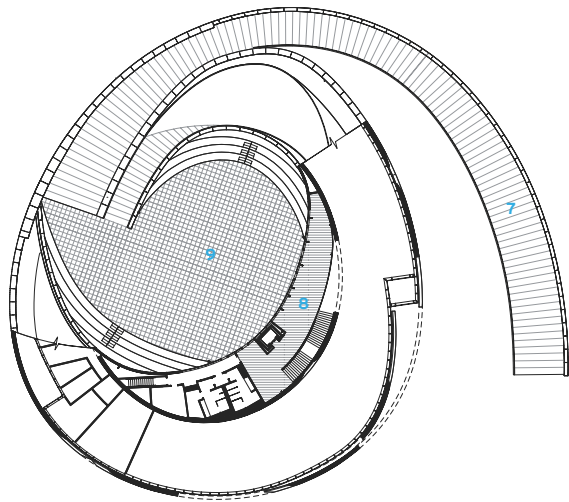
tion route continue, there are more spaces for both gathering and contemplation, such as a double-story great hall for dinners and other functions and a below-grade, circular “cyclorama” for meetings or temporary exhibits. A mezzanine level looks out onto the rooftop plaza through windows with glazing striped in multiple colors inspired by the service bars that members of the military wear on their uniforms. But most of the interior is devoted to a permanent multimedia exhibition developed by Ralph Appelbaum Associates, which snakes through much of the perimeter and middle rings. Above the displays, the composite steel-and-concrete roof structure and the wood-louvered ceiling gradually slope downward to create an intimate space. Visitors feel almost as though they are alone while they take in NVMM’s displays, including videos relating to the personal stories of veterans, told in their own

voices. Joshua, for example, describes his urge, in the aftermath of the 9/11 attacks, to leave West Point early and enlist; Jaspen talks about her desire for her son to see her as a soldier rather than a single mother; and Thom, who emigrated from Vietnam as a child, and whose father had been imprisoned by the Viet Cong, explains that he joined the army “to give back to the country that let me call it home.”

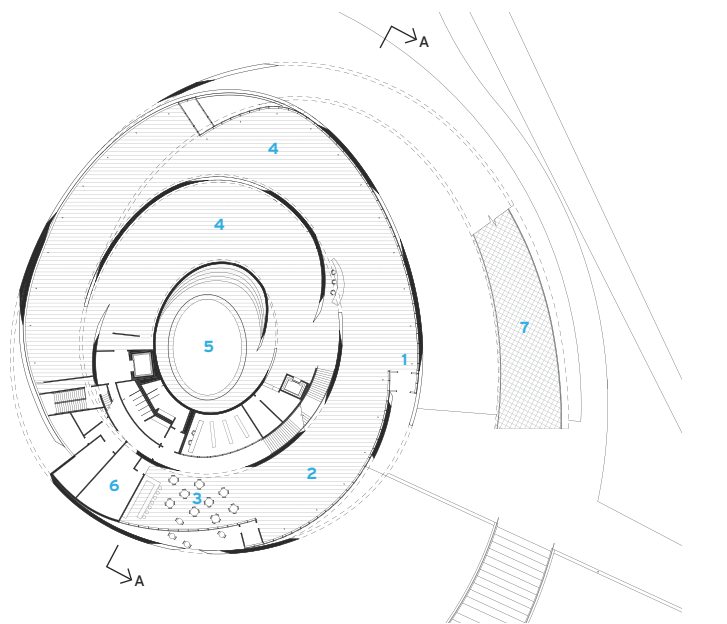
While these narrations can be sobering and intense, the generous areas of glazing inserted within the perimeter ring of arches provide sunlight and a visual connection to the city. “Visitors can step away and go to the window,” says Cloepfil. But, unfortunately, although people on the inside can see out, those on the outside can’t see in, since keeping heat gain in check necessitated tinted glazing that appears almost black in typical daytime conditions. The lack of transparency is off-putting, lending the building a somewhat forbidding character that detracts from its compelling form and the project team’s significant structural achievement.

And the structure is significant. As just one example of its complexity, Helbig points to the curved chain of arches, explaining that their structural behavior is less straightforward than that of typical planar arches, which transfer forces to the ground in pure compression. Along with compression, the NVMM arches respond to loads with bending. But the shape of the arches was not the only source of engineering challenges. Since the concrete bands also overlap—which creates the impression that they slip past one another—transferring forces between the seemingly sliding pieces required connection details that include intricately interwoven steel reinforcement. Throughout,

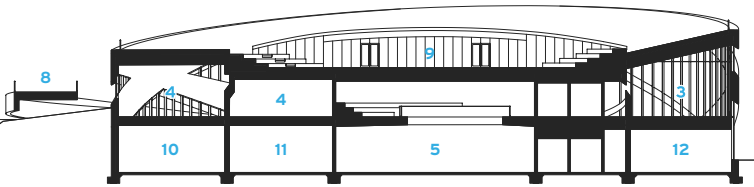




MEZZANINE-FLOOR PLAN

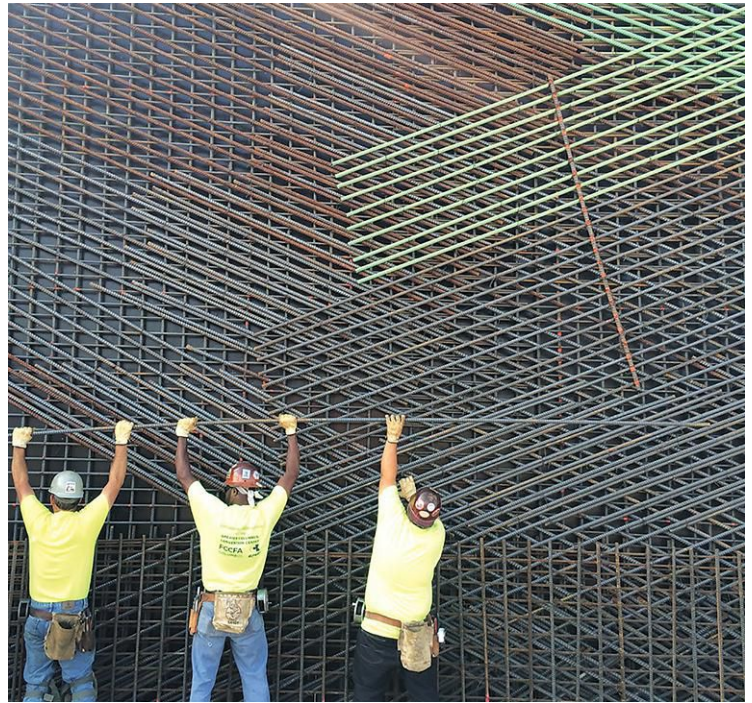


FIRST-FLOOR PLAN



SECTION A - A

- | | | |
|---------------------|----------------|-----------------|
| 1 LOBBY | 5 CYCLORAMA | 10 OFFICES |
| 2 GREAT HALL | 6 KITCHEN | 11 MECHANICAL |
| 3 CAFÉ | 7 RAMP | 12 MULTIPURPOSE |
| 4 PERMANENT EXHIBIT | 8 MEZZANINE | |
| | 9 ROOF TERRACE | |



there is a high density of rebar, with as many as 51 longitudinal layers in some locations. The steel helps resist torsional forces and control the quality of the concrete surface, explains the engineer.

The quantity of reinforcement brought with it a host of other problems, namely, tuning the self-consolidating concrete mix to ensure that it flowed without forming voids or large cracks. Contractors and engineers also needed to carefully consider the arches' construction sequence so that the concrete rings would appear monolithic, even though they were made in multiple pours, says Helbig.

The resulting concrete work has been very well executed, though it is not pristine: the outlines of the edges of the plywood forms are visible, as is the occasional hairline crack. But the structure was never intended to be "precious," says Cloepfil, and the slight imperfections do enhance, rather than diminish, its materiality and its formal power. If only the NVMM were more transparent, it would have been a building that was approachable and welcoming without blunting its sculptural presence. ■

credits

ARCHITECT: Allied Works – Brad Cloepfil, founding principal; Kyle Lommen, principal in charge; Chelsea Grassinger, project lead; Nathan Hamilton, project architect; Kyle Caldwell, Chris Brown, Rachel Schopmeyer, Alexis Kurland, Luciana Varkulja, project team

ASSOCIATE ARCHITECT: Design Group

CONSULTANTS: Knippers Helbig (structural); Prater Engineering Associates (m/e/p/fp); EMH&T (civil); OLIN (landscape); Ralph Appelbaum Associates (exhibit design); Arup (lighting, security); Reg Hough Associates (concrete)

GENERAL CONTRACTOR: Turner Construction

CLIENT: Columbus Downtown Development Corporation

SIZE: 53,000 square feet

PROJECT COST: \$75 million

COMPLETION DATE: October 2018

SOURCES

CONCRETE: Baker Concrete Construction

LIGHTING: Litelab, Gotham, Elliptipar, FC Lighting

WHITE OAK FLOORING: Kasell

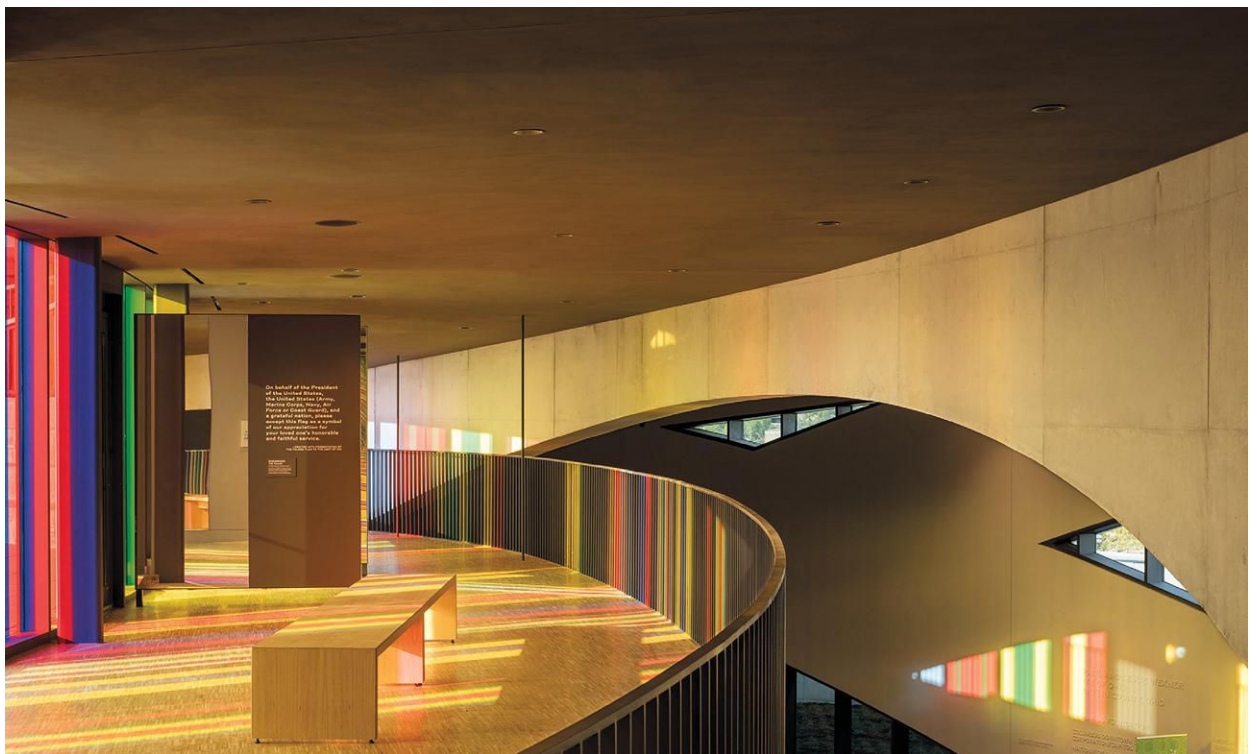
ROOF PAVERS: Tectura Designs

ELEVATOR: Schindler



COLOR GUARD

A stair that hugs an inner concrete ring takes visitors from the great hall (above) to a mezzanine level (right). It looks out onto a rooftop plaza through glazing striped to recall the service ribbons that adorn military uniforms. The NVMM's poured-in-place concrete structure includes an unusually high density of reinforcing steel (opposite).





Wrightwood 659 | Chicago | Tadao Ando Architect & Associates

The Big Reveal

An ordinary apartment building on a quiet block is revamped as a stunning space for art.

BY NAOMI POLLOCK, FAIA

PHOTOGRAPHY BY JEFF GOLDBERG

From the street, Wrightwood 659 reads as a typical Chicago apartment building from the 1920s. But behind this anonymous redbrick wrapping stands a privately owned gallery designed by the Pritzker Prize–winner Tadao Ando. Dedicated to architecture and socially engaged art, the gallery interior takes visitors entirely by surprise. Its big reveal is a soaring three-story atrium extending the original building’s full height and clad entirely with Chicago common brick. Walking a fine line between showcasing the new while respecting the old, this jaw-dropping space turns the mundane into the monumental.

Based in Chicago’s sister city of Osaka, Japan, the architect has a long history with the Windy City, home to his first two built works in the United States: the Art Institute’s Japanese-screen gallery, which opened in 1992, and a house for philanthropist and activist Fred Eychaner, completed in 1997. Some 15 years later, Eychaner asked

Ando to turn his adjacent property, a 38-unit apartment building, into an art venue. The catch was, the building’s brick exterior had to stay. “We wanted to respect the context of the mixed, residential street,” explains Eychaner.

“I thought this would be difficult,” says Ando, “but I really felt that the brick walls symbolized Chicago.” His response was to gut the interior completely, insert a new concrete-and-steel structure, and pop up an additional floor, penthouse-style. This building-within-a-building concept is reminiscent of other Ando projects, such as Venice’s Punta della Dogana, Paris’s Bourse de Commerce, and the Ando Museum on the island of Naoshima in Japan—a traditional wood house turned concrete-lined gallery. Though larger in scale, Wrightwood 659’s residential interior underwent a similar rebirth.

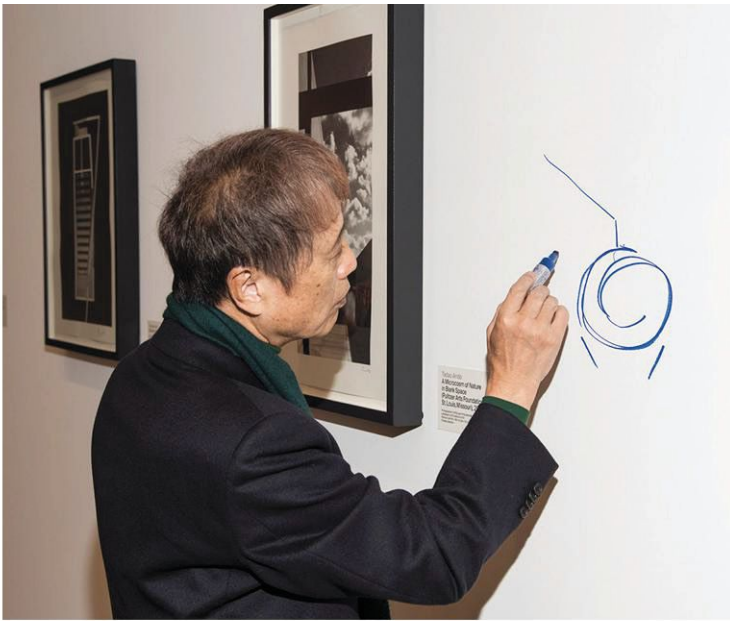
This time, the building opens with a vestibule that leads to the atrium, where a concrete stair tower ascends to the second and third floors. While support functions fill out the first floor, both upper



TADAO ANDO
AND
LE CORBUSIER

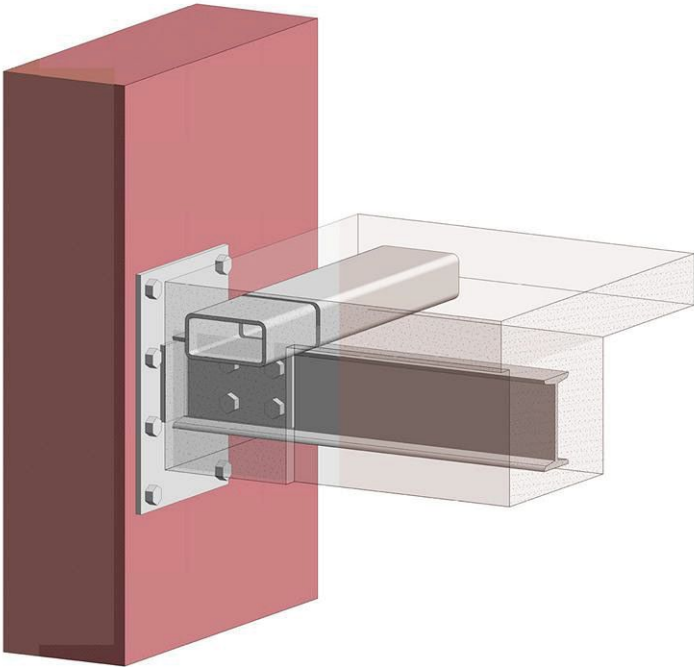
ARTISTS OF
THE FUTURE

OUTSIDE IN
The redbrick apartment building sits next door to the same client's concrete house (opposite). The soaring atrium and its stair is the pièce de résistance of Ando's design (this page).

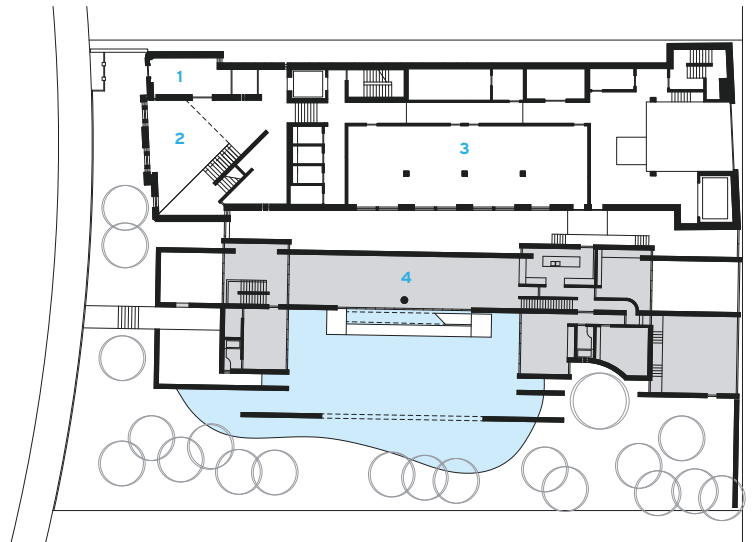


levels contain lobby-like balconies followed by pristine, white-walled galleries sandwiched between narrow slots of mechanical and circulation space. The third-floor gallery culminates in an elevated double-height area that can serve as an informal stage. From there, stairs go up to the skylit fourth-floor gallery, followed by a lobby and a corridor linking roof terraces at either end. Reconnecting with the city, the north terrace opens to the street's tree canopy, the south to a skyline view toward downtown, and the corridor to the client's adjacent home and reflecting pool.

All four floors (plus the basement) are supported by a composite concrete-and-steel structural system. To stabilize the brick walls, a bracing frame needed to be built before the innards could be demolished. This entailed strategically cutting holes in the existing interior walls, floors, and the roof, and then using those openings to construct a three-dimensional grid of steel girts and flange columns that anchor the exterior walls. After deconstruction, this steel skeleton was utilized as the permanent structure by spanning the beams with poured-in-place concrete joists connected with cast-in-place joints. "This [method] was more expensive, due to the formwork, but it has high load capacities," explains William Bast, a principal at Thornton Tomasetti, the project's structural engineer.

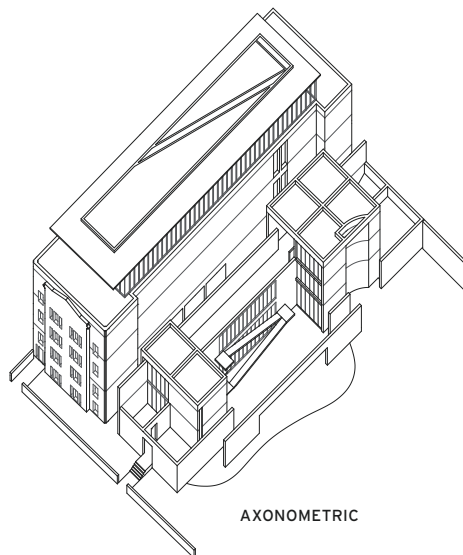


DETAIL OF STEEL TO MASONRY AT COLUMN LINE



GROUND-FLOOR PLAN

0 30 FT.
10 M.



AXONOMETRIC

- 1 ENTRY VESTIBULE
- 2 ATRIUM
- 3 ADMINISTRATIVE
- 4 ADJACENT HOUSE

credits

ARCHITECT: Tadao Ando Architect & Associates – Tadao Ando; Masataka Yano, principal; Kazutoshi Miyamura, associate

ASSOCIATE ARCHITECTS: Vinci|Hamp Architects, Gensler

ENGINEERS: Thornton Tomasetti (structural); AEI (m/e/p)

GENERAL CONTRACTOR: Norcon

CLIENT: CFAB – Fred Eychaner, Daniel J. Whittaker

SIZE: 37,200 square feet

COST: withheld

COMPLETION DATE: May 2018



THE MASTER'S HAND
Ando is photographed inside the new gallery (opposite). The brick-clad atrium culminates in a wood-lined ceiling (above). The inaugural exhibition showcases Ando's work, including his Chichu Art Museum in Naoshima, Japan (left).





ON DISPLAY For additional strength as well as aesthetics, steel columns were encased in concrete (opposite, top). The upper-floor gallery is skylit (opposite, bottom). A story was added to the existing structure, offering views of Chicago's skyline and of the client's concrete house next door, also designed by Ando (above).

For additional strength, as well as for its aesthetic qualities, the steel columns were also encased in concrete. While steel micro-piles transfer the vertical load to bedrock, push piles fortify the foundations beneath the brick walls. This extra bolstering was essential, since the live loads of the old apartments were considerably less than the bearing capacity of 300 pounds per square foot the client requested for the anticipated art installations. Measuring 18 inches thick, the atrium walls incorporate the existing masonry plus an additional layer of tan-colored bricks, salvaged during demolition.

To help meet the gallery's interior climate requirements and prevent condensation, the engineers devised thermally broken connections between the new steel elements and the existing masonry wall. These consist of a face-mounted plate attached with stainless-steel adhesive anchors and separated from the outer masonry with a nonconductive shim. The inner, salvaged bricks are mounted with rigged back joints and 3/4-inch-deep recessed mortar, creating deep shadows when illumi-

nated, turning a utilitarian material into a rich interior finish.

Fittingly, Wrightwood 659's inaugural exhibit, *Ando and Le Corbusier: Masters of Architecture*, pairs Ando with the architect who influenced him profoundly. Though the two never met—Le Corbusier died just prior to Ando's first visit to Paris in 1965—the parallels between their emotive concrete forms and elegant use of light are underscored by showing their works in tandem. Washington University professor Eric Mumford curated the Le Corbusier displays, while architectural historian Dan Whittaker selected the Ando buildings, culminating in Ando's three major museums in the United States: the Pulitzer Arts Foundation in St. Louis, the Modern Art Museum of Fort Worth, and the Clark Art Institute in Williamstown, Massachusetts. The exhibit "helps you to understand Ando's work as part of the continuum of the history of modern architecture," explains Mumford.

It also highlights Ando's great admiration for Le Corbusier. Yes, his architecture has been an inspiration for Ando, but even more has been Corb's willingness to go against convention. Le Corbusier "was very brave and kept fighting; I really applaud his courage," explains Ando. An outstanding achievement that will inspire others, Wrightwood 659 too is the product of an architect with a courageous spirit and iron will. ■



UCCA Dune Art Museum | Qinhuangdao, China | OPEN Architecture

Castle in the Sand

A subterranean museum with spectacular domelike galleries opens up to ocean views.

BY ARIC CHEN

PHOTOGRAPHY BY WU QINGSHAN

A passerby could easily miss the new UCCA Dune Art Museum, by Li Hu and Huang Wenjing of Beijing-based OPEN Architecture. Located on a strip of sand on the Bohai Sea—not far from Beidaihe, the summer retreat of China’s Communist Party leaders—the 10,000-square-foot museum lies mostly hidden, literally buried within one of the last remaining natural dune formations on the country’s northeast coast.

From the outside, just a few tubular skylights, a small stair tower, and glimpses of the parabolic concrete shells tracing the museum’s

outdoor terraces poke out from the sand and scrub. Inside, daylight filters generously into a warren of seven otherwise cavernous galleries, their domelike spaces warping and shape-shifting like a cluster of giant soap bubbles fossilized in concrete. “It connects to something ancient and timeless,” Li says of the project, whose three terraces open to expansive sea views. “We wanted to encourage people to think about their relationship with art, and with nature,” Huang adds.

BEACHFRONT PROPERTY Visitors enter through a long tunnel (above). The museum’s outdoor terraces poke out from the sand and scrub (opposite).



While the museum opened in October as an outpost of the well-regarded Ullens Center for Contemporary Art in Beijing, its function wasn't fully determined at first. Situated in a quiet corner of a sprawling, impeccably pruned enclave of luxury homes, shops, and resort hotels, OPEN's project is one of several "follies"—including a widely publicized library and chapel by the Chinese studio Vector Architects—that were commissioned for the beachfront by Aranya, the property developer.

The original brief vaguely called for a space for art and dining. Midway, the art took over, prompting OPEN to convert a planned

kitchen into the museum's only somewhat rectangular gallery (a small café remains). However, changes in program were hardly the only cause for improvisation. The museum's construction called for excavating the existing dune and erecting the museum's structure before replacing the sand on top. ("We built into the dune in order to save it," Li says of the formation, which would probably have been slated for demolition.) The entire building—including a dramatic, structural spiral stair leading up to the dune's ridge—would be cast in concrete. But the question remained as to how.

Li and Huang took broad license in exploring possibilities. They



considered specially fabricating steel ribs and trusses that could support concrete formwork. However, that proved to be too time-consuming and costly. They explored using CNC-milled foam, but the foam would be too fragile. Taking an experimental and conceptual leap, they even looked at erecting mounds of sand that could be sprayed in shotcrete and then hollowed out once the latter set—“sort of obvious, given the context,” Li says—or, even more radically, doing the same using blocks of ice. (“We first visited here in winter, and were struck by how the ocean was frozen,” Huang explains.)

In the end, the answer was indeed right in front of them, floating on the water. The surrounding area is known for its fishing boats. And with more advanced fabrication techniques being unfeasible, the architects turned to the local contractors, whose experience in boat construction meant they knew how to create complex curves in wood.

While the structure’s geometry was exact-



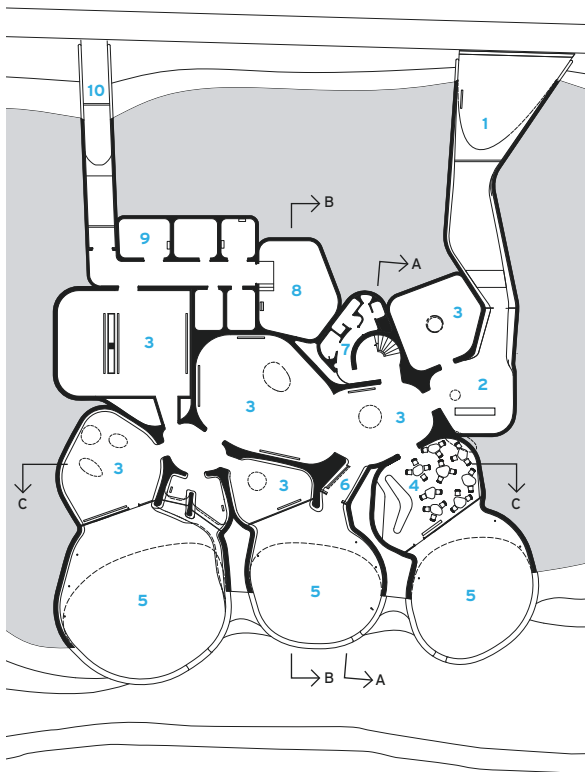


OTHERWORDLY The subterranean galleries are filled with daylight, thanks to skylights and generous glazing (opposite). A muscular spiral stair (right) connects the rooftop (above) to the galleries and to a viewing platform up high. Like the galleries, the spare café is a domelike space whose concrete shell reveals the process of its making through its jumble of patterns and textures (below).

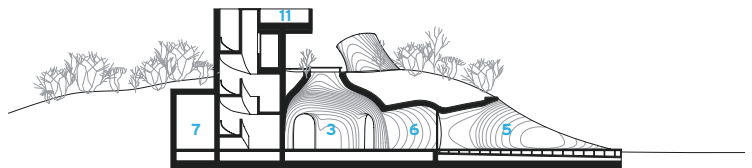
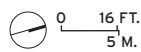




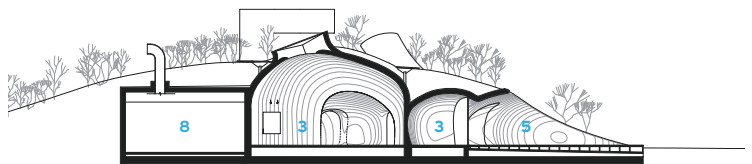
BY THE SEA The architects turned to local shipbuilders for the formwork (left and above). The inaugural exhibition explores the shifting relationship between humans and nature in light of China's last three decades of breakneck development (opposite).



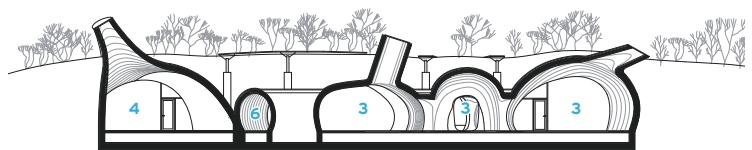
FLOOR PLAN



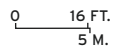
SECTION A - A



SECTION B - B



SECTION C - C



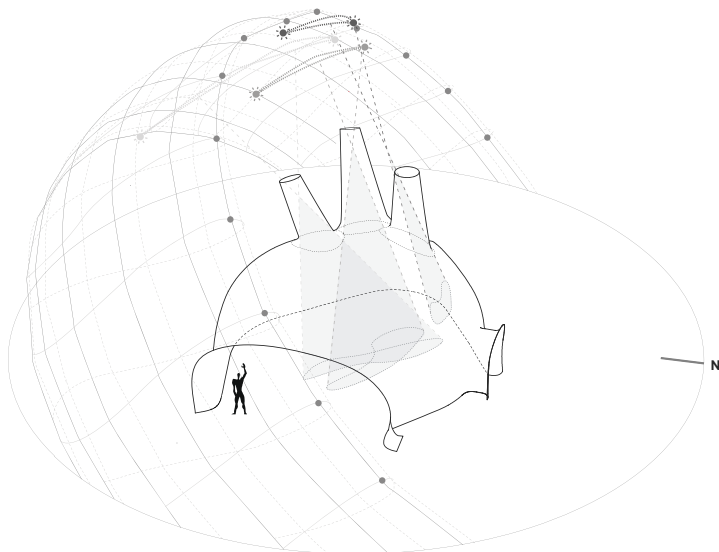
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|-----------------|---------------------------|--------------------|---------------------|
| 1 MAIN ENTRANCE | 4 CAFÉ | 7 BATHROOM | 10 SERVICE ENTRANCE |
| 2 LOBBY | 5 TERRACE/OUTDOOR EXHIBIT | 8 GEOTHERMAL PLANT | 11 VIEWING PLATFORM |
| 3 GALLERY | 6 SECONDARY ENTRANCE | 9 ELECTRICAL | |



ingly precise, its method of construction wasn't. With a lattice of rebar in place, thus began an iterative design-build process that played out in real time as the contractors bent wood slats, planks, and boards into formwork, making on-the-spot adjustments along the way. There were digital models, of course, and lots of data, but also a 1:50 scale maquette for eyeballing. (A full-scale mock-up of one of the smaller galleries, which could be repurposed as a beachside changing room, was also erected.)

To further complicate matters, the concrete would need to be thick-

er at the base, while doorways and skylight apertures called for extra rebar reinforcement. On paper, 200-square-foot windows providing unobstructed views to the water could be easily mounted from the exterior. But, in reality, the building's geometry got in the way, requiring workers to devise custom pulleys to install them from the inside. Throughout, details had to be continuously redrawn. And while the museum's geothermal heating and cooling lay hidden beneath the floor, a grid of recessed spotlights were cast into the concrete above—and, as Li says, “you only get one chance at that.”



SUN PATH DIAGRAM

credits

ARCHITECT: OPEN Architecture – Li Hu, Huang Wenjing, principals in charge; Zhou Tingting, Wang Mengmeng, Hu Boji, Fang Kuanyin, Joshua Parker, Lu Di, Lin Bihong, Ye Qing, Steven Shi, Jia Han, project team

ENGINEER: CABR Technology (structural, mechanical, curtain wall)

CONSULTANT: X Studio of the School of Architecture at Tsinghua University (lighting)

CLIENT: Aranya

SIZE: 10,000 square feet

COST: withheld

COMPLETION DATE: October 2018

SOURCES

CONTROLS: Lutron

HARDWARE: Dorma

CHAIRS: Emeco

SUNSHADES: Silent Gliss International

OUTDOOR DECKING: Woodn



THE SHELTERING SKY The terraces offer expansive ocean vistas after a visit to the galleries, and also double as outdoor exhibition areas.

Most visibly, however, the formwork itself required a string of impromptu solutions, as different curves required different sizes of wood oriented in different directions—and, when all else failed, the workers cannily resorted to using sheet metal and even rubber tubing instead. Heightened by its contrast with the building’s polished white terrazzo floors, the resulting concrete shell almost viscerally reveals the process of its making through its jumble of patterns, textures, and even staple marks imprinted by the formwork.

From the start, Li and Huang had anticipated such flaws and planned to smooth them over with a layer of plaster. Then “we saw how beautiful the imperfections were and decided to keep them,” Huang says. And so the concrete was left exposed, adding to the sense, as Li puts it, that

“the whole building is handcrafted.”

In fact, the museum is one of a pair that OPEN has designed for the site; work is expected to begin next year on a “Sea Museum” that will be reached by a 500-foot-long causeway designed to disappear beneath the water at high tide. The Dune Museum, on the other hand, is not just embedded in the landscape. It also tracks the sky: two of its skylights orient to the sun at the summer and winter solstices, while others are designed to capture daylight or cast it on the walls.

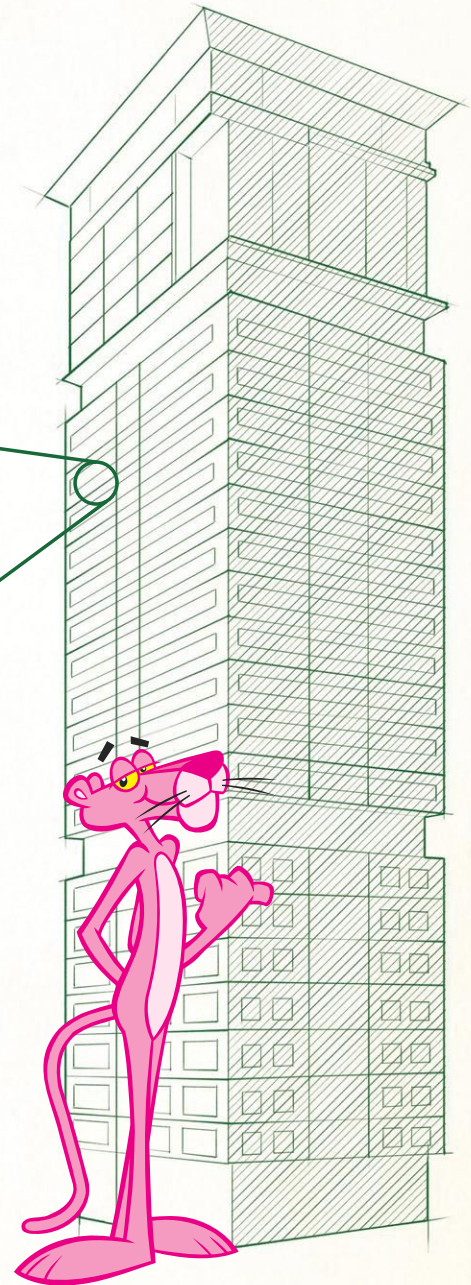
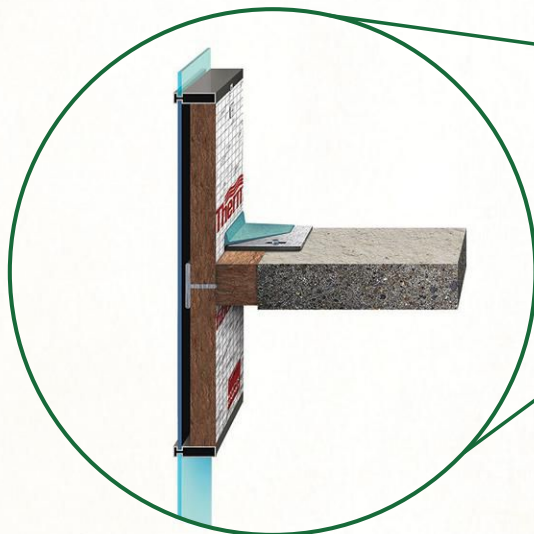
When it came to the building’s construction, OPEN both drew from local know-how and embraced its limitations. The architects also skillfully worked with the terrain. When Li says that “we wanted to create a deep connection with the site,” he perhaps means it in more ways than one. ■

Aric Chen is an independent curator and writer based in Shanghai.

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Record Products 2018

Architectural Record's annual best-products competition received more than 320 entries this year. As you'll see on the pages ahead, our independent jury of designers selected 67 winners, with the Best in Category receiving top numerical rankings. Record editors also examined the winners to highlight additional favorites, which received the Editor's Choice designation. Leaf through the results to find the latest and most innovative building products.



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



BLUE-RIBBON BEST reflects the Record editorial staff's picks in each category.

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

Jurors

Faith Baum, IALD, LEED AP
 Baum merged her firm with Horton Lees Brogdon (HLB), creating one of the largest woman-owned lighting-design firms in North America. Her expertise in lighting bridges is widely known.

Yolande Daniels
 Daniels, as cofounder of Design Vanguard 2006 firm StudioSUMO, is a visiting professor at CUNY, MIT, and Pratt Institute, among others.

Priya Patel
 Accolades for 4|Mativ, cofounded by Patel, include being featured in RECORD's kitchen and bath roundup (RECORD, September 2018). Patel has completed projects in India, Kenya, and the U.S.

Maxwell Pau, AIA, LEED AP
 A partner in Beyer Blinder Belle, Pau focuses his dual skill sets, in architecture and urban design, on large mixed-use projects.

Sarah Randall
 Trained as an architect, Randall specializes in lighting design for Renfro Design Group. Her portfolio includes galleries, residences, and museums.

Ghislaine Viñas, IIDA
 Founder of her eponymous firm, Viñas is known for her exuberant residential and workplace interiors and for product-design collaborations. Her 2018 honors include IIDA's NeoCon prize for Small Showroom (under 4,000 square feet).

Irena Savakova, LEED AP
 As director of design for Leo A Daly, Savakova leads large-scale federal, commercial, and education projects. She's licensed in three countries.



Standing (above, left to right) are Maxwell Pau, Priya Patel, Irena Savakova, and Yolande Daniels; seated, Faith Baum, Sarah Randall, and Ghislaine Viñas.

Lighting

Indoor | Outdoor | Commercial | Linked Systems



Infra-Structure

Belgian architect Vincent Van Duysen devised this multifaceted system for Flos Architectural using Bauhaus design cues. Its rigid aluminum-stem framework (in black or white) accommodates a range of LED pendants, tubes, and spots—simply inserted with magnetic fastening to allow for numerous schemes.

architectural.flosusa.com



Best in Category

Arrangements

Our judges' lighting favorite, this modular collection from Flos is by the London-based industrial designer Michael Anastassiades. His intent: to evoke jewelry by linking its various LED units to create a glowing chain. Choose from eight 2700K geometric luminaires to create a unique custom chandelier with power connections through a ceiling rose.

flos.com

Modular Columns

A kit of parts for site planners, architects, and designers, the versatile 8"-round marine-grade-aluminum outdoor-lighting columns by Selux reach up to a standard height of 18' and integrate a wide range of optical systems and high-quality camera/speaker options, leaving an uncluttered landscape that doesn't detract from the architecture or the grounds around it.

selux.us



Acoustic Shapes

These new, super shapes for an existing line of LED fixtures from LightArt have acrylic frames clad in felt made up of 50% post-consumer content. Drum (above), Ring, and Box were designed to relieve sound issues in large, densely populated indoor environments such as airports, transit centers, and shopping malls. They offer 1% dimming capabilities and a choice of 15 felt colors and 3 plate finishes.

lightart.com

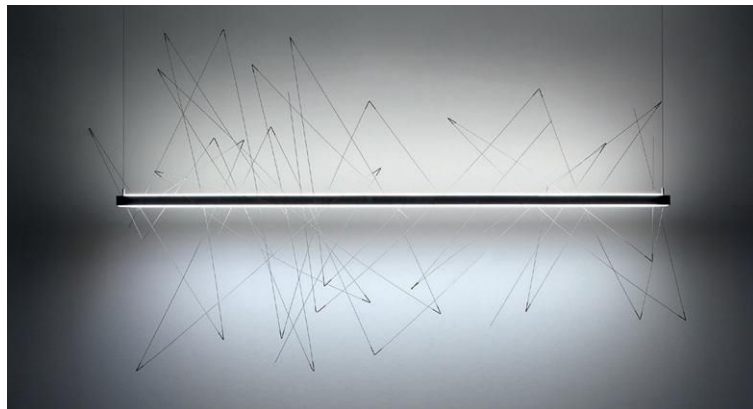
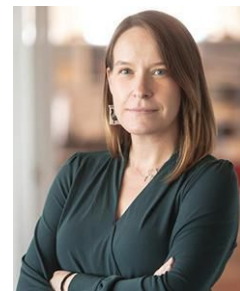


BuzziProp LED

The aerodynamic form of this light fixture by BuzziSpace is upholstered in acoustic foam to regulate noise in workplace and other environments. Available in a wide range of colorful textiles, the dimmable BuzziProp LED targets low, mid-, and high tones via absorption, and emits a warm 3000K color temperature at 90 CRI. buzzi.space

“We liked Flos’s Arrangements because the clean lines and concealed connectors provide a balanced lighting effect”

—Lighting designer Sarah Randall, Renfro Design



Graffiti

Created by Kazuhiro Yamanaka for Pallucco, this sculptural luminaire, available in the U.S. through ddc, is meant to be played with. Illuminated by a central magnetic aluminum bar, Graffiti—which comes in two sizes as a pendant or sconce—is named for the thin stainless-steel rods that surround it and can be rearranged at will. pallucco.com



Pursuit

Available in 2’, 3’, 4’, 6’, or 8’-long housings for upward, downward, or bidirectional illumination, this linear LED outdoor fixture, by Hubbell Architectural Area Lighting, links for continuous runs of up to 150’. The system offers a range of mounting, color temperature, distribution, and finish options, plus wireless control and L-, T-, and X-shaped connectors. hubbell.com

MUN Dark

Available in white or graphite and in three diameters—4.7”, 7.1”, and 11.8”—at about 2” deep, this indirect light source from Nordeon USA is precisely designed to be grouped in various surface-mounted compositions. Each size features a spun-aluminum housing, encircled from behind by a ring of 3000K or 4000K LEDs shielded by an opal polycarbonate diffuser, to provide a subtle atmospheric radiance. nordeon-usa.com



Ruby MC Recessed

This in-grade exterior/interior luminaire by Griven USA has six powerful, high-quality quad-chip LEDs in a choice of RGBW, dynamic white or static white, and four distributions. Its 11”-diameter x 6”-high size enables shallow installations, while multiple diffuser and control options provide flexibility. griven-usa.com



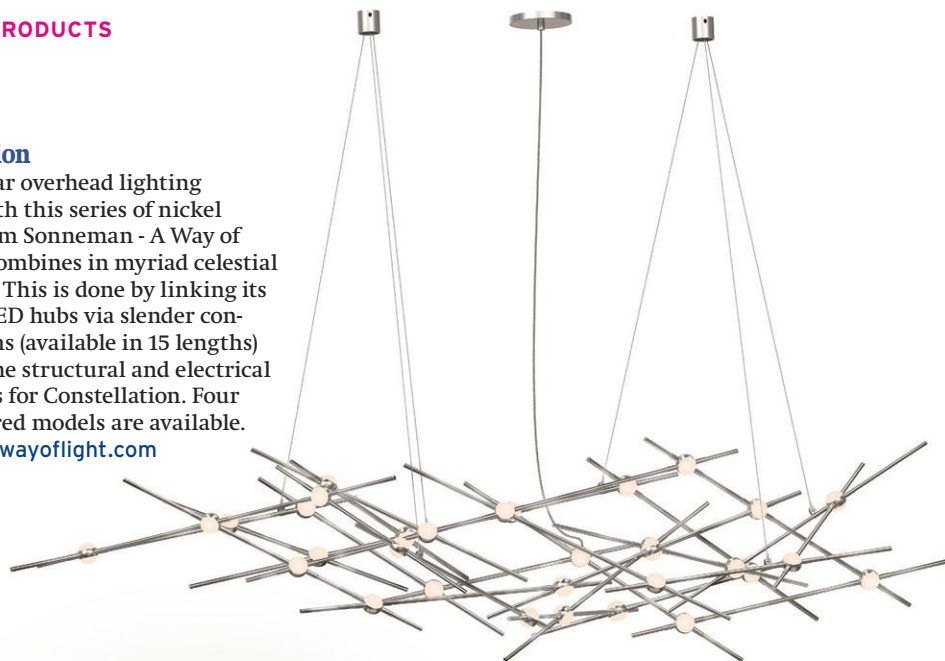


Artima/5 VNSP Bluetooth

This track or surface-mounted fixture from Edison Price Lighting is powered by a Cree chip-on-board LED and has an embedded Xicato driver that enables wireless control—a good idea for double-height spaces. Users can manage the many aspects of this lighting system—such as the on/off control, dimming to 0.1%, collecting data, push notifications, and switch or sensor connections—with a smartphone. Optional accessories are available for tailored optics. epl.com

Constellation

Create stellar overhead lighting schemes with this series of nickel fixtures from Sonneman - A Way of Light that combines in myriad celestial formations. This is done by linking its luminous LED hubs via slender connecting arms (available in 15 lengths) that form the structural and electrical connections for Constellation. Four preconfigured models are available. sonnemanawayoflight.com



Editors' Choice



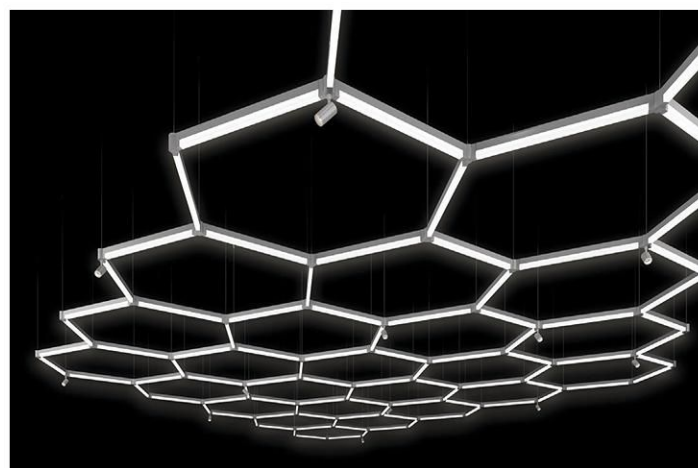
Flindt Wall

Named for its Copenhagen-based designer, Christian Flindt, Louis Poulsen's circular indoor/outdoor wall fixture appears to float as the glare-free glow it emits from two LEDs tucked behind its fold creates a subtle rim of light around its arc and gently washes down over its face toward the ground. Made of die-cast aluminum, its sculptural moonlike form is offered in 7.9", 11.8", and 15.7" diameters, as well as in Cor-Ten-look and white finishes. louispoulsen.com



Linesse

"Strip" lighting at its finest, Visa Lighting's Linesse provides continuous linear illumination in recessed, surface-mounted, or pendant versions available with standard or disinfecting white LEDs (the latter said to eliminate germs). Lengths of the 3"-wide luminaires range from 2' to 8', and options include daylight and occupancy sensors, an emergency driver and battery, and black, silver, or white finishes. visalighting.com



GlowSTX

Each linear section of LF Illumination's suspended LED lighting system measures 3/4" wide x 2 1/4" high and up to 8' long. Adjustable connectors form a wide range of shapes and configurations, and an optional LED Accent module provides more focused light where it's needed. A patent-pending multipath, multiplex circuitry allows continuous runs while maintaining independent circuit paths. lfillumination.com

U-CARA

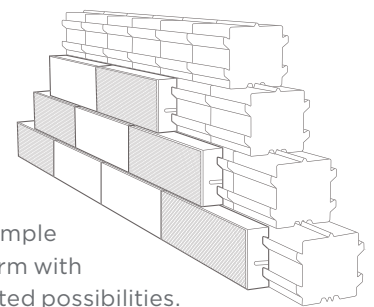
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Kitchen & Bath

Cabinets | Appliances | Fixtures | Fittings



Etna

What appears to be a built-in kitchen is actually a modular solution from Lineadecor USA that can be conveniently reconfigured by homeowners. Pieces in Etna—the open ceiling-mount shelving, mobile storage, and retractable tables—are available in three Concreta hues of gray, beige, and white, and feature hinge and drawer systems tested to withstand up to 200,000 and 100,000 open/close movements, respectively.

lineadecor.us

Beale MeasureFill Touch Kitchen Faucet

American Standard expands its Beale collection with a zinc-bodied touch faucet that users can program to deliver preset volumes of water, measuring up to 5 cups. Powered by AA batteries or an optional AC adapter, a dial on the base glows when the measuring function is in use.

americanstandard.com



Best in
Category



Flotation Tub with Zero Dimension Technology

Based on a decade of neurological research, TOTO's Flotation Tub features a special interior that encourages reclining with the legs bent and higher than the posterior to simulate a feeling of weightlessness, among other spalike features such as massaging water jets and an ergonomic, adjustable headrest. Measuring 87" long x 41" wide x 30" deep, it's made from the company's proprietary reinforced marble composite.

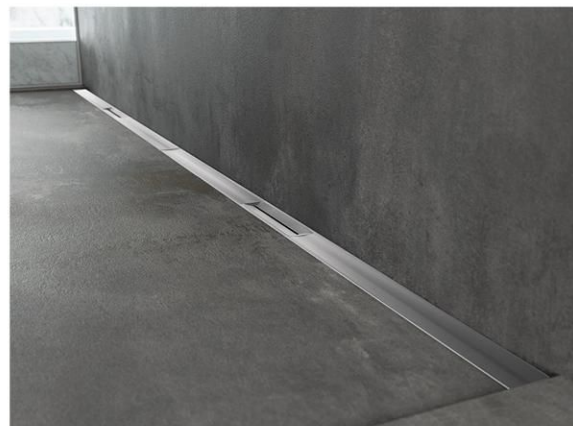
totousa.com



Brioso

Designed by Christian Werner, Brioso is Duravit's affordable line of bath vanities, mirrors, and storage, allowing designers flexibility on a budget. Options span 15 finishes, five vanity widths, multiple console thicknesses, drawer options, and a choice of LED-lit mirrors with dimmers and defogging ability.

duravit.us



Supreme

This system is innovatively designed to simplify the installation of linear drains when the pipe is off center. QM Drain's Supreme, made with an independent base, eliminates the need to relocate existing pipes. While allowing for installations 8" left or right of center, Supreme appears centered regardless of the existing drain-pipe's location.

qmdrain.com

GroTherm SmartControl and Rapido SmartBox

This compact shower-control system supports up to three outlets on one slim wallplate, and installs easily using the company's single, universal rough-in device, Rapido SmartBox. Once installed, GroTherm SmartControl's low-profile, push-and-turn knobs control water flow and spray patterns from the shower and hand shower. They project just 1 1/8" from the wall. grohe.us



"Amuneal's kitchen has a gorgeous aesthetic. Gunmetal is an amazing finish for the cabinets – industrial, but refined and textural."
 – Priya Patel, principal, 4Mativ



Editors' Choice

Gunmetal Kitchen

Stainless-steel cabinet and drawer faces on this new kitchen by Amuneal can also be specified in brass, copper, and bronze, with 1/4"-thick bronze pulls and a choice of more than 400 patinated finishes. The Gunmetal finish shown here features welded and polished corners on carcasses built from solid ebonized white oak. Options include glass-front upper cabinets and wood or metal organizing inserts such as dividers and trays. amuneal.com

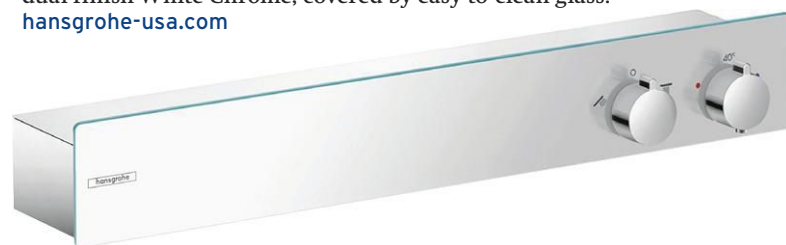
Union

Crosswater London collaborated with architect Antonio Gardoni and designer Federico Castelli to create Union, a line of solid-brass faucet sets, shower heads, and tub fillers. Enhancing the industrial profiles (finished in unlacquered brass, polished chrome, brushed black chrome, brushed nickel, and bold red) are high-quality cartridge and thermostatic valve technology. crosswaterlondon.com



ShowerTablet 600 Thermostat

Part of the Raindance collection, a new 24"-long thermostatic shower mixer from Hansgrohe performs double duty as a convenient shelf. Its brass body comes finished in a Chrome or dual-finish White Chrome, covered by easy-to-clean glass. hansgrohe-usa.com



Clear Space Elliptical Shower Door

This shower enclosure from C.R. Laurence uses a narrower-than-average door-guide mechanism to enable the door to fold open like an accordion, reducing outswing projection and freeing up 45% more bathroom space than conventionally hinged systems. Frameless, all-glass Clear Space holds 3/8"- and 1/2"-thick tempered glass. crl-arch.com



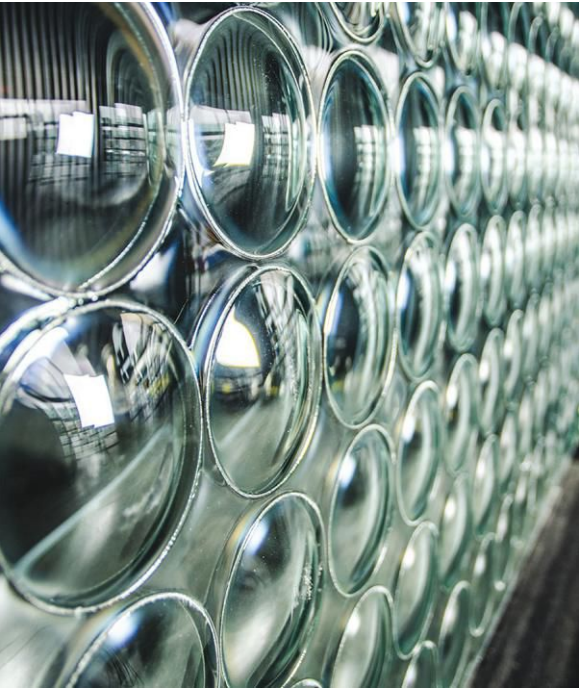
Joining Kits

A special hardware kit from True Residential can unite up to three of the manufacturer's 30" refrigerators, freezers, or wine columns in custom combinations. Made of 300-series stainless steel, the Joining Kits are available in 60" and 90" versions and with custom finishes and hardware. true-residential.com



Doors, Windows, Hardware

Options | Controls | Safety | Integration



Convex Circles Grande

Large-scale 3-D-patterned architectural glass is among the latest offerings from manufacturer Nathan Allan Glass Studios. Made in an array of custom panel sizes ranging from 1'-square up to 6' x 11', the molded glass can be specified in tempered or laminated safety glass and with an insulating low-E coating. While 98% of the surface is clear, the 3-D pattern distorts views for added privacy. nathanallan.com



CeraMax

An innovative ceramic coating makes this line of hand-finished, stainless steel hardware stand out. CeraMax door handles resist most solvents and chemicals and withstand the standard industry Salt Spray Corrosion test 85 times longer than uncoated hardware. The special coating was developed to endure high humidity and ultraviolet light for more than 5700 hours without yellowing or losing its luster. inoxproducts.com



*Best in
Category*

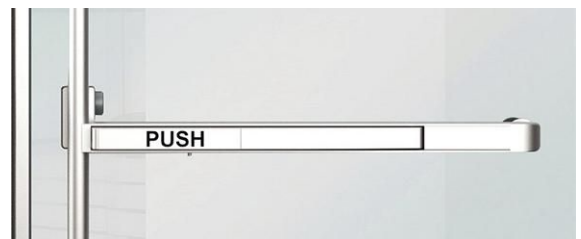
WhiteOUT

Nanawall's latest glass wall system can change from clear to opaque at the touch of a button, with the added benefit that its white privacy glass can function as a writable surface and projection screen. Designers can also specify an unlimited number of sliding panels sized as large as 4' wide x 11' tall, which can be retracted to stack out of sight when they're not in use. nanawall.com



Louvre Rail System

Adaptability marks Amuneal's Louvre Rail banister, a modified version of a system that included stairs released by the company in 2016. The railing-only update works with new and existing steps, and the 1½"-wide steel slats add visual interest. The rails can also be specified as a divider wall. Standard handrails come in white oak or walnut, in a variety of finishes. amuneal.com



Entice Panic Device by Blumcraft

This egress system for commercial glass doors simplifies typical panic-device installations. The crash bar uses a proprietary through-glass fitting to attach easily to its matching panic component, and the two-piece system is stocked in popular lengths, cutting previously long lead times. The system is engineered for use on 1"-thick double-glazed insulating glass doors. crl-arch.com



Loki Sliding Door Hardware System

Krownlab's latest offering is a budget-friendly version of its popular hardware. The new system, Loki, features a high-grade aluminum trolley and a wheel made from high-quality plastic to fit a broader range of projects. The track is available in 4', 8', and 12' lengths and in Top Mount, Face Mount, and Glass Mount versions that hold a range of door materials such as wood, glass, metal, and plastic. krownlab.com

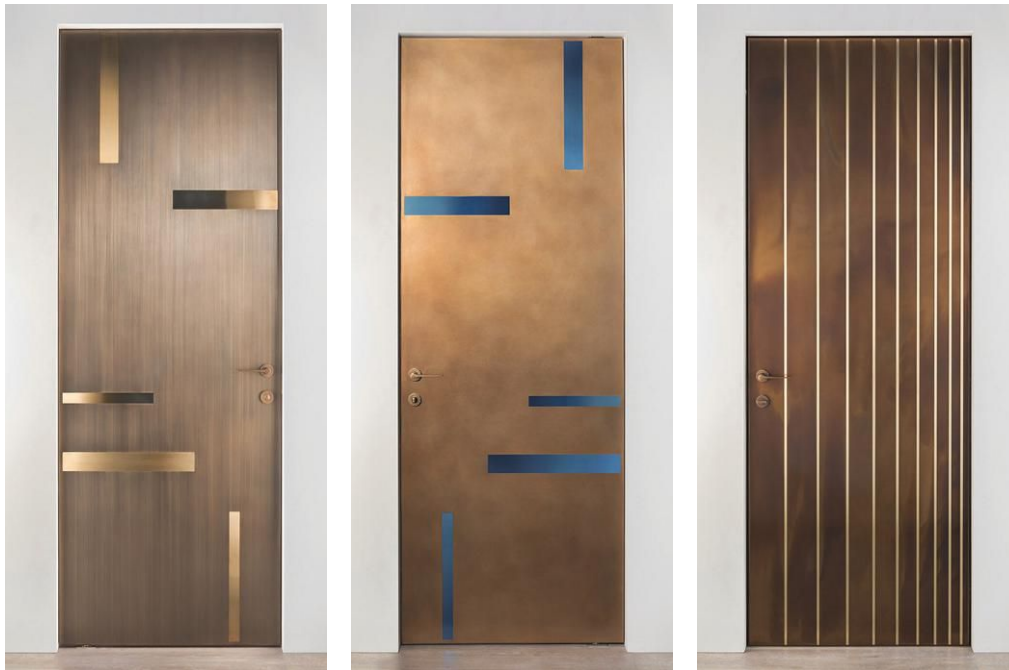
"WhiteOUT glass walls offered a seamless, elegant solution."

- Lighting designer Faith Baum, Horton Lees Brogden



HIRT SF90 Descending Wall

This retracting wall descends instead of sliding sideways, to dramatically open up residential and commercial spaces at a touch of a button. Manufactured with a thermally insulated aluminum profile, the expansive airtight and watertight window can disappear into the floor. HIRT SF90 is available in an array of sizes up to 19'-square. hirtusa.com

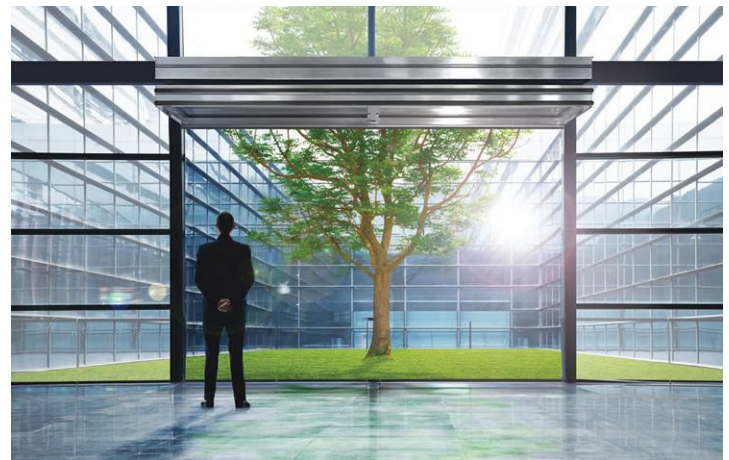


Astec Interior Doors

A striking mix of materials—glass, copper alloys, bronze, fabric, and even titanium—distinguishes new Astec Interior Doors. Astec collaborated with Paris-based architect Stephane Parmentier to design the 83"-91" panels, which can be specified to slide, swing, or pivot, and feature burnished brass or stainless-steel handles and fittings. astec.it

Arc3D

DoorWall Systems' Arc3D operable wall is designed to integrate seamlessly with openings, viewed from the exterior or interior, and built to perform structurally and thermally like the rest of the facade. A direct-drive system allows for streamlined installation of the 1 $\frac{3}{16}$ " triple-pane insulated safety glass and thermally broken aluminum frame, without the clutter of hydraulics or cables. doorwallsystems.com



Surfaces

Walls | Ceilings | Flooring | Partitions

**Best in
Category**



Ebanys

What appears to be upholstered fabric is actually Paola Lenti's 24"-square wood rug modules, designed in collaboration with Italian flooring specialist Listone Giordano. Each cushiony square is polyester and expanded-polyethylene padding stitched to a sheet of wood veneer; the combination takes on the quality of a textile. Listone Giordano applies a proprietary Mano Opaca oil-based finish to the veneer surface. paolalenti.it

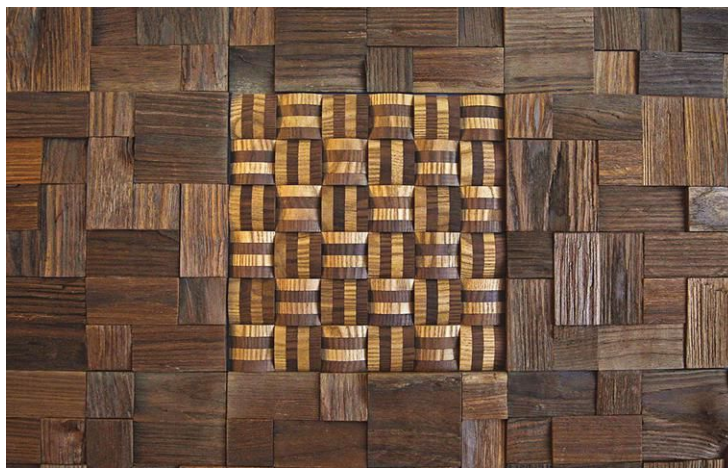
Laguardia

Craftsmanship makes Laguardia wood flooring stand out. Colors are applied in eight steps, reproducing an age-old chemical weathering process, and its 3/4"-thick planks are cut into random lengths ranging from 6' to 7' for a handcrafted style. Part of the company's InLove collection, it can contribute to LEED, Living Building Challenge, WELL, and Green Globes certifications. pidfloors.com



SoundBar

Arktura combined its Soft Sound fabric-and-LED fixtures in this flexible acoustic-lighting solution. Made of recyclable PET plastic, SoundBar is Class A and C fire-rated, comes in more than 30 colors, and has an NRC rating of up to 0.9. The LED modules are dimmable, available in three color temperatures (3000K-4000K), and deliver approximately 960 lumens. Designers can specify baffles 3" or 4" wide x 4", 6", or 10" high and up to 8' long. arktura.com



Thermally Modified Ash Hardwood Wallcoverings

These wall tiles are made from beetle-damaged ash timber once considered unusable. CFP Wood's technique of using high-pressure steam and heat to halt the wood's decay converts it into a maintenance-free material the manufacturer renders as dimensional wallcovering for interior and exterior applications. Six compositions come pre-installed on mesh backing, for easy installation. cfpwoods.com

Moiré Collection

As a broadloom or modular tiles, this collection from Mannington adds interest to commercial carpet. Lines layered in crisscrossing, gradating bands of color appear to shift in hue and depth as the user's perspective changes. The 24"-square tiles come in three patterns: Pure Wavelength, Ray Tracing, and Visible Light. Broadloom is only available in the latter. manningtoncommercial.com





Orbit

One of the latest offerings from Designtex is a composite latex-polyester wallcovering with patterns informed by findings about biophilia—the idea that there’s a beneficial connection between people and nature. Its digitally printed patterns abstractly reference experiences in nature such as dappled light and falling rain.
designtex.com

“With Ebanys, Paola Lenti delivered a subtle and sensuous rethinking of the tatami mat.”
— Yolande Daniels, principal, Studio Sumo



Inside Shapes

Stockholm design studio Form Us With Love helped Shaw Contract develop these playful carpet tiles: each 24" square contains CNC-machined diagonal, arced, or triangular cutouts, allowing designers to create their own puzzlelike geometric flooring compositions. The company also offers 17 pre-mixed sets in 12 colorways.
shawcontract.com



Nutopia

Besides design input from Gensler, Nutopia has the distinction of being Mohawk Group’s first carpet made using its ecofriendly yarn-processing system. As one of the company’s certified Living Products, the 12" x 36" planks feature a solution-dyed nylon that’s made without water, in a process that renders it natural and wool-like, in four coordinating patterns and up to nine colorways.
mohawkgroup.com



Xorel Artform

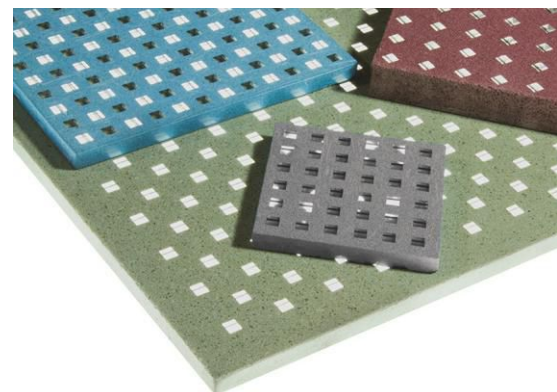
Carnegie has expanded its series of inventive interlocking acoustic panels with four new shapes—Arc, Criss, Cross, and Circle 3D—available in up to four sizes, depending on which style. All feature the company’s Xorel fabric on two acoustical substrates: either Quiet-Core (1" thick, formaldehyde-free, and Class A fire-rated) or Mi-Core, (¾" thick, tackable, Class A fire-rated, and moisture- and warp-resistant).
xorelartform.com

Editors' Choice



Center Cut Ceiling Panels

Armstrong Ceilings now offers its Calla, Lyra PB, Ultima, and Optima PB panels with pre-cut 3½" or 5"-square or -round openings to integrate USAI’s trimless downlights. The factory-finished panels enable designers to achieve the flangeless look without having to field-cut the apertures for recessed lights. Formats range from 24"- to 48"-square, depending on the product line, and are Class A fire-rated, as well as humidity-, sag-, mold-, and mildew-resistant.
armstrongceilings.com



PIXA Screen

Sensitile has developed a larger, thinner version of its PIXA tiles and slabs that is suited to screening and space-dividing. The ½"-thick, 4' x 8' sheets feature the same concrete field punctuated by transparent resin apertures in seven perforation patterns. PIXA Screen can also be cast in custom shapes.
sensitile.com

Furnishings

Contract | Residential | Indoor | Outdoor

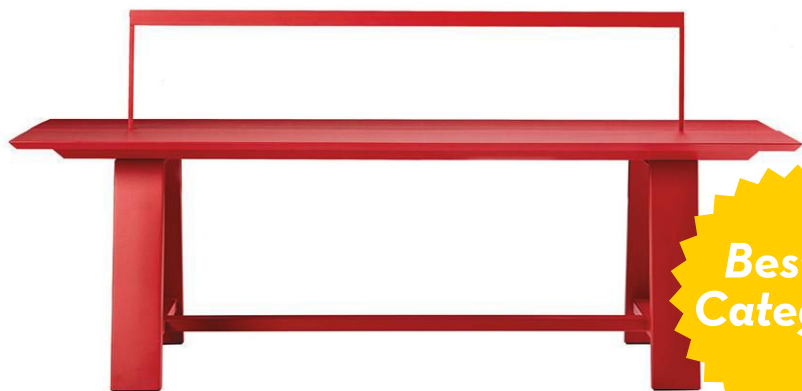


Pivot XL

To extend its line of operable pergolas, manufacturer Arcadia designed a modular version for commercial settings. Built of extruded aluminum, the Pivot XL system is available with 8', 10', or 12' x 20' louvered frames that users can program to close in response to weather, diverting rain to the ground through channels in its posts. Designers can also specify optional integrated lighting and ceiling fans. arcadiaroofs.com

Bistrò

An expanded color palette updates Italian manufacturer Paola Lenti's popular Bistrò parasol, which is now available in 50 colorways ranging from solids to madras patterns. Waterproof and colorfast, the 8'-tall umbrellas come in domed and flat versions measuring about 10' in diameter and with optional integrated seats and tables from the company's Clique series. paolalenti.it



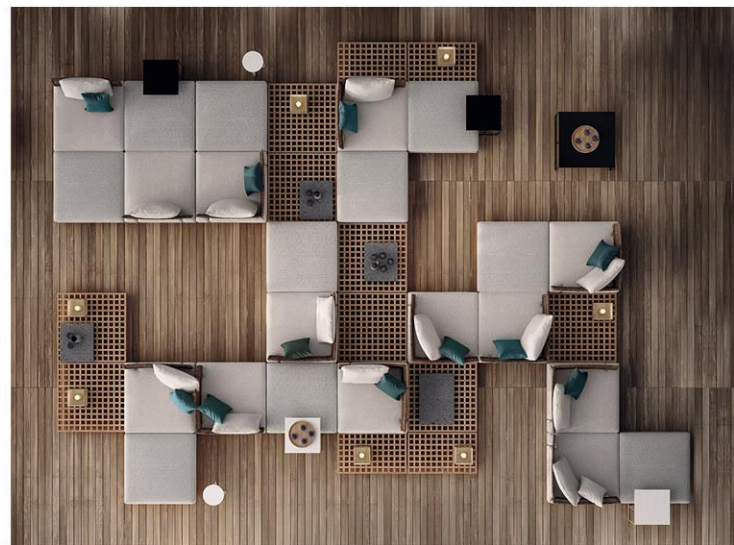
**Best in
Category**

Harvest Collection

Part of a new line of matching outdoor benches and tables from Landscape Forms, Harvest table is available with an optional 3200K LED mounted on top. Designers can specify standing- and dining-height versions with 6"- or 14"-tall tasklights. Like the tables, seating is made of extruded aluminum bolted to steel supports, topped with post-consumer plastic, and finished in a polyester-based powder coating in four bright colors, including Apple Red (shown). landscapeforms.com

Quadrado

Brazilian architect Marcio Kogan based his design of Minotti's new modular furniture system on the style of 1950s- and '60s-era buildings in Japan's futuristic Metabolist movement. At 40" square, the teak modules function as frames for seat cushions (rigid woven rubber-polypropylene backs are optional) and as side tables when used bare. minotti.com



Sakonnet Café Chair

Lothar Windels, chairman of RISD's furniture department, designed a contract-friendly Windsor chair for O & G Studio. The 32"-tall, 16"-wide chair has a single spindle supporting its back, as opposed to the traditional two. Designers can specify it in ash with a choice of 19 stains. oandgstudio.com





Tova

The innovative feature of this table from Nucraft is a structural-steel core beneath the top, enabling it to expand up to 20' without additional legs. A 45° chamfer along the top's edges keeps its profile thin, despite the heft. Designers can route a power line discreetly through one leg to a central spine of outlets and USB ports. Tova also comes in 42"-, 48"-, 54"-, and 60"-square.

nucraft.com

"QuickStand Eco from Humanscale is an attractive, well-designed computer stand."
– Interior designer
Ghislaine Viñas



Editors' Choice



QuickStand Eco

The latest innovation from ergonomic office-furniture maker Humanscale is a portable version of its popular sit/stand workstation. Built of aluminum, steel, and PVC-free plastic, the durable stand has a self-locking mechanism for stability and can support up to 35 pounds of equipment. Three versions accommodate a laptop, a combination keyboard and monitor, or a keyboard with dual monitors.

humanscale.com

AT Task Chair (187 Range)

A self-centering suspension and side-tilt mechanism help to distinguish this new line of task chairs from Wilkhahn. The only visible controls are on backs and armrests. Designers can specify the plastic shell in black or white, 12 upholstery fabrics, three back heights, and in five finishes on the aluminum base.

wilkhahn.com



A-Frame

As a storage unit, a magnetic writing surface, and a space divider in one, A-Frame adds versatility in the office. The writable surface is made of a durable $\frac{3}{16}$ "-thick tempered low-iron glass that comes in 12 colors. Casters and the unit's easy-to-manage size (40" wide x 73" high by 25" deep at base) enhances its mobility.

springboard-us.com

Kinzie

This hinged screen by HBF opens to a maximum 120° and allows for transparency, as well as privacy, because of its slat-filled aluminum frames. Panels come in two widths (34" and 48") and two heights (48" and 60"), with vertical ash or walnut slats in an array of finishes.

hbf.com



Building Envelopes

Claddings | Coatings | Surfacing | Systems

Duranar MXL and Coraflon MXL

PPG has engineered two new state-of-the-art architectural coatings to enhance the luster and color of metal-clad buildings. In addition to deflecting sunlight and helping to reduce cooling loads, Duranar MXL and Coraflon MXL are both infused with pigments that create a dynamic 3-D effect that shifts in color.

ppgmetalcoatings.com



Editors' Choice



U-Cara

Builders can install concrete fascia panels anywhere on the versatile backer blocks of Unilock's latest retaining-wall system. The result is a virtually limitless combination of patterns, colors, and textures. With a palette of four finishes and 23 colors, the U-Cara wall system can also contrast or coordinate with the company's pavers. unilock.com

Best in Category



Super Metal Future Collection

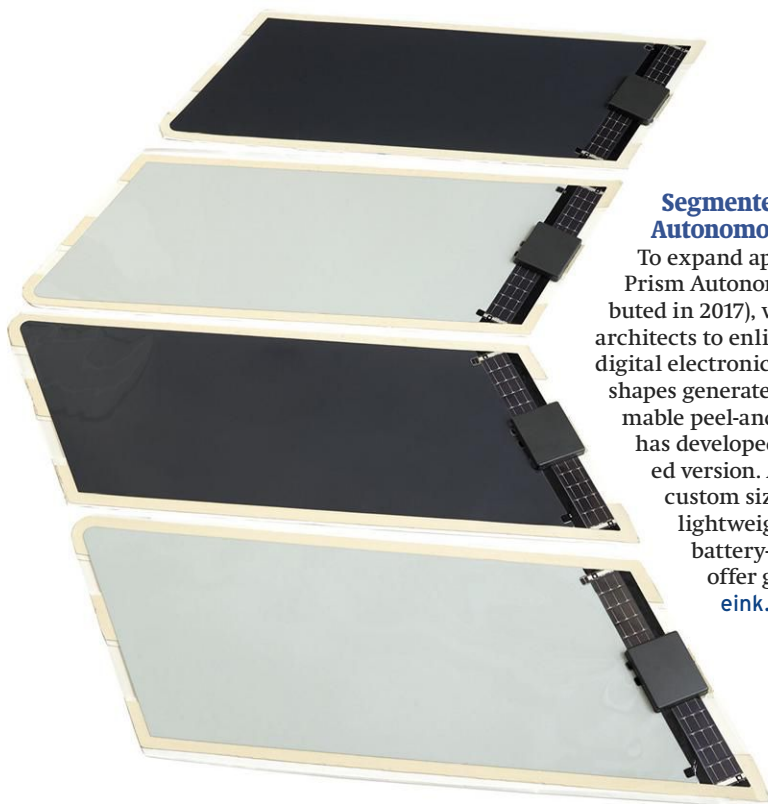
This line of real metal cladding from Pure Free Form allows architects to apply the vast range of textures, finishes, and colors of raw aluminum without waiting through the process of natural weathering. Instead, Super Metal Future enables architects to control the metal's natural beauty up front with a choice of 12 patterns. The maximum sheet size is 4' x 15', available in thicknesses ranging from 0.08" to 0.125".

purefreeform.com



CLT-100, -200, and -300

Adjustable, with its own integrated leveling and measuring devices, this cladding-support system facilitates faster and easier installations. The aluminum tracks and mounts and polyamide clips can accommodate continuous insulation and minimize thermal bridging. The company's CLT-100, -200, and -300 models are all suitable for exterior and interior applications, and, when used with external insulation, achieve 91% thermal effectiveness. cl-talon.com



Segmented Autonomous Tiles

To expand applications of its Prism Autonomous Tiles (debuted in 2017), which enable architects to enliven facades with digital electronic patterns and shapes generated on programmable peel-and-stick film, E Ink has developed a more segmented version. Available in custom sizes, the newer lightweight, solar- and battery-powered panels offer greater flexibility. eink.com



QuadCore Technology

A special closed-cell foam insulation in four of Kingspan's insulated metal panels (ISPs) adds heightened thermal efficiency, performing twice as well as mineral wool and at least 11% better than other standard polyisocyanurate products. The foam, QuadCore, is Greenguard-certified and offered in the company's Shadowline, Micro-Rib, Optimo, and Designwall 4000 panels. kingspanpanels.com



Neolith Skyline + Pureti

To enhance its sintered-stone cladding, Neolith by the Size now offers a line of slabs pre-treated with PURETI's state-of-the-art self-cleaning water-based photocatalytic solution. The coating (containing titanium dioxide, like sunscreen) is available on five sizes of Neolith's Skyline product and uses energy from sunlight to break down grime from pollution. neolith.com/en

"The benefit of Super Metal Future is that it allows designers to control the natural look of aluminum cladding."

*—Irena Savakova,
director of design,
Leo A Daly*



Building Systems & Components

Controls | HVAC | Devices | Special Equipment



Best in Category



PowerHUBB

The accessible plug-and-play nature of a power-over-ethernet (PoE) lighting- and building-control platform from Hubble Control Solutions makes it user- and budget-friendly. PowerHubb sensors and user interfaces, which work with the company's luminaires, can be reconfigured easily with software. hubble.com

Solar Canopy

Designed in collaboration with SITU Studio, the adaptable Solar Canopy resolves the code constraints limiting solar-power-generating installations on flat roofs. Meanwhile, its sheltering design encourages use of rooftop space. The UL-listed aluminum truss-and-leg-frame can be raised to a height of 14', span a maximum 26', work on the ground, and be powder-coated in any color. brooklynsolarcanopy.com



Leviton Load Center

A so-called "plug-on" design for circuit breakers in Leviton's Load Center is among the features that mark it as innovative. Circuit breakers also use the company's reset lockout technology for enhanced safety, and LEDs to make it easier to identify trip conditions. Branch wires also terminate at custom lugs in the panel for neater wiring. leviton.com

Editors' Choice



Art Cool Mirror VRF Indoor Unit

Users operate LG's 34" x 8" x 12" Wi-Fi-enabled cooling/heating unit with a smartphone and the LG SmartThinQ app, or with voice control using Alexa and Google Assistant. Convenient for multifamily and hotel applications, it is compatible with the company's full range of VRF outdoor units. lghvac.com

Electricity

A collection of switchplates and outlets by architect-owned lighting and hardware company Buster + Punch is noteworthy because of its uncharacteristically "hip" design. The high-quality brass, aluminum, and marine-grade steel on Electricity's dimmers, switches, and wall plates add style to these functional elements. The line is available in sets or individually, and is EL-tested for use in North America. busterandpunch.us

Fireline 140 Fire Barrier Expansion Joint System

Builders can expect the same fire protection from Fireline 140 as they'd get from Inpro's larger original model, without fire caulk or additional hardware. The updated smaller filler fits expansion joints ranging from 2" to 4" and can accommodate up to 50% movement. inprocorp.com



"Solar Canopy has valuable functionality—an armature for generating power with the ability to inhabit the space beneath it."

— Maxwell Pau, partner, Beyer Blinder Belle





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CONTINUING EDUCATION

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Photo: © Geoffrey Lyon, supplied by CertainTeed Ceilings; Architect: Page; Location: Houston Methodist West Hospital



Health Care: Better Designs for Better Care

Sponsored by CertainTeed Ceilings, Construction Specialties, and Inpro

IN LS PM CREDIT: 1.25 AIA LU/HSW

Image courtesy of Vectorworks



Using Building Information Modeling for Architectural Drawings

Sponsored by Vectorworks

PE PMD SU CREDIT: 1 AIA LU

Image courtesy of Thermalfiber



Perimeter Fire Containment and Engineering Judgments

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Using Western Red Cedar in Commercial and Multifamily Buildings

Sponsored by Western Red Cedar Lumber Association

IN PM RR CREDIT: 1 AIA LU; 1 IDCEC CEU

Image courtesy of Huber Engineered Woods © 2018

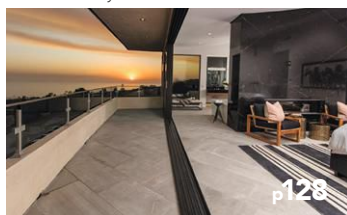


New Options for Insulating and Ventilating Wood-Framed Sloped Roofs

Sponsored by Huber Engineered Woods

BE RE ST CREDIT: 1 AIA LU/HSW

Photo courtesy of LaCantina Doors



An Open Invitation

Sponsored by LaCantina Doors

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Image: LEVER Architecture



The Business Case for Building with Wood

Sponsored by Think Wood

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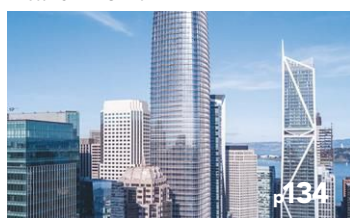


Balancing Fire and Energy Code Requirements in Exterior Walls

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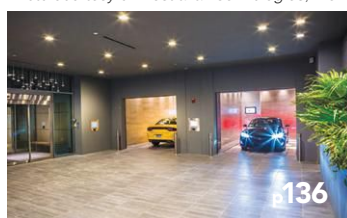


High-Performance Glass for Sustainable Design

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Photo courtesy of Westfalia Technologies, Inc.



The Evolution of Parking

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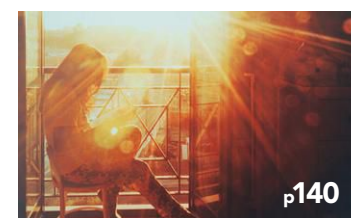
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- BE** BUILDING ENVELOPE DESIGN
- IN** INTERIORS
- LS** LIFE SAFETY & CODES
- PE** PROFESSIONAL ETHICS
- PM** PRODUCTS AND MATERIALS
- PMD** PRACTICE, MANAGEMENT, DIGITAL TECHNOLOGY
- RE** RESIDENTIAL
- RR** RENOVATION AND RESTORATION
- SI** SITE INFRASTRUCTURE DESIGN
- ST** STRUCTURAL
- SU** SUSTAINABILITY

Courses may qualify for learning hours through most Canadian provincial architectural associations. This course is part of the Glass in Architecture academy.

Photo: © Geoffrey Lyon, supplied by CertainTeed Ceilings; Architect: Page; Location: Houston Methodist West Hospital



This hospital room features products specified to improve the patient experience and promote health, safety, and welfare.

Health Care: Better Designs for Better Care

A guide to products that can contribute to safe, sanitary, and pleasant environments in health-care facilities

Sponsored by CertainTeed Ceilings, Construction Specialties, and Inpro

By Jessica Jarrard

Room acoustics, privacy, and patient safety are vital to ensuring that patients are able to get the rest they need to heal. Noise-reduction and safety-protection products can improve the health, safety, and welfare of patients as well as hospital staff. They also provide patients with the comfort needed to rest and heal.

Walls, doors, and ceilings are part of every hospital. By selecting superior products, each of these building components has the potential to improve the patient experience and also provide a better working environment for the hospital staff. Inside the building, other products can be added to walls, doors, ceilings, floors, and spaces throughout the hospital to improve patient comfort and safety. These products include cubicle curtains and tracks, both of which provide safety and comfort

for occupants, as well as ligature-resistant and bariatric handrails that offer safety to specific groups of patients.

WALLS AND WALL-PROTECTION PRODUCTS

Walls make up one of the largest elements of an interior. In addition to creating spaces within the interior, walls also can help reduce the transmission of sound and provide aesthetically pleasing spaces through the use of bright colors or graphics. However, if walls are damaged or dingy, they can create negative impressions or even anxiety for patients who come to the facility to heal. Specifying quality wall materials and wall protection can not only protect the walls but also create a more positive environment for patients.

CONTINUING EDUCATION



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Learning Objectives

After reading this article, you should be able to:

1. Identify how noise-reduction and safety-protection products can provide patients with quieter and more comfortable spaces to heal and health-care professionals with better work environments.
2. Describe how design elements and products can absorb noise in health-care facilities, thus optimizing acoustics in health-care environments.
3. Explain how materials and products provide health, safety, and welfare for patients and occupants by limiting debris from damaged walls and the transmission of germs, thus reducing the number of health-care-associated infections (HAIs).
4. Discuss how specialty products enhance safety for specific populations or populations with specific needs.
5. Understand how materials and products are specified for germ reduction, noise reduction, and wall and door protection while also providing environmental solutions.

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Wall panels made from long-lasting materials that quickly lock into place allow for easy installation. These panels can be installed by one person in almost half the time when compared to traditional z-clip systems. Because they are easily installed, they can also be easily removed for repairs. Panels that snap into place can be butted up to each other and installed almost flush with the ceiling.

To further increase the durability and life of walls, wall protection can be added to walls and is recommended especially for high-traffic areas. Wall protection often comes in the form of rigid plastic sheets and is available in a range of colors and patterns. While rigid plastic is extra durable, there are other alternatives available for those in search of a different aesthetic. A new class of flexible wall-protection materials is now available and has changed the look of wall coverings without sacrificing quality and function. These new materials incorporate intentional textures and are as durable as rigid plastic. They can also fend off stains and marks and be installed seamlessly, providing a professional appearance.

Doors

Doors are another interior element prevalent in hospitals. While doors are common in most buildings, not all doors are the same quality or designed to handle the level of use that hospital doors can see. In high-traffic areas, such as between waiting rooms and treatment rooms, doors are constantly being opened and closed as well as bumped by machinery, carts, and possibly wheelchairs or gurneys. Doors can also separate public spaces such as hallways from sterile spaces like clean rooms, labs, and operating rooms. When specifying doors, it is important to understand the various types of

doors as well as the amount of use the door is likely to receive in a specific area.

In high-traffic areas, it is important to select durable materials that can be quickly and efficiently repaired and easily cleaned. Doors made from materials resistant to germs and bacteria are ideal in health-care facilities where germ transmission is likely and occupants are already compromised. Durable door and doorway materials can reduce wear and tear and also provide environmental benefits and cost savings.

In health-care environments, interior elements have to fulfill many functions, and multiple goals must be balanced. Kristin Ledit, IIDA, senior vice president and director of interiors at FKP Architects, explains the factors that drove the selection of interior doors for the Nemours/Alfred I. duPont Hospital for Children in Wilmington, Delaware.

“All products were chosen to equally meet aesthetic, durability, and functionality requirements,” she says. “This is often the most challenging aspect of product selection. The doors were selected for their durability, compatibility with integral blind solutions, and overall palette coordination. Doors were strategically specified at all areas where impact resistance was the most critical element of the patient and staff journey.”

Ceilings

Ceilings are a necessary part of construction that also provide protection to occupants and can affect air quality. Design elements that go into ceilings can add extra protection and also reduce noise.

Many buildings, including health-care facilities, are not acoustically optimized for their intended purpose. A wall-to-wall ceiling is most

often the most efficient solution, but in some cases, this is not achievable. There are three product families that can support aesthetic design, technical challenges, and construction-based limitations all while achieving improved sound environments. These include free-hanging clouds and baffles, direct-to-deck panels, and wall panels.

Cubicle Curtains and Tracks

Cubicle curtains can divide large spaces into smaller enclosures in areas where multiple patients are being treated. The curtains provide a private enclosure for patients.

Cubicle curtain design has evolved in recent years. The opening and closing of older cubicle curtain products creates noise that can disturb patients trying to rest. Innovations such as bendable cubicle tracks and smooth-glide designs allow for quiet movement of carriers along the track. This can lower the decibel level when compared to traditional track products.

Newer designs made from easily laundered materials also help reduce the occurrence of health-care-associated infections (HAIs) by providing separations between patients. Frequent cleaning and laundering can prevent the spread of germs and bacteria.

Ligature-Resistant Brackets and Bariatric Handrails

In-patient suicides and self-harm are serious issues in health-care facilities that focus on behavioral health. Hanging is the most common method of suicide and requires the use of a ligature, which is an item used to bind one thing to something else. Ligature-resistant products are commonly used in both behavioral health-care facilities and facilities accessed by the general public. Ligature-resistant



Photo courtesy of Inpro

Durable wall products installed in hospital settings reduce the damage caused by carts, wheelchairs, and beds.

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Durable door materials reduce the risk of unsightly damage and costly repairs.

products help prevent self-inflicted harm by preventing patients from binding themselves to a structure (for example, for the purpose of hanging themselves) or hurting themselves on sharp corners or edges.

Patient falls are one of the most common dangers in health-care environments. Handrails can reduce the risk of falling by providing support and helping patients maintain balance; however, these handrails must at times accommodate patients who are obese, also referred to as bariatric patients. Products such as bariatric brackets can reinforce handrails to accommodate more weight, providing increased safety for patients and occupants.

NOISE REDUCTION

Noise is inevitable in busy places like hospitals and health-care facilities. In addition to being a nuisance, noise causes fractured sleep and slower healing for patients while also causing stress and distractions for health-care personnel. For patients, good acoustic environments can lower blood pressure, improve quality of sleep, and reduce the intake of pain medication. Healthy acoustic levels also lower stress and improve communication, which is vital when a doctor is relaying health information to a patient. They also improve patient safety while enhancing staff well-being, which leads to better job performance and higher job satisfaction.

With all of the technological advancements in 21st century hospitals and machinery, combined with the considerable foot traffic from doctors, medical practitioners, patients, and visitors, there is significant potential for harmful noise that not only prevents patients from resting but also can cause hospital staff fatigue. Hospital staff fatigue can lead to burnout and even mistakes.

There are many manmade and machine noises in hospitals, such as device alarms, overhead paging and intercom systems, and even conversations between hospital staff in the corridors. While all these things that create noise are vital to hospital operations and patient care, the noise can prove to be harmful to patients and hospital staff.

Noise can be mitigated and reduced through design. High-quality products and materials that go into the construction of floors, walls, curtains, and doors can significantly reduce sounds, thus improving health, safety, and welfare of both patients and staff.

Sound-absorbing products not only benefit patients who need quiet spaces to sleep, but they also allow doctors and patients to communicate without excess background noise. A quieter environment makes it easier for health-care professionals to think clearly while making life-or-death decisions.

Acoustics in Hospital Spaces

Acoustics should be considered in multiple areas of health-care facilities, including patient rooms, waiting areas, corridors, neonatal intensive care unit (NICUs), and lobbies or atriums. With so many people, machines, phones, and other products including gurneys, wheelchairs, and carts being moved around, the potential for noise is everywhere.

Waiting areas are often full of people, from patients waiting to be seen to loved ones waiting to hear news about a patient. For those who are spending time in a waiting area, the reason for their visit is likely stressful; therefore, sound absorption achieved through a combination of ceiling and wall products is vital for creating a calming atmosphere for patients and families in potentially stressful situations.

Corridors are a main thoroughfare for patients, hospital staff, and visitors. High acoustic performance including both sound absorption and sound blocking is important to keep extraneous noise confined to the corridor.

Sound absorption is required in the NICUs to counteract the high concentration of medical equipment in order to protect the health of tiny patients.

Large open spaces, such as lobbies and atriums, require special attention in order to reduce reverberation. As with most high-profile health-care spaces, design impact and indoor air quality are key.

Mechanical Systems and Interior Finishes

There are many design elements that can be used to dampen sound and reduce noise from mechanical systems and interior finishes in health-care facilities.

Mechanical systems in buildings can transmit noise through the building structure and ducting. Strategies to reduce this noise include centrifugal airfoil, plenum, and mixed-flow fans to reduce ventilation noise. Larger ducts also can be installed to reduce friction rates. Discharge rates for variable air volume (VAV) terminal boxes should be addressed in the design.

Vibration-isolation products can be used to reduce the transmission of noise and vibration from mechanical equipment. In hospital settings, no special treatment is required when using vibration isolation products; however, performance requirements should be reviewed. Since flexible fiber ducting is usually prohibited in hospitals, films and metal no-fill silencers can be an effective tools in reducing duct noise.

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The right ceiling for the space

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Interior finishes also can reduce noise in patient spaces and corridors. For example, ceiling tiles made from glass fiber can be very effective at absorbing sound. Ceiling plenum equipment also can be a source of noise. This noise can be reduced by specifying and using mineral fiber ceiling panels that are designed to absorb sounds.

Ceilings

As discussed earlier, there are three product families that can improve sound performance; these can either enhance wall-to-wall ceilings or mitigate for those situations where wall-to-wall ceilings are not possible. These product families include free-hanging clouds and baffles, direct-to-deck panels, and wall panels.

Clouds. Clouds can be used with wall-to-wall ceilings to boost noise control in areas where many people are speaking at the same time, such as a hospital contact center, reception area, lobby, or dining area in a health-care facility. Adding lowered clouds directly above tables or desks dramatically reduces the overall noise level and sound propagation. Clouds of any shape and color can be installed in layers, on angles, and at any desired depth to create a range of effects, from minimalist acoustic control to dramatic scul-

tural installations. Available in multiple shapes, sizes, and colors, the premium painted surfaces available on high-quality clouds (on both sides and all edges) can present a finished look from every angle.

Baffles. Baffles are distinct from clouds in that they are installed vertically. In spaces with standard proportions and average ceiling heights, baffles can create a uniquely modern linear visual, providing excellent sound absorption with a relatively shallow system depth. In large atriums and clerestory spaces such as lobbies, suspended baffles are an even better option than clouds, as they visually maintain the magnitude of the space without disrupting sight lines to the top of the building. Baffles come in multiple sizes and colors. As with clouds, the painted surfaces present a finished look from every angle.

Direct-to-deck panels. With the popularity of adaptive reuse projects in urban areas across the country, it is not surprising that roughly 40 percent of ceilings are destined for remodeling projects. Remodels, renovations, and adaptive reuse projects, including urgent-care facilities and hospitals being built in urban areas, can be especially challenging. When applied to the entire ceiling, direct-to-deck panels can simulate a monolithic drywall finish while providing excellent sound ab-

sorption. Applied in fields or as individual panels, they can also be used for acoustic remediation in existing spaces. Direct-to-deck panels are available in multiple colors and edge details.

Wall panels. Wall panels and wall protections are particularly helpful in reducing echoes and improving speech intelligibility in spaces with high ceilings and/or highly reflective walls. They are available in many colors, shapes, and sizes, thus allowing for creative patterns. High-density fiberglass wall panels and insulation can contribute to superior sound absorption, thus providing quieter spaces for patients and health-care staff.

Floors

With foot traffic, the transportation of patients via wheelchairs and beds, and the movement of heavy carts and machinery down corridors, standard floors have the potential to transmit considerable noise. By specifying floor materials that absorb sound, such as rubber, carpet, or materials containing gypsum, footfalls and carts create less noise when traveling in and out of patient rooms and along the corridors. Sound reduction from footfalls and items being moved from place to place not only have the potential to affect those on the same floor as the movement but also on floors below. Gypsum materials installed in the floor materials as well as the ceiling materials can reduce the transmission of sound both at the source (from the footfall and carts) and at the point where they could enter the room below (the ceiling).

Another way to mitigate sound transmission is by providing a tight seal between floors and walls. Unsealed gaps at these junctions can cause noise leaks. By considering these design elements early in the process, the potential for these types of noise leaks can be mitigated during construction.

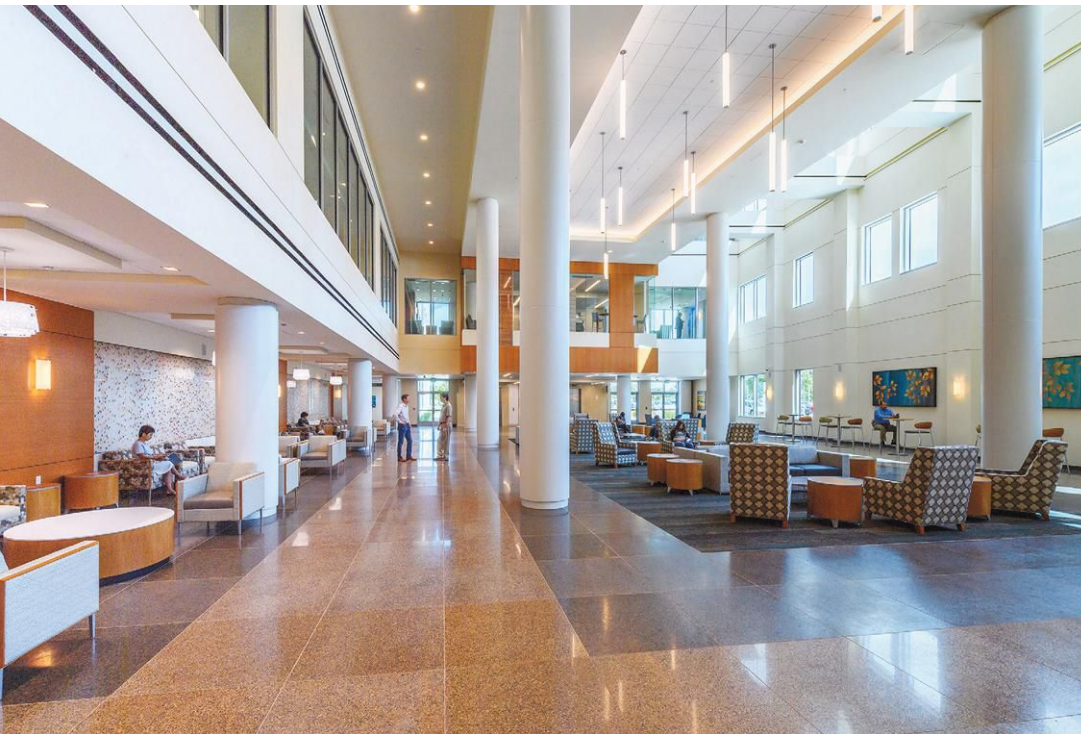
Walls Panels and Protections

Wall panels and wall protection are particularly helpful in reducing echoes and improving speech intelligibility in spaces with high ceilings and/or highly reflective walls. They are available in many colors, shapes, and sizes, allowing for creative patterns. High-density fiberglass wall panels and insulation can contribute to superior sound absorption and so provide quieter spaces for patients and health-care staff.

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Jessica Jarrard is an independent writer and editor focusing on health, science, and technology. She contributes to continuing education courses and publications through Confluence Communications. www.confluencecc.com

Photo: © Geoffrey Lyon, supplied by CertainTeed Ceilings; Architect: Page; Location: Houston Methodist West Hospital



Houston Methodist Hospital's atrium features a high-density fiberglass ceiling to help with sound absorption while creating a high-end aesthetic.

PRODUCT REVIEW

Health Care: Better Designs for Better Care

CertainTeed Ceilings

Photo: © Geoffrey Lyon, supplied by CertainTeed Ceilings; Architect: Page; Location: Houston Methodist West Hospital



CertainTeed Ceilings Symphony® m

Symphony® m is a mineral fiber panel that provides excellent sound absorption and blocking plus washability with a superior finish and exceptional durability. For demanding health-care applications, Symphony m Rx offers additional stain resistance and water repellency. Part of the Symphony Collection, a series of smooth ceilings with design flexibility, Symphony m can be combined with Symphony, Adagio®, and Tufcore™ to provide matching visuals with differing acoustic performance within the same space.

CertainTeed.com/TargetedAcoustics

Construction Specialties

Image courtesy of Construction Specialties



Snap Lock Cubicle Curtains

This curtain system eliminates the dangers of removing cubicle curtains from ceiling-mounted track systems. Instead of getting on a ladder to remove the privacy curtain, Snap Lock allows maintenance staff to separate the fabric portion of the curtain from the mesh while standing on the ground. Soiled curtains are then laundered, and the maintenance staff snaps clean curtains back onto the mesh.

www.c-sgroup.com/cubicle-curtains-and-tracks/snap-lock-cubicle-curtains

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BIM is making it more efficient for architects and other design professionals to produce high-quality drawings of all types for design, construction documents, and coordination.



Using Building Information Modeling for Architectural Drawings

BIM tools can improve professional practice and drawing quality without any compromise

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

Managing an architectural practice means, among other things, managing the process for providing services. That includes having capable people doing the work that needs to be done in a timely and efficient manner. It also means providing those people with the flexibility and freedom to produce creative work and innovative design. Each firm or workplace typically develops its own culture to achieve these management goals with direct influence coming from both the individuals involved in the firm and the tools that are employed to do the work. Finding and engaging the right people is a needed crucial activity, but so is identifying and using the best tools. In recent decades, firms have steadily abandoned hand-drawing tools for design and construction documents in favor of computerized tools to achieve better results. While two-dimensional CAD drawings have been the norm for some

time now, three-dimensional computer models of buildings have been steadily growing in use in architectural practices around the world. For some, the computer software is simply an electronic means to produce visual elements of a drawing such as lines, shapes, forms, and text. For many others, it is a way to link the visual, three-dimensional components in a project to specific information about building systems, materials, products, and performance characteristics. As such, it is also a way to produce better-coordinated, higher-quality construction documents. This latter approach is the basis of building information modeling (BIM) and is emerging as the new norm for successful architectural practices.

What has driven the move toward BIM? For some, using this advanced technology is simply a logical evolution of the way the firm has been operating but allows a more consolidated,

CONTINUING EDUCATION



1 AIA LU

Learning Objectives

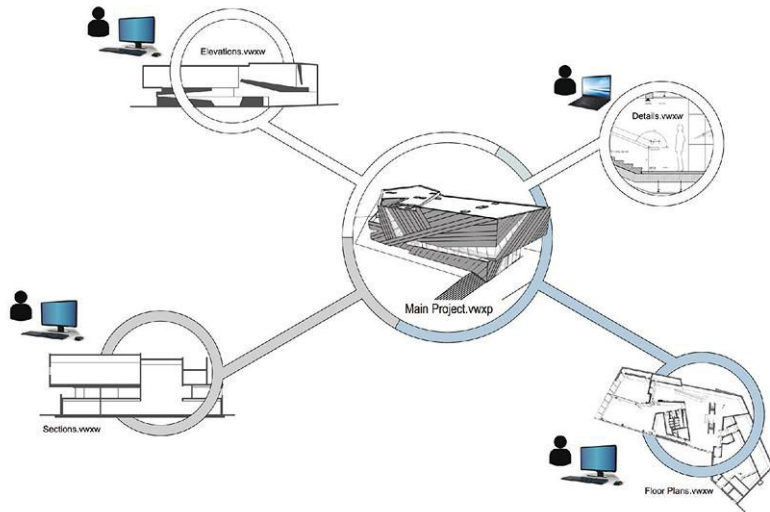
After reading this article, you should be able to:

1. Identify the depth and breadth of BIM capabilities to provide a central data and design basis for a project.
2. Recognize the design options and variations of drawings and other outputs during all phases of building design.
3. Assess the range of ways that BIM can meet a variety of specific drawing standards to create high-quality construction documents to suit a variety of firm and client needs.
4. Investigate the ways that firms are successfully incorporating BIM across the full design and construction document process to work more efficiently with less risk of error.

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Image courtesy of Vectorworks



Working in a BIM environment means that a central computer model can be used by everyone on the design team to view different aspects of the building, contribute their portion of the design, and find coordination issues in advance.

coordinated and time-efficient way of working. Others have found that it allows architects to design with more creative freedom through better visualization at different stages of design. For still others, it has offered improved collaboration and coordination by multiple project stakeholders, thus reducing the potential for miscommunication, errors, or omissions in the final documents. In all cases, the quality of the documents produced has also been a major advantage. However, this three-dimensional, collaborative design and documentation software has not usurped the need to still produce printed, stamped construction drawings. Such stamped drawings are still expected from most owners, code officials, financial stakeholders, and construction contractors. The good news is that BIM can do that too. In fact, for firms that are fully embracing BIM, they are finding that producing documents of all types—from schematic through design development into construction documents and beyond—is done most effectively, efficiently, and with the best quality through the use of BIM software. Further, the firms and practitioners that are taking the time to fully understand and implement the full range of features found in BIM software are reaping multiple benefits related to new innovations in design, more efficient work processes, and better overall project (and firm) management.

In this course, we will look at some of the aspects of successfully incorporating BIM into a professional design practice focused on versatility of design and quality output, plus review the experiences of some of the firms that are doing it.

ACCEPTING THE OUTPUT OF BIM

In making the transition from other design and documentation methods to BIM, questions and uncertainty can arise since this may include a change in firm culture. Therefore, the first mindset that needs to be established is that the computerized building information model needs to be seen as the “single source of truth” throughout a project’s design process. In other design and documentation methods, there are commonly multiple sources of the truth for a project that are all coming together from different people and in different forms. That requires coordination at the very least and detailed review, interpretation, and integration at most. The use of a central building information model still allows all of those separate sources (i.e., people involved in the project) to do the things they need in order to assess, analyze, and synthesize particular aspects of the design. But ultimately, when each person provides the design data, sizing, and product or material information related to their parts of the building, they are each contributing to this central, single source of up-to-date information. In so doing, they can also see how their part relates to the rest of the building and systems and respond accordingly.

One of the key aspects of BIM is that it is based on “objects” that represent the actual materials, products, and assemblies that make up a building. This means that a wall may still show up as lines in plan view, but in fact it is in the model as a three-dimensional wall with

a defined width, length, height, and material makeup based on the attributes assigned to it. Similarly, discreet objects like windows, doors, or furnishings can be viewed two dimensionally but in fact are stored as three-dimensional objects with definable attributes such as size, shape, materials, finish, etc. All of these attributes for any part of the building can be identified as generic or “default” choices at the beginning of a project that can be modified, adjusted, updated, or changed completely at any time.

Using this object-based approach, the design team is in essence using BIM as a means not just to graphically represent different parts of a building but also to actually assemble and “build” it electronically in the model. In so doing, different options can be tried, substituted, updated, coordinated, etc. simply by making the edits or revisions as appropriate within the computer model. Those edits may be visually based, such as the size or shape of a building component, or they may be purely information based, such as a change in the specification or manufacturer’s data for a product or material. The point is that everyone benefits from working off of the same central model and accepting the information within it as the current representation of the project.

This approach doesn’t mean that only completely detailed information can go into the model. During early design stages, the information is typically still being developed, collected, researched, or analyzed. Therefore, it may be premature to include details that may or may not become part of the final design. In those cases, just some basic or default information can be provided that can be developed and updated later on as decisions are made. This approach allows for a firm’s typical design process to still take place, it just changes the place where all of the design information is stored to be in the central model. Of course, it is still possible to create several preliminary computer models representing different design schemes or concepts and then compare them, make adjustments as appropriate, and ultimately select a final concept to with which to move forward.

▶ Continues at ce.architecturalrecord.com

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

Perimeter Fire Containment and Engineering Judgments

Ensuring system integrity to provide escape time for building occupants

Sponsored by Owens Corning® | By Rebecca A. Pinkus

Curtain wall, joint, and floor slab



On June 14, 2017, just before 1 in the morning, a fire started in a kitchen on the fourth-floor apartment of the 23-story Grenfell Tower in the North Kensington neighborhood of West London. Within half an hour, the fire had traveled up the building's exterior, and within the hour it had consumed all four sides of the structure. By 3 in the morning, all of the upper floors were engulfed in flames. According to a fire-safety engineer who reported on the event to the Grenfell Public Inquiry, the fire spread vertically and then took a lateral path along the cladding above and below the window lines and the panels between the windows.¹ Photos from the night confirm this claim.

CONTINUING EDUCATION



1.25 AIA LU/HSW



1 PDH

Learning Objectives

After reading this article, you should be able to:

1. Identify the main design components of a successful perimeter fire-containment system, and explain how the system is designed to protect the safety and welfare of building occupants.
2. Define what an engineering judgment (EJ) is, and describe the key elements of a high-quality EJ.
3. Describe and explain the differences between the three issuing parties of EJs—labs, fire-protection engineering (FPE) firms, and manufacturers of fire systems—and the role each plays in ensuring the safety and welfare of building occupants.
4. Explain how EJs are useful to the design and construction community as a whole in terms of identifying stakeholders and attributing liability, as well as the role that different stakeholders have in ensuring occupant safety and welfare.

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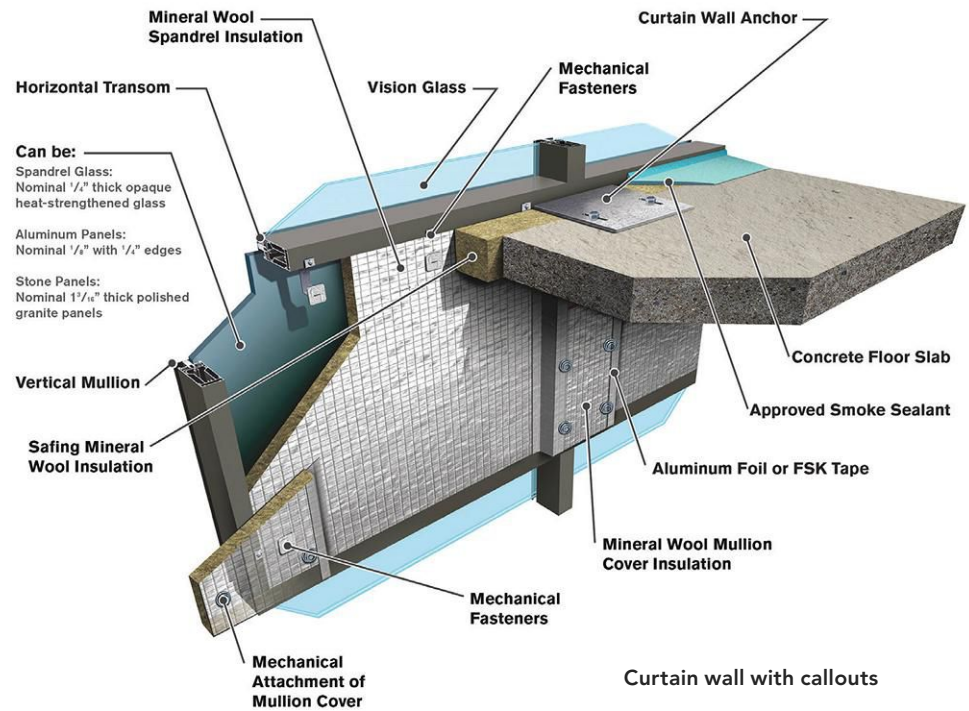
Seventy-two people died in that fire. Many died because of how rapidly the blaze spread and because of the property's "stay put" policy. This policy was in place because the building was designed to contain a fire in a single flat until firefighters could extinguish the fire, thus keeping everyone else in the building safe. Fortunately, some residents ignored the policy and evacuated the building. Others did so only after the fire commander ordered people to "make efforts to leave the building."²

Over the course of the following day, the building continued to burn, finally dying out nearly 24 hours after it had first started, with more than 100 flats destroyed.

Nearly a year and a half later, an ongoing independent public inquiry is still looking into how and why the fire spread, as well as other aspects of the tragedy. The window and exterior cladding design and a lack of sprinklers are believed to be the primary causes of the rapid fire spread, with the continuous insulation application and cladding not being tested to NFPA 285.

The Grenfell Tower fire made issues of fire safety in newer and renovated high-rise buildings a priority; the rate at which the tower burned and the lives lost hit home for everyone in the building and fire-safety professions. And this tragedy has meant that a lot of people are looking at these buildings differently than they had before and focusing on ways to improve fire safety. This is a good thing, but it also can be extremely complicated, and it requires that everyone involved in the design and construction process—including inspections—work together and communicate their concerns to ensure that nothing gets overlooked.

One challenge has been that when it comes to high-rise fire safety, most people assume that the building has been designed and built to meet all fire codes and that the structure is safe. Architects assume this, building owners assume this, and building occupants assume that their safety is a priority. In some cases, however, where the building has been signed off as being safe, it actually is not, resulting from a feature common in buildings with curtain walls. This feature is a void, located between the fire-rated floor slabs and the edge of the nonrated curtain wall, and it is frequently overlooked in fire-safety design. Sometimes, since the void space is hidden from view after construction, it is not protected with the proper system that seals the joint or protects a portion of the exterior curtain wall in order to keep the joint material in place. Other times, a curtain wall is attached as part of a building renovation. Regardless of the situation, a building that does not have an appropriately designed



and properly tested system is a serious fire risk. That unprotected space at the edge of the slab immediately acts as a chimney for fire and hot gases, and that means that the fire will easily spread from floor to floor.

Perimeter fire-barrier systems, also called perimeter containment systems or "firestops," are designed to protect buildings from having fire, hot gases, and toxic smoke travel upward into other levels through the floor-slab edge and the exterior assembly, or curtain wall. By blocking openings and properly protecting a portion of the exterior curtain wall with tested and rated fire-resistant materials, they can help contain the fire to the room of origin and give building occupants time to escape. The tricky part is making sure that the fire-ratings of the firestop systems and sealants match the fire-ratings of other building components.

The void between the floor slab and the curtain wall tends to be anywhere from 1 to 8 inches, although in some buildings it can be more. While that space may seem insignificant in comparison to the size of the overall building, it's important to realize that in fact is quite the opposite, especially when the building as a whole is taken into account. Take, for example, a building with a floor plate size of 200 by 200 feet, or 800 lineal feet. An unprotected joint that is 3 feet wide will create 200 square feet of open area (i.e., a "chimney")

just on one floor. The square footage of open air will be multiplied by the number of floors on the building.³ That open space not only puts the floors above at risk, but it also makes the curtain wall vulnerable from the heat of the fire, which can degrade curtain wall components. It is also important to note that smoke will travel through a small space very quickly, and so the system also must be properly sealed against smoke.

Let's consider what may happen in a high-rise fire. As an example, a small fire starts in the kitchen in a unit on the fifth floor. If that fire is not immediately suppressed, the fire inside the building will begin to burn the interior surfaces, including the interior details of the curtain wall and perimeter fire-barrier materials. If the barrier does not hold, the flames will make their way outside of the building through broken glazing or other openings caused by the fire.

Continues at ce.architecturalrecord.com

Rebecca A. Pinkus is an independent communication consultant, writer, and editor focusing on the intersection of technology, environment, and human health. She has contributed to more than 40 continuing education courses and publications through Confluence Communications. www.confluencecc.com



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Western red cedar (WRC) is seeing a surge in popularity for exterior and interior use in commercial, institutional, and multifamily buildings across the United States and Canada. Shown here is One North, a mixed-use project in the heart of Portland designed by Holst Architecture.



Using Western Red Cedar in Commercial and Multifamily Buildings

Cedar is a reliable material that architects are finding new and exciting ways to use

Sponsored by Western Red Cedar Lumber Association

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

Wood is a natural, renewable, and sustainable building material that has garnered more attention in building designs. While there are many species of wood available to choose from, western red cedar (WRC) has been a preferred and appealing choice for many buildings over the past 150 years for a lot of good reasons related to design, construction, and maintenance. WRC products come from trees grown in forests in the Pacific Northwest area of North America, but they are used in buildings around the world because of

their warm, natural, aesthetic appeal and well-known durability and stability. While its use has been growing, many think of it only for residential (single-family) design. The fact is that, in recent years, WRC has become notably more popular in nonresidential buildings too. The types of buildings that architects are selecting it for include well-designed multifamily buildings, commercial structures, retail settings, hospitality and resort facilities, museums, churches, educational facilities, and most other project types where beauty and durability are sought.

CONTINUING EDUCATION



1 AIA LU



1 IDCEC CEU

Learning Objectives

After reading this article, you should be able to:

1. Identify the general characteristics of real western red cedar (WRC) related to appearance, durability, versatility, grades, and finishes.
2. Investigate ways to incorporate WRC siding and trim products on the exterior of commercial buildings for appearance and performance.
3. Assess the use of WRC for specific interior finish applications on ceilings and walls.
4. Explore the ways that WRC can be used for renovation and retrofit applications to create an updated appearance, improve durability, and contribute to the sustainability of existing buildings.

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

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IDCEC COURSE #CC-107981-1000

Photos: © Adam Mørk



Project: ECCO Hotel and Conference Center

Architect: Dissing+Weitling Architecture

WRC is a versatile material for use on the interior and exterior of a wide range of building designs.

This course will look at some of the more diverse and innovative uses of cedar across this broad set of building types.

CEDAR SIDING ATTRIBUTES

Architects, interior designers, building owners, and facility managers have been drawn to use WRC for some specific reasons. These include:

- **Appearance:** WRC is real wood with the corresponding authentic appearance of wood. Its grain and natural color have helped it to become regarded as a superior aesthetic imbued with decidedly crisp yet superbly rich tonal properties. It is quite attractive in a variety of commercial and other building types in a range of design styles, including traditional, contemporary, arts and crafts, and modern styles.
- **Durability:** WRC is well known for its longevity and durability due to the natural makeup of the wood. It has been found to be naturally

resistant to rot, decay, and insect attacks, which means anything built with it will last longer and require less maintenance.

- **Sustainability:** Independent studies prove that when it comes to environmental performance, natural wood is superior to synthetic products in every way. While other building materials generate greenhouse gases, WRC trees actually remove greenhouse gases from the atmosphere. Further, unlike many manufactured or composite material, WRC is fully biodegradable at the end of its useful life. Perhaps one of the best known sustainability attributes of WRC is that it is a renewable resource when harvested and replanted using sustainable forest practices. In fact, WRC in North America is sourced from some of the most sustainably managed forests in the world. These forests are managed by private companies who participate in sustainability certifications such as the Sustainable

Forestry Initiative (SFI), Forest Stewardship Council (FSC), and Canadian Standards Association (CSA). The LEED rating system for green buildings now recognizes all three of these certifications.

- **Versatility:** WRC offers a wide range of sizes, surface textures, grades, and profiles—both standard and custom. Therefore it is easy to incorporate into a wide range of design schemes and patterns.
- **Profiles:** A virtually unlimited variety of common and specialty profiles of cedar siding, boards, and trim are made to suit different design and construction needs. These include beveled, lapped, tongue and groove, and boards for board and batten applications in various thicknesses and profiles for vertical and horizontal siding, paneling, and trim board applications.
- **Grades:** Recognized independent agencies use grading systems to identify different appearance lumber grades as distinct from structural lumber grades for cedar. These grading systems use terms like “clear vertical grain heart,” “A,” “B,” “rustic,” “select knotty,” and “architect knotty,” among others. The word “heart” in the case of grading cedar refers to the inner wood in a tree as opposed to the narrow outer sapwood between the heartwood and the bark.
- **Surface texture:** The surfaces of cedar products are available with a smooth surface, a rough-sawn appearance, or a rougher headed texture, any of which can be specified to suit different project needs.
- **Fasteners:** High-quality, corrosion-resistant fasteners that prevent staining and discoloration (i.e., stainless steel, aluminum, hot-dipped galvanized) help to assure that both the appearance and the performance are maintained over time.
- **Finish:** Unlike some other wood species, WRC is pitch and resin free. This means it’s ideal for accepting and holding a wide range of wood finishes, including clear stains, semi-transparent stains, solid stains, or paint to protect and preserve appearance and meet a variety of design needs for tonal properties or finished appearances.

► Continues at ce.architecturalrecord.com

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



The Western Red Cedar Lumber Association represents quality “Real Cedar” producers, distributors, and retailers throughout North America. Founded in 1954 and known as “the voice of the cedar industry,” WRCLA offers extensive resources to assist with selection, specification, application, and quality standards. www.realcedar.com



Wood-framed sloped roofs need to provide all of the same functions as exterior walls, if not more so, including weathering, thermal resistance, air barriers, and moisture control using vapor retarders and ventilation.

All images courtesy of Huber Engineered Woods © 2018

New Options for Insulating and Ventilating Wood-Framed Sloped Roofs

The building science behind the latest code changes provides design guidance

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

High-performance wood-framed building enclosures often focus on wall designs, but there is an equal need and growing amount of attention on roof assembly designs. Matt Minchew has observed this quite heavily in his role as General Manager of ZIP System Roof and notes, “For the past 10 years, energy code cycles have focused on wall assemblies. Higher R-values, airtightness, reduction of thermal bridging, and condensation control has been emphasized in the energy code.” He goes on to point out the shift, stating, “Recent code changes have begun to influence roof design to emphasize the same assembly functionalities. Methods to achieve unvented attic assemblies are evolving and bring attention to the need for proper detailing of moisture, air, thermal, and vapor control.” In essence, he is reminding us that all of the same concerns for providing the appropriate barriers in wall assemblies are equally important as part of good

roofing design in wood-framed buildings too. Therefore, in this course, we will focus on wood-framed roof assembly options, some of the building science principles that influence good roof design, and some of the emerging options recognized in the International Energy Conservation Code (IECC), International Residential Code (IRC), and International Building Code.

PRIMARY FUNCTIONS OF A WOOD-FRAMED SLOPED ROOF

Wood-framed sloped roofs have been a common means to provide shelter and protection from the weather for centuries. The methods of construction have included everything from simple “lean-to” structures to post-and-beam framing, spaced rafter framing, and most recently engineered wood trusses with engineered sheathing. Beyond simply providing structure and covering, however, wood-framed

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Learning Objectives

After reading this article, you should be able to:

1. Explain the primary functions of a wood-framed sloped roof, including four primary, code-based barriers for high-performance green and sustainable buildings.
2. Define the common options for wood-framed sloped roofs related to ventilation, insulation, and current (2015) code requirements.
3. Review the emerging research and 2018 code provisions that address new variations in unvented wood-framed sloped roof assemblies.
4. Compare some of the different methods for providing continuous and integrated air, water, and thermal barriers in roof assemblies.

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roof design has evolved in recent times in several important ways. Perhaps the most notable is the need for higher thermal performance to meet energy conservation and comfort demands. That has included not only accommodating more insulation but also providing air barriers to control unwanted air infiltration or drafts. Related to that is the control of airborne moisture or vapor that needs to be restricted to keep it out of roof construction or allow it to dissipate away when needed. Of course, water drainage is needed for bulk water too, not only in the form of precipitation but also from the melting of ice dams or other cold-weather concerns. Holistically speaking then, wood-framed roofs are no longer just a structural item but need to be seen as a complete, coordinated assembly to provide at least four barriers—one each for water, air, moisture, and thermal control.

Barriers versus Ventilation

The difference between a successful roof system and one that falls short is the ability to create an unbroken line of defense in all of these four barriers. Achieving that objective requires more than just a note on the construction drawings calling for these barriers to be “continuous.” It requires proper design and detailing of the roof assembly conditions, which means the person doing that detailing needs an understanding of the fundamental building science and physics that contribute to a successful design. Building codes take advantage of some of that building science and establish minimum requirements for typical roof construction systems. However, the codes don’t do the design of a particular roof system—that’s the role of the design professional.

Another recognized key to a successful roof system is having a backup means to prevent damage in the event water or moisture does breach the barriers. Unanticipated water can cause wood to rot or otherwise deteriorate over time, render some insulation relatively useless if it becomes even partly saturated, and drain into the rest of the building causing additional damage. Commonly, the backup means to prevent this is done by providing ventilation (i.e., as in attic spaces) or using assemblies that create a drainage plane for water to drain away harmlessly. Once again, the building codes have some specific requirements to be sure this is addressed in the interest of protecting the integrity of the structure and the rest of the building, but they do not purport to design the means to achieve it in any particular project.

In the quest for a source of reliable information and assistance on better building assembly design, it is not uncommon for architects to turn to independent consultants or specialists. One such independent source is Peter Yost who is vice president of building performance for

Building Green in Brattleboro, Vermont, and technical director for Taunton Press’s Green-BuildingAdvisor.com. Yost has more than 30 years of experience in building, researching, teaching, writing, and consulting on high-performance buildings. His work includes both academic and vocational instruction, field research on building products, building investigations, construction document review, and technical research and writing. A LEED AP, he is a past co-chair of the USGBC’s LEED for Homes program and a certified instructor/course author for the NAHB Advanced Green Building: Building Science certificate program. Yost is also a lecturer for Yale’s graduate program in Forestry & Environmental Studies, an instructor for the Boston Architectural College’s Sustainable Design Certificate program, and research associate with the University of Massachusetts Department of Building Construction and Technology program.

Prioritizing Barriers

In light of his past experience, it is easy to see why Yost has published information about the four barriers of a wood-framed roof assembly and the importance of keeping them continuous. In particular, he has taken the approach to prioritize these barriers in the following order¹:

1. A continuous bulk-water-control layer
2. A continuous air-control layer
3. Dedicated, directional drying potential (vapor control and ventilation)
4. A continuous thermal-control layer

He emphasizes the fact that problems arise when we do not honor this prioritization in roof and wall assemblies. For example, a design focus on the continuity of bulk-water and air-control layers means the assembly is less likely to have water or air leakage. That in turn means the need for drying is reduced and ventilation is relied on less. Drainage that uses conventional weather-lapped roofing including proper underlayment, flashings, etc. is a proven means to address the number-one threat of bulk water. Moving that water quickly and completely off of the roof is the best line of defense. Similarly, preventing air infiltration where it is not wanted means that vapor in that air is kept out too. That prevents condensation from occurring when the moisture-laden air cools on a material or surface and turns to water droplets.

Since air barriers are second on the list, it is important to have a source to define whether something really qualifies as an air barrier or not. One of the leading sources for researching and testing materials and



Successful roofing systems need to address barriers and proper ventilation in a truly continuous manner.



Providing an air barrier as part of the roofing sheathing is one way to assure continuity and effective performance of the roof.

assemblies for air permeance is the Air Barrier Association of America (ABAA), which, according to the website, is a “national, not-for-profit trade association that consists of a wide cross section of stakeholders in the building enclosure industry. Their membership includes manufacturers, architects, engineers, trade contractors, researchers, testing and audit agencies, consultants, and building owners.” Using data and information from this organization can help identify both individual materials and assembled systems that will qualify to properly restrict airflow through a roof or wall. They can also provide information on critical areas to address in those assemblies through their education and certification programs for professionals. In some cases, materials can qualify as an air barrier and also as another type of barrier such as water or moisture, or insulation may, in some cases, qualify as an air barrier, all depending on the proper testing and reporting of results.

Different Types of Ventilation

Of course, if water is penetrating an assembly somewhere, either from bulk water or from airborne water vapor, no amount of roof surface drainage will solve the problem—it

will only keep it from getting worse. Hence, the means of fully drying a roof assembly if it does get wet must still be properly addressed. There are two common options to provide that ventilation. The best and preferred means is to provide convective drying through a means that sets up an actual airflow through the assembly. Continuous soffit vents that are sized and balanced with a continuous ridge vent are the most common way to achieve this convective ventilation. In this case, air that is warmed by the sun or other means in a roof assembly is allowed to escape out through the ridge vent. That movement then brings in replacement air that is pulled in through the soffit vents, thus creating a full convective current as the means of ventilation.

The second means of drying a roof assembly or materials is simply through diffusive drying, which is the natural process of materials slowly giving up their moisture by releasing it to the air as water vapor. That released moisture can then either move out to the exterior of the building or move to the interior. The speed and direction of the vapor diffusion can be determined by looking at the permeability of the materials used in a roof assembly. Building scientists, like Yost

and others, refer to this as creating a “vapor profile” which allows them to help determine how well a particular assembly will dry, and in what direction (to the interior or exterior) if it does get wet.

Clearly, designing the roof assembly to address water- and air-barrier continuity is the first and best approach. Then, proper ventilation needs to be provided so water or vapor has a ventilated path to escape and avoid causing problems. Of course, if an air leakage problem exists, adding ventilation isn’t the way to solve it—the source of unwanted air leakage needs to be sealed.

STANDARD DESIGN AND CONSTRUCTION OPTIONS

Plenty of wood-framed roofs have been constructed over the past 40–50 years or so with different levels of understanding of the need to provide the four barriers and proper ventilation. Some assembly designs have come about through trial and error, and some have been found to work quite well under defined circumstances. In particular, some have tried to solve specific design problems, such as pitched, non-attic types of assemblies. One of the well-known design professionals who has spent a considerable amount of his time and effort looking at the barrier and ventilation/drying aspects of different types of roof construction assemblies is Joe Lstiburek, Ph.D., PE, ASHRAE Fellow, who is the founding principal of Building Science Corporation headquartered in Westford, Massachusetts. According to the firm’s website, “Dr. Lstiburek’s work has been focused on advancing the building industry with a lasting impact on building codes and practices throughout the world, particularly in the areas of air barriers, vapor barriers, and vented and unvented roof assemblies. Of note, his work through the Department of Energy’s Building America program led to significant research into the wetting and drying of walls and ultimately to a major code change relaxing the requirement for vapor barriers in the International Residential Code.” He and his firm have addressed all types of roof construction assemblies through research, testing, consulting, and forensic exploration and make a great deal of their findings available for free at www.buildingscience.com.

Among the most commonly used wood-framed roof construction approaches that Dr. Lstiburek’s firm and others have looked at are the following four.

Vented Attic

This is probably the most common type of wood-framed roof assembly being built currently. Vented attics rely either on engineered trusses or rafters with ceiling joists to form

an open, unconditioned attic space. Here, the water barrier is located on the roof surface above the attic, while the air barrier is along the ceiling surface below with the vapor retarder and thermal barrier (insulation). Note that the air barrier in the walls may well be in a different location, such as on the exterior of the sheathing, so to be fully continuous, the details of air sealing need to connect these two locations. Attic ventilation above the air and thermal barrier is most commonly provided using soffit and ridge vents or other acceptable means if dictated by the roof design or type. Properly designed and constructed with attention paid to the needed levels of insulation as well as the integrity and continuity of all barriers

and ventilation, this roofing system can be expected to perform very well over time in almost all climate zones.

Cavity-Vented Insulated Pitched Roof

There are circumstances where a horizontal ceiling and attic space above do not meet the design needs of a building. In those cases, the assembly may be more compact, creating a pitched roof and sloped ceiling all in one, but all of the same barrier and ventilation needs must still be addressed. The common approach is to use roof framing members that are deep enough to carry the structural loads, fit the needed level of insulation in between, and still provide space for ventilation. In some climate zones, even a 2-by-12 rafter may not

be enough to achieve all of that, so a deeper flat truss or other engineered member may be called into play. Regardless, the water barrier will still remain on the exterior surface of the assembly, while the air barrier and vapor retarder are along the inner face. Insulation is installed between the framing members to the level needed or desired depending on the type and corresponding R-value per inch (i.e., batts, spray foam, etc.). The depth of the insulation will be restricted by the need for a continuous ventilation space of at least 2 inches of depth that allows air to flow between the soffit and the ridge openings such that each framing space is ventilated (not every other space as some would purport). Commonly, continuous vent chutes or insulation barriers are installed along the underside of the roof sheathing to assure that ventilation space is maintained.

Top-Vented Insulated Pitched Roof

If providing enough ventilation and insulation all in one framing member depth is not readily achievable, then the alternative is to construct an additional ventilation layer on top of the framing layer. In this case, the framing cavity is filled with insulation or rigid insulation is applied over a timber frame and ceiling system. A minimum 2-inch air space is then provided as an “over-roof” to carry away any moisture that escapes up through joints in the insulation. The ventilation space also helps keep the underside of the over-roof surface cold, thus avoiding snow melting and forming ice dams. Dr. Lstiburek recommends this over-roof approach when structural insulated panels (SIPs) are used too since the panel joints can be sources of air exfiltration from within the building. While this over-roof approach is effective for ventilation, it can be more costly to construct since it involves the creation of the ventilation channel that needs to support the sheathing and roofing water barrier.

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Among the most common wood-framed construction types, flat ceilings with an insulated attic above are prevalent and require proper ventilation as called for in the building codes.

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Selecting multi-slide glass doors creates a seamless transition between indoor and outdoor living spaces.



Photo courtesy of LaCantina Doors

An Open Invitation

Multi-slide glass doors revolutionize open design by creating a focal point and bringing the benefits of the outdoors in

Sponsored by LaCantina Doors | By *Amanda Voss, MPP*

“We wanted clients to be able to seamlessly move outside and make the connection with what they are visually taking in,” says Fogelstrom Design Build Principal Designer Brett Fogelstrom in reference to a recently completed project in Oregon.

Creating a connection between indoors and outdoors is a design goal for both commercial and residential buildings. While glass offers a visual channel to connect to the outside, too often the actual physical transition to exterior environments is abrupt or dissonant.

Modern design means not only embracing a structure’s surrounding natural environment, but it also upholds the benefits of bringing the outdoors in by capturing daylight, bolstering indoor air quality, and improving the overall health of occupants.

New product offerings using multiple sliding door panels, or multi-slide doors, that stack or store in wall pockets now make it possible to fully connect indoor and outdoor spaces without interruptions. When open multi-slide doors allow indoor spaces to extend outward, creating an outdoor living experience with all the benefits of fresh air and daylight. When closed, attention to details and performance characteristics assure that multi-slide doors provide the needed protection from weather and climatic conditions.

ELIMINATING DIVIDES WITH MULTI-SLIDE GLASS DOORS

Not only does the integration of outdoors and indoors enhance occupant health, but many building designs also envelop outdoor

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1 AIA LU/HSW



1 IDCEC CEU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss the design flexibility and performance characteristics allowing multi-slide doors to create a direct connection to the outdoors.
2. Identify and specify high-performance multi-slide glass doors for a project, and understand how these doors are affected by national standards.
3. Explain how the characteristics of multi-slide doors contribute to meeting energy, sustainability, and performance goals.
4. Recognize specifications and standards of multi-slide doors and how these attributes can be selected to fit specific project goals.

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spaces and incorporate them as part of the overall usable building footprint. This can capture valuable square footage for use.

Commercial building designs, restaurants, office buildings, and apartments all can benefit when welcoming outdoor weather conditions allow for activities like dining and meetings to occur both indoors and out. In residences, rooms that flow into patios, decks, or natural outdoor areas such as beaches or wooded areas give residents a direct connection to those outdoor spaces.

As the focal point of modern design embraces open spaces, architects and designers need products that can capture this attribute. Multi-slide doors offer a dynamic solution that transforms and innovates open spaces. Thoughtful selection of materials mean multi-slide doors are well suited for many different environments and climates and will enhance and complement any architectural style, creating an outdoor living experience for any space. By eliminating a wall or standard door installation, multi-slide products remove the

distinction between the indoors and outdoors, creating a healthier, more comfortable environment with natural light and open air.

How to craft a transition that both allows for enjoyment of the outdoors yet still maintains the functional needs of the indoor spaces becomes the key design focus.

THE ADAPTABILITY OF THE MULTI-SLIDE DOOR

The uses for multi-slide doors are only limited by the imagination and creativity of the building designer.

Multi-slide glass doors are used today in a full range of building types and functional applications. Multi-slide doors allow residential buildings to open up entire walls and connect main living areas with outdoor spaces. Multifamily developments use multi-slide doors to create a larger living unit by extending floorplans to include outdoor balcony and common spaces. Restaurant and retail buildings can cater to customers who prefer to relax in outdoor spaces while still being directly connected to the indoor facilities. Resorts and hotels similarly can provide their guests with a convenient and inviting indoor/outdoor experience for individual rooms and common lobby, restaurant, or functional areas. Educational buildings that need the ability to expand or contract a space to accommodate gatherings can use multi-slide glass doors to redefine footprints. Offices that open to a central atrium or courtyard can use multi-slide doors to provide open access when desired or be closed off when needed.

LAYING THE RIGHT FOUNDATION: HOW TO SPECIFY MULTI-SLIDE GLASS DOORS

When specifying multi-slide glass doors, there are choices and specification details to pay attention to so that the best products are selected for the application and design. The Master Format section number commonly used is 08 32 13: Sliding Aluminum-Framed Glass Doors.

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

CASE STUDY

Project: Ponzi Vineyards

Location: Sherwood, Oregon

Architect: Fogelstrom Design Build

Ponzi Vineyards is a family-owned and -operated winery located in the Willamette Valley, Oregon, outside of Portland known for its world-class Pinot Noir. Ponzi Vineyards began operation in the late 1960s, initially starting out as a 20-acre small farm. More than 50 years later, the Ponzi family is using the same methods and philosophies, but its passion and success for winemaking has expanded the vineyards to 130 acres.

A glass wall was a must have for the new indoor/outdoor project, known as Laurelwood, to create a smooth transition through the space and provide repeat customers the opportunity to experience the ever-changing environment through the seasons. Multi-slide doors were a natural choice for the project. An aluminum thermally controlled system was specified due to its 2^{15/16}-inch stile-and-rail profile to maximize the views and maintain energy efficiency during inclement weather.

“By visually and physically connecting to the vineyards, the agriculture becomes both a beautiful landscape as well as an important point of discussion,” says Principal Designer Brett Fogelstrom.



Photo: © William James Photography

A glass wall was a must have for Ponzi Vineyards, creating a smooth transition through the space and allowing customers to experience the ever-changing environment through the seasons. Patrons can seamlessly move outside to make the connection between their natural surroundings and the wine being served and sampled.



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The Business Case for Building with Wood

How wood construction can contribute to process efficiency, sustainability, and marketability

Sponsored by Think Wood | *By Juliet Grable*

Speed of assembly is one of the greatest advantages of prefabricated panelized components. At Albina Yard, a new office building in Portland, CLT panels enabled each floor to be built in a matter of hours.



For those involved in shaping tomorrow's built environment, this is an exciting time.

Several converging trends are presenting both design challenges and new market opportunities. Cities are getting denser, spurring mixed-use projects that combine ground-level retail and several stories of residential units. Urban dwellers, millennials in particular, are seeking affordable dwellings that are close to work and include plenty of amenities. New office construction continues to be strong, but these offices are eschewing traditional configurations and instead tend to include common areas and open plans that encourage collaboration. At the same time, firms are under pressure to innovate, implement lean practices, and create repeatable designs. More stringent building and energy codes and a growing emphasis on resilience are catalyzing performance-based designs—buildings that not only ensure occupants can safely evacuate during a disaster but that also maintain some functionality during an event and to be safely used afterward.

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1.25 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Explain how wood construction can be used to reduce construction timeframes, ensure quality, and accommodate changes in the field.
2. Name some value propositions other than cost that are making wood an attractive construction choice for building owners.
3. Describe common prefabricated and modular components and assemblies that are used in wood construction today.
4. Describe how wood is being used to create environments that appeal to the new generation of employees and occupants.
5. Explain how recent code changes are enabling cost-effective, high-density designs.

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Photo: © Albert Vecerka/Esto

Alongside these trends, builders and owners are facing a tightening lending market, especially from the larger banks.¹ To remain competitive, many construction companies are incorporating off-site manufacturing into their processes to ensure faster, more efficient project delivery and make up for the shortage of construction workers.²

Increasingly, building owners and design professionals are turning to wood construction to satisfy all of these industry, market, and regulatory demands and challenges. Long valued as a building material for its performance and cost advantages, today's building owners are choosing wood to satisfy these and other value propositions, from environmental sustainability and resilience to creating distinctive buildings that appeal to the next generation of employees and apartment dwellers, all while meeting tight budgets and construction timelines.

Innovations in off-site manufacturing and prefabricated wood components and assemblies have expanded the options for wood construction. To fully serve their clients, design professionals must understand these trends and technologies and be able to communicate the benefits of the various wood construction systems to their clients.

COST BENEFITS

There's a reason why light-frame construction is the go-to method for most residential and many commercial projects. Wood is an abundant resource in North America, and tradespeople are familiar with the materials and methods of wood construction.

A comparative analysis of one- to four-story office buildings constructed between 2009 and 2015 conducted by WoodWorks shows that wood offices cost 20 to 30 percent less per square foot than their non-wood counterparts.⁴

But beyond lower construction and lower overall costs, wood construction—and especially the use of prefabricated wood components and assemblies—allows project owners to meet tough construction timelines, ensure quality control, and differentiate their projects from others, whether offices, schools, or multifamily apartment buildings. In some cases, wood offices can capture higher rental rates than similar non-wood buildings. For example, the developer for Clay Creative, a timber office building in Portland, reports that tenants were willing to pay \$7 more per square foot than a similar non-wood structure located across the river downtown.



Designed as an innovative and inspiring building that visibly demonstrates the UMass Amherst's commitment to environmental sustainability, the John W. Olver Design Building uses a CLT structural system that significantly reduces its carbon footprint.

Faster Project Delivery

Because they are manufactured off-site, prefabricated components are less vulnerable to weather delays and other complications associated with site-built construction. Off-site fabrication does require logistical planning to ensure the components arrive on time and in sequence; however, once the packages arrive, construction proceeds quickly. In fact, speed of construction is one of the key benefits of both light wood-frame construction and mass timber. Mass timber structures can be built more quickly than comparable steel, concrete, or even light wood-framed structures, which translates into reduced construction costs.⁵ The methods often require smaller crews, and, depending on the size of the project and its proximity to other buildings, smaller cranes can be used to lift panels higher. In an example that highlights the speed and efficiency of mass timber construction, CLT panels were used to construct shear wall cores for the four-story John W. Olver Design Building at UMass Amherst. Four 60-foot-tall CLT panels comprising one of these cores were lifted and dropped into place with a crane and anchored to the foundation in a single weekend.⁶ These wood components also add to the building's distinctive aesthetic, where exposed wood is promoted as a demonstration of the school's commitment to sustainability.

Faster construction schedules mean the building can be commissioned more quickly, enabling building owners to begin earning rental revenue sooner. Projects with shortened construction schedules and smaller crews may prove attractive to lenders—a real advantage during an era of tight lending and rising labor costs.⁷

Indirect Savings

Wood is light but strong. Glulam is stronger than steel at comparable weights, and it is stronger and stiffer than dimensional lumber, making it a cost-competitive choice for long structural spans and tall columns.⁸ The lighter weight of wood can lead to reduced foundation sizes and other structural elements. For example, Carroll Smith Elementary School in Osceola, Arkansas, was originally designed in concrete block using steel construction elements.

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Juliet Grable is an independent writer and editor focused on building science, resilient design, and environmental sustainability. She contributes to continuing education courses and publications through Confluence Communications. www.confluencecec.com

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Exterior walls can take many forms, but building codes require that they all meet minimum requirements for fire safety either by using noncombustible materials or by demonstrating safety through specific testing.

Balancing Fire and Energy Code Requirements in Exterior Walls

Exploring options for exterior wall designs with insulation that is consistent with codes and the testing standard NFPA 285

Sponsored by ROCKWOOL™ | By Peter J. Arsenault, FAIA, NCARB, LEED AP

Designing exterior walls in buildings is a complex process. Beyond the structural system that may be either independent from or integral to the wall system, multiple other criteria must be met. The International Building Code (IBC) requires that the wall include a water-resistant barrier (WRB) in the interest of durability and integrity of the wall. It also indicates the conditions where fire resistance is or is not required in exterior walls according to different aspects of life safety. The International Energy Conservation Code (IECC) requires an air barrier to reduce air infiltration as a mandatory provision. It also requires insulation in the wall with a prescriptive requirement for continuous insulation (ci) outside of the structure in many climate zones in order to address the issue of thermal bridging. There are also project design

criteria for general appearance, budget, and reduced maintenance that may impact not only the cladding or outermost surface of the wall but the rest of the assembly too. Altogether, the various materials and products designed and specified into an exterior wall must be able to be constructed as a complete, integrated wall assembly that is functional, code compliant, durable, cost-effective, and meets the design intent of the building.

In light of all of the above, this course will look specifically at ways to solve one of the biggest challenges in many exterior wall designs, namely designing and demonstrating life safety performance during a fire. We will begin with a look at what the building codes require as well as one of the most cited, but often misunderstood, standards referred to in the code, namely NFPA 285. With an understanding of

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Learning Objectives

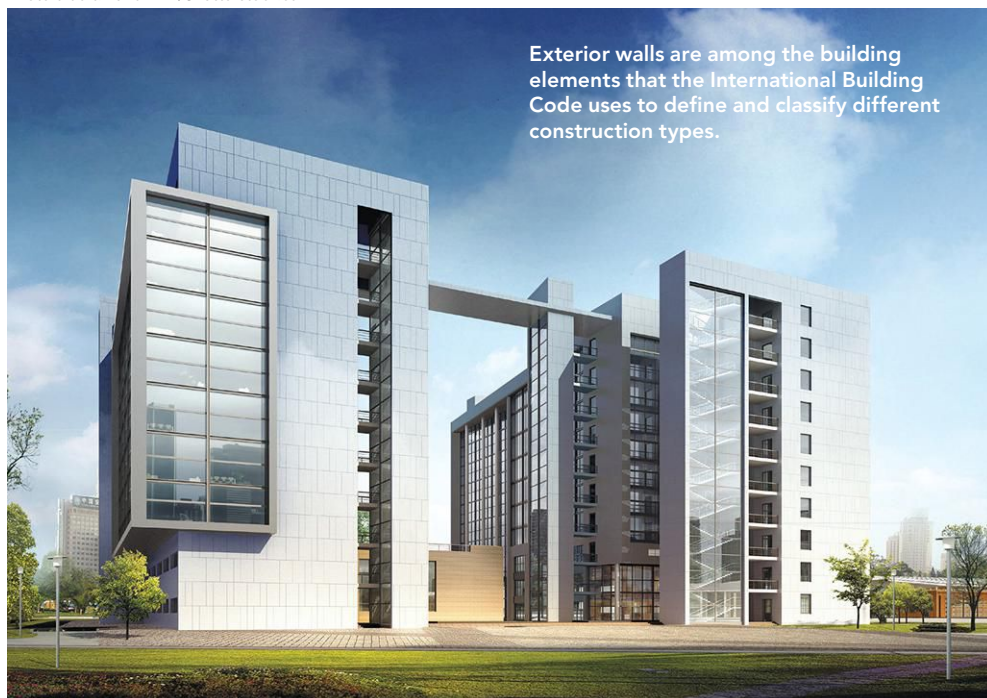
After reading this article, you should be able to:

1. Identify and recognize the fundamental requirements of the International Building Code (IBC) related to noncombustible exterior walls in the code-defined types of construction.
2. Assess the impact on the design of exterior walls as prescribed by the insulation requirements of the International Energy Conservation Code (IECC).
3. Investigate and review the purpose, intent, and specific details of the fire-propagation testing standard known as NFPA 285.
4. Explore different design options for exterior walls that are fully code compliant, safe, and energy efficient.

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Exterior walls are among the building elements that the International Building Code uses to define and classify different construction types.

It is significant to note for our purposes that Types I, II, III, and IV all require noncombustible exterior walls as part of their basic description. The clear intent, in the interest of life safety, is to limit the spread of fire whether one originates inside a building or somewhere outside. This the fundamental approach of fire safety in the code: contain a fire if it breaks out through various means, including the use of materials that don't burn and contribute to growth of the fire. Nonetheless, there are some specific exceptions and variations for different types of exterior walls, and some of those exceptions can be different between different versions (years) of the IBC so it is always a good idea to check the prevailing code for a particular building location. Even so, the noncombustible requirement remains a key point for exterior walls.

Exterior Wall Requirements

In addition to the construction-type descriptions, there are other places in the code that bring additional requirements for exterior walls. For clarity, the code does define exterior walls in Chapter 2 as “a wall, bearing or nonbearing, that is used as an enclosing wall for a building, other than a fire wall, and that has a slope of 60 degrees or greater with the horizontal plane.” This comprehensive definition is the basis for Chapter 14 of the IBC, which is devoted entirely to multiple aspects of such exterior walls.

Beginning with Section 1402: Performance Requirements, the IBC identifies specific criteria for weather protection, including the need for a water-resistive barrier (WRB) behind the cladding or outermost surface. It also lists requirements for structure, fire resistance, flame propagation, and flood resistance. Since some of these things are interrelated, most notably in flame propagation that is directly influenced by the materials used in an exterior wall, it provides a specific clarification. Section 1402.5 indicates that “exterior walls on buildings of Type I, II, III, or IV construction that are greater than 40 feet in height above grade plane and contain a combustible water-resistive barrier shall be tested in accordance with and comply with the acceptance criteria of NFPA 285.”

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each of these, we will then look at several design approach options to create exterior walls that are safe, fire resistant, and readily able to be constructed.

IBC REQUIREMENTS

The IBC is widely adopted across the United States by most authorities having jurisdiction (AHJ) as the basis for health, safety, and welfare in buildings. Other than one- or two-family homes and townhouses (which are covered by the International Residential Code), all other new construction or significant renovation of existing buildings need to comply with the relevant provisions of the IBC wherever it is adopted and in place. While there are different versions issued every three years (2012, 2015, and 2018 versions are currently in use around the country), there are some basic things that haven't changed significantly, if at all, including the following.

Types of Construction

The IBC identifies five fundamental ways to characterize construction as a basis to subsequently refer to specific code requirements applicable (or not) to each type. Chapter 6 of the IBC identifies these five types (using Roman numerals) by listing specific “building elements,” such as primary structural frames, bearing and nonbearing exterior and interior walls, floor systems, and roof construction. In

order to qualify as Type I or Type II construction, all of these primarily structural building elements listed in the code “are of noncombustible materials” except in a few cases where some specific exceptions may apply.

Moving on to Type III construction, the code defines this as “that type of construction in which the exterior walls are of noncombustible materials and the interior building elements are of any material permitted by this code.” There is a provision that allows for fire-retardant wood framing and sheathing here if certain criteria are met, but otherwise, combustible materials generally are not allowed on the exterior walls but are allowed on interior assemblies within the parameters of other sections of the code. Type IV construction is similar in that it also requires “the exterior walls are of noncombustible materials” but goes on to indicate more specifically that “the interior building elements are of solid wood, laminated wood, heavy timber (HT), or structural composite lumber (SCL) without concealed spaces.” Finally, Type V construction is “that type of construction in which the structural elements, exterior walls, and interior walls are of any materials permitted by this code.” This type typically means acceptable wood-framed construction that is not Type IV and does not have the same noncombustibility requirements for building elements.



ROCKWOOL

ROCKWOOL™ is the world's leading manufacturer of stone wool insulation offering a full range of high-performing and sustainable insulation products for the construction industry with solutions that help create more resilient, energy-efficient, safe, and sustainable buildings. www.rockwool.com



High-Performance Glass for Sustainable Design

A comprehensive guide to understanding the benefits of and best practices for specifying high-performance glass

Sponsored by Guardian Glass

The selected glass coating for Salesforce Tower is a high-performance, low-e coating on clear bent and flat glass with a visible light transmission of about 50 percent.



Photo: © Tim Griffith

Glass is a physically unique product that is made from sand, soda ash, and salt cake. The basic formula for glass is 75 percent silica sand, then soda ash, salt cake, dolomite, and rouge/iron oxide are added. Metal oxides are added to the formula to obtain a variety of colors. For example, adding iron can change the glass to a green color. Iron and sulfur or selenium make the glass bronze. Copper and cobalt turn glass blue. Selenium, cobalt, and iron turn glass gray.

During processing, glass is melted and cooled with care. The result is rigid but distorted molecules that resemble what we readily recognize as glass, which can be used not only to provide occupants with views of the outside world but also enhance the facade of a building or structure.

CONTINUING EDUCATION



1 AIA LU/HSW



1 GBCI CE HOUR

Learning Objectives

After reading this article, you should be able to:

1. List the energy-efficiency and aesthetic attributes architects should consider when specifying high-performance glazing.
2. Evaluate different glass samples to select the most appropriate type and style for a project in order to satisfy comfort and sustainability goals.
3. Discuss current standards and certification programs that can help support sustainable design goals when specifying high-performance glass.
4. Explain how lowering visible light transmission through high-performance glass can improve the comfort and health of the occupants while supporting energy-savings goals and providing ample light within the building.
5. Note the use of oversized glass as an innovative design trend and highlight some considerations.

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 #K1811J
GBCI COURSE #092001766

Image courtesy of Guardian Glass

Glass for commercial and residential construction is typically manufactured as sheet glass. Sheet glass is often created using a float glass process. Float glass is made by floating molten glass on a bed of molten tin. This allows the sheet to be uniform in thickness and flatness. The float glass process makes clear and tinted glass in standard thicknesses ranging from 1.7 millimeters to 12 millimeters, and various sizes commonly up to 130 inches by 204 inches (also known as jumbo glass). Some manufacturers offer thicker and larger glass sizes.

After glass is floated, any specified glass treatments or coatings are applied in a separate process. Simply put, glass is floated, then coated. Over time, technological advances in glass treatments and coatings have made glass a much more chemically and mechanically stronger product. To improve the performance of glass, low-e coatings and heat treatments are specified depending on the needs of the building and occupants. Low-e coatings provide reflectivity, transparency, and energy efficiency. These will be discussed in more detail throughout the course.

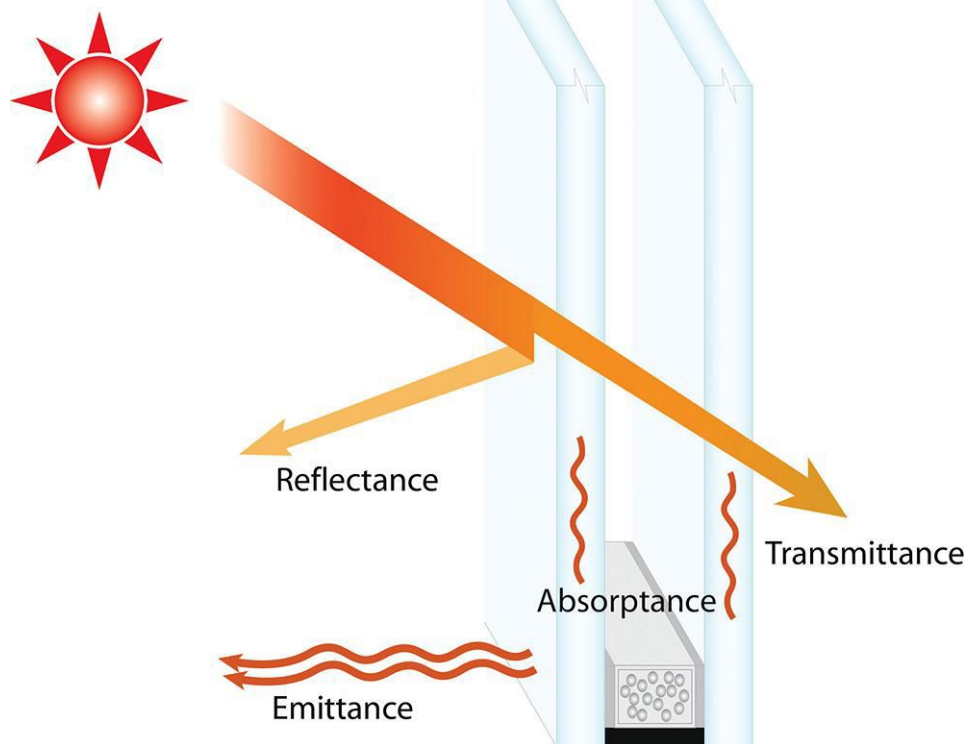
PICKING THE PERFECT GLASS FOR ANY PROJECT

After determining how glass will be used to execute the design intent of the building, the architect or designer can examine which high-performance glass will deliver on the needs of the occupants. Building orientation, the window-to-wall ratio, and shading elements can impact glass needs for the overall building objective, including light transmittance and energy performance.

Building orientation refers to the direction the building faces. By understanding building orientation, the architect or designer can accommodate for glare while also taking into consideration the fluctuations of light transmittance from summer to winter months.

Heat transference is another consideration. Depending on the climate, it may be preferable to keep outside heat from entering the building in order to limit the strain on cooling systems. However, in cooler climates, it may be more energy efficient and cost-effective to allow heat from the sun to enter the building and help warm interior spaces.

After determining the building orientation and how it will be affected by sun exposure, the architect or designer should consider the window-to-wall ratio and shading elements. Shading elements can include natural structures such as trees and cliffs/mountains as well as



Shown is a visual account of how sunlight and glass interact. The percentages of light that are reflected, absorbed, and transmitted are represented in the RAT equation.

nearby buildings or other outside man-made structures. The ratio of windows to the wall and shading elements directly affects the amount of sunlight that enters a building.

In the past, to make a building more energy efficient, smaller windows were specified for projects. The idea was that the smaller the window, the less chance there was for solar heat gain. Thanks to vast improvements in glass technology and fabrication, buildings can be very energy efficient (sometimes up to 100 percent efficient) with large expanses of glass, allowing for vast exterior views and more daylighting reaching occupants, which has been proven to improve well-being.

CONSIDERING THERMAL HEAT TRANSFER WHEN SPECIFYING GLASS

Desired design aesthetic, building orientation, and window-to-wall ratio are all variables used to determine potential thermal heat transfer within the building. Thermal heat transfer occurs when sunlight enters a building through the building envelope. In the context of glass and the building envelope, the amount of heat

allowed into the building is measured as the solar heat gain coefficient (SHGC). Heat loss means heat is transferred from a warmer area to a colder area while moving through the material—in this case, glass. The rate of the heat flow is measured as the rate of heat transfer, or U-value. The resistance to the heat flow is measured by the reciprocal, or R-value.

When sunlight hits a material, the material will reflect or absorb the light and energy or allow it to pass through. Glass's ability to manage solar energy is measured as SHGC. The SHGC equation (or RAT equation) is:

$$100\% = R(\%) + A(\%) + T(\%)$$

In this equation, R is reflection, A is absorption, and T is transmission of heat. The solar heat gain coefficient is the percentage that is absorbed or reflected. A related concept is emissivity, which is the material's ability to take the heat that is absorbed from the sun and disperse it either inside or outside the building.

Continues at ce.architecturalrecord.com



The Evolution of Parking

How automated systems are changing the future of parking with lowered emissions, space savings, user safety, and ROI

Sponsored by Westfalia Technologies, Inc. | By Kathy Price-Robinson

You're in a big city, and it's time to park your car. Feel the tension rising? But imagine this: You drive into a dense metropolitan area. Unlike in years past, you feel no growing tension about finding a parking spot, dodging other cars in a parking garage, breathing exhaust fumes, or dealing with a valet. Instead, you see a sign that indicates "parking," and you steer your car into a luxurious transfer area. Just outside the transfer area you see a touchscreen, which asks you a few questions: "Have you taken your keys with you? Have you removed belongings you need?" Upon the affirmative, you indicate that you want your vehicle stored for a few hours. The door to the enclosure slides down, and you walk away. Your role is complete.

But inside the automated garage is where the action begins. A sophisticated melding of machinery and software shifts devices beneath

your car, lifts it slightly, and backs it out of the transfer area. The machinery turns your car 180 degrees and transports it to a tight storage slot in a finely orchestrated sequence of movements. The parking garage is quiet and dark with the whirring of machinery and movement of gears. Exhaust fumes do not permeate the space because none of the engines are running. Upon your return, with a series of indications to the touchscreen, the machinery deposits your car back into the transfer area, facing outward, and the sliding door lifts. Average time for retrieval is about 2½ minutes. You ease into your vehicle and drive away.

Does this sound like science fiction, a futuristic vision of a utopian city? In fact, "smart" parking methods like this exist today and have been operating in large cities such as New York City, Philadelphia, Copenhagen, and many

CONTINUING EDUCATION



1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Discuss land design challenges in large urban areas with increasing numbers of automobiles and shrinking available space for conventional parking garages.
2. Describe how innovations in automated parking systems are changing urban land-use patterns, allowing forward-thinking designers to preserve on-grade space for parks, recreation, and buildings.
3. Assess the space-saving, user-experience, safety, and environmental benefits of automated parking systems.
4. Explain the benefits of automated parking systems to property developers and owners in terms of cost, space savings, labor savings, and energy savings as well as the benefits of a turnkey approach to specifying such a system in a project.

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 #K1812P

Photos courtesy of Westfalia Logistics Solutions Europe

large cities around the world for more than a decade. They are known as automated parking systems, or APS. In fact, such a system is automatically parking cars via this method at this very moment in Philadelphia. Systems like this could be specified today into many urban projects now being designed where land and parking spots are at a premium, from office buildings to hospitals, airports, multifamily units, and other uses.

“Developers and architects are increasingly looking at automated parking systems,” says Ian Todd, director of automated parking systems at Westfalia Technologies, a leading vendor of automated parking systems. “That’s because they are becoming more aware of the inherent advantages of these systems over conventional parking, namely: space savings, making the whole parking experience more convenient, safe, and luxurious for the user; a more sustainable solution due to the reduced emissions, landfill, and energy consumption; and cost savings due to lower construction, operational, and finishing costs and accelerated depreciation of the automated parking system equipment.”

MORE CARS AND DENSER CITIES: A DIFFICULT MIX

Why is this important now? For the first time in history, more than half of the world’s population is living in urban areas. With more people living in cities, residents and visitors often spend more and more time looking for available parking.

According to an article in *USA Today*, “Searching for parking is more painful than ever for U.S. drivers.”¹ The typical driver spends, on average, 17 hours a year searching for open parking spots. This adds up to an estimated \$345 per driver in time, fuel, and emissions. This is according to a study by INRIX, a leading specialist in connected car services and transportation analytics.

In New York City, according to the study, the average driver spends 107 hours a year looking for empty parking spaces, adding up to \$2,243 in wasted time, fuel, and emissions per driver. In total, this issue costs residents, commuters, and tourists in New York City \$4.3 billion per year.

A United Nations report highlighting the need for more sustainable urban planning and public services estimates that by 2050, two out of every three people in the world will be living in cities or other urban areas. In order to support this rapid growth, cities will be challenged with expanding resources and infrastructure, including housing and parking.



In an automated parking system, the vehicle is driven in forward but rotated on a turntable so that when it is retrieved, the driver can pull out forward and not have to back up into the street.

LAND USE CHALLENGES AND THE PROBLEM OF CONVENTIONAL PARKING

According to a study by the National Automobile Dealers Association (NADA), 16.7 million new cars and trucks are expected to be sold in the United States by the end of 2018. These rising numbers are driven by several factors, including rising populations, lower unemployment rates, and a wider array of car options that suit every budget and need.

While this is great news for the automotive industry, it continues to create a dilemma for architects and building developers in the residential, office, and commercial real estate markets as well as the airport and hospitality sectors.

With more cars on the road each year, developers are now tasked with creating ample parking to accommodate them on top of tight budget constraints and already limited building footprints, particularly in congested cities.

According to an article in *Fortune* magazine, the average car is parked 95 percent of the time when a single person drives it, meaning these new cars will need new spaces to park.²

Strict Parking Regulations

In crowded cities, developers are typically required to build at least one parking space per housing unit. In Los Angeles, for example, according to the Los Angeles County Department of Regional Planning, the city requires each single-family and two-bedroom home to have two designated parking spaces, while studio apartments require one parking spot.



An estimated 17 million new cars and trucks will be sold during 2018. This is due to rising populations, lower unemployment rates, and a large section of cars for every taste and budget.



The average car driven by one person is parked 95 percent of the time.

▶ Continues at ce.architecturalrecord.com

Kathy Price-Robinson is an award-winning housing and construction writer. Her series on home remodeling ran 12 years in the Los Angeles Times. She has profiled more than 500 projects and developed more than 100 continuing education courses. www.linkedin.com/in/kathypricerobinson



Westfalia’s parking solution is paving the way for innovation in the automated parking industry. By capitalizing on existing core competencies in warehouse automation and materials handling, its parking solutions specialize in cutting-edge, time-tested, fully automated parking systems for businesses, cities and municipalities, hotels, and residential properties. www.westfaliaparking.com

Photo: © Architectural Imageworks

The Cortex Innovation Community is home to a vibrant 200-acre innovation hub and technology district in the historic Central West End of St. Louis. When the owners decided to build an additional mixed-use structure that could act as a gateway to the hub, they wanted to create a building that would measure up to the nationally ranked universities and medical centers in the surrounding neighborhood while achieving pedestrian scale to invigorate a walkable community.



Innovation and Resilience

Precast concrete advancements and attributes help designers achieve performance, life safety, and welfare goals

Sponsored by Precast/Prestressed Concrete Institute (PCI) | By Amanda Voss, MPP

Concrete is an ancient material, with gypsum mortars found everywhere from the pyramids of Egypt to the remarkable hard lime mortars of early Greece and the Great Wall of China. The same benefits that attracted these civilizations to concrete as a medium for building—its performance capabilities, resilience, and versatility—have propelled it into a large and increasingly innovative role in today's construction industry.

Contemporary precast concrete consists of a mixture of cement, water, aggregate, and optional admixtures that is cast off-site into specific shapes in a controlled environment. The concrete is poured into a form, or mold, and cured before being stripped from the form. These components are then transported to the construction site for erection into place. Precast concrete is reinforced with either

conventional reinforcing bars, strands of high-tensile-strength steel, or a combination of both. Prestressing is a method of reinforcement where the steel strands are pretensioned in the form before the concrete is cast. The compressive force created by the strands allows precast elements to span greater distances and carry more load. Prestressing also reduces cracks since the members are in compression.

While modern methods and techniques have enhanced aesthetic and performance capabilities, they have also preserved concrete's original attributes. Precast concrete is an environmentally sound material produced from natural materials. No toxic substances are used or created by its production or use. Controlled manufacturing further enhances environmental soundness by optimizing material use, reducing waste when the panels are made and associated waste on the job site.

CONTINUING EDUCATION



1 AIA LU/HSW

Learning Objectives

After reading this article, you should be able to:

1. Describe how the attributes of concrete create energy and operational efficiency for buildings while aiding in risk reduction.
2. Discuss how a resilient structure not only encompasses durability and long service life but also ensures functional resilience and multihazard protection.
3. Define concrete's versatility in regard to both design selections and special concerns, such as historic preservation, reuse, and storm resistance.
4. Explain how cutting-edge innovations like three-dimensional printing are reducing costs and increasing the versatility of concrete in buildings, bringing the life and safety attributes of concrete to a greater span of construction types.

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AIA COURSE #K1812C

Once in place, concrete's resilience and performance shine. The thermal mass of concrete saves energy year-round. Precast concrete is noncombustible with inherent fire-resistant capability, creating a safe envelope that helps protect personnel, equipment, and the integrity of the structure itself. When used for structural components, precast also eliminates the need and cost of additional fire-proofing measures. Concrete's high albedo, or ratio of light reflected, has the added quality of reflecting solar heat as well as sunlight, reducing the heat island effect and higher temperatures endemic to urban areas. The resulting lower overall temperatures can make a difference in the amount of electricity consumed in air-conditioning and reduce smog formation, potentially improving air quality in urban areas. In addition, the inherent sound attenuation properties, due to precast concrete's mass, provide an economical acoustical barrier to exterior or interior noise penetration. The life-safety and tenant benefits provide a potent marketing asset when attracting long-term occupants.

When a building needs extensive remodeling, precast wall panels can be reused and adapted for expansion or new design.

A CATALOG OF ADVANTAGES

Durability and adaptability: Precast concrete panels provide a long service life due to their durable, low-maintenance surfaces. Insulated sandwich panels paired with precast concrete construction also provide the opportunity to move and reuse panels to refurbish the building, rather than tear it down and discard it, should its use or function change.

Thermal mass and energy performance: The thermal mass of concrete allows shifting of peak heating and cooling loads in a structure to help reduce mechanical system requirements and energy consumption throughout the building.

Fire and natural disaster resistance: Concrete is noncombustible and can contain a fire. As a separation wall, precast concrete helps prevent fire from spreading throughout a building or jumping from building to building. Precast concrete also is resistant to wind, hurricanes, and floods and impacts from wind-driven and flood debris.

Air infiltration: Precast concrete panels have negligible air infiltration. Minimizing air infiltration between panels and at floors and ceilings will provide a building with low air infiltration. These effects will lower energy costs and help prevent moisture problems.

Abundant, local materials: Concrete is used in almost every country of the world as a basic building material. Aggregates, about 85 percent of concrete content, are generally low-energy,

local, naturally occurring sand and stone. Most precast concrete plants are located within 200 miles of a building site. Using local materials reduces the transportation required to ship heavy building materials and its associated energy and emissions.

Indoor environmental quality: Concrete contains low to negligible volatile organic compounds (VOCs). Polished concrete floors do not require carpeting. Exposed concrete walls do not require finishing materials, eliminating particulates from sanding drywall taped seams.

Inedibility: Vermin and insects cannot destroy concrete because it is pest resistant.

Versatility in use and design: Precast concrete insulated wall panels can be used in both load-bearing and non-load-bearing building applications. The use of precast concrete insulated wall panels for both building envelope and interior applications provides a variety of benefits for architects, owners, and consumers, including resilient designs that are energy efficient and attractive. Precast concrete insulated wall panels can be finished with a wide variety of textures, colors, and even graphic designs.

Architectural precast concrete not only can ensure these general goals are met, but it also provides a myriad of life-cycle and ancillary benefits that are difficult to match with other materials.

ADDRESSING MISPERCEPTIONS

Understanding the benefits of precast concrete can assist designers in evaluating the impact of precast concrete on the environment and building operation. However, misperceptions about concrete's cost, weight, difficulties with on-site erection, and connections, as well as the lack of aesthetical versatility of the product, often eliminate concrete from the picture. In particular, outdated and inaccurate perceptions of insulated concrete wall panels—that they are too heavy, not versatile, or do not do much to support sustainability of a structure—mean failure to consider a pioneering set of envelope technologies.

Despite being a building block of some of civilization's earliest structures, concrete has continued to evolve, and today's products are anything but ancient. The precast concrete industry is heavily invested in research and development, with current investigative projects touching on everything from 100-year lifespan impacts on individual concrete components to aesthetic finishes, anchorages, and connections and interactions with wind-energy systems.

Photo: © Kessler Photography



Owners of the newly expanded Girls Inc. health and wellness facility in Omaha, Nebraska, wanted a design to reflect their mission of being "strong, smart, and bold." From the beginning, the architect felt the project's scale, durability, and budget requirements made insulated architectural precast concrete wall panels the obvious choice. The enclosure provides an R-value nearly double what is required by building codes, while the exposed interior wythe of the panel matches the white exterior, eliminating the cost and continual maintenance of painting.

PERFORMANCE

Performance does not only encompass simple energy conservation, but, as an asset, a material's performance also must support whole building and occupant health. Manufacturers of precast concrete systems strive to produce products that solve the needs of architects looking for versatile and energy-efficient load-bearing and non-load-bearing wall systems.

Precast concrete manufacturers produce insulated wall panels that can be used as both structural and non-structural components of a building system. To obtain a range of insulating, or R-values, precast concrete walls may have insulation applied to the back, or the insulation may be incorporated into a sandwich wall panel to reduce heating and cooling costs. The thermal mass inertia of concrete, which is recognized in ASHRAE standards, also reduces peak heating and cooling loads, saving energy year-round by reducing large internal temperature swings.

➤ Continues at ce.architecturalrecord.com

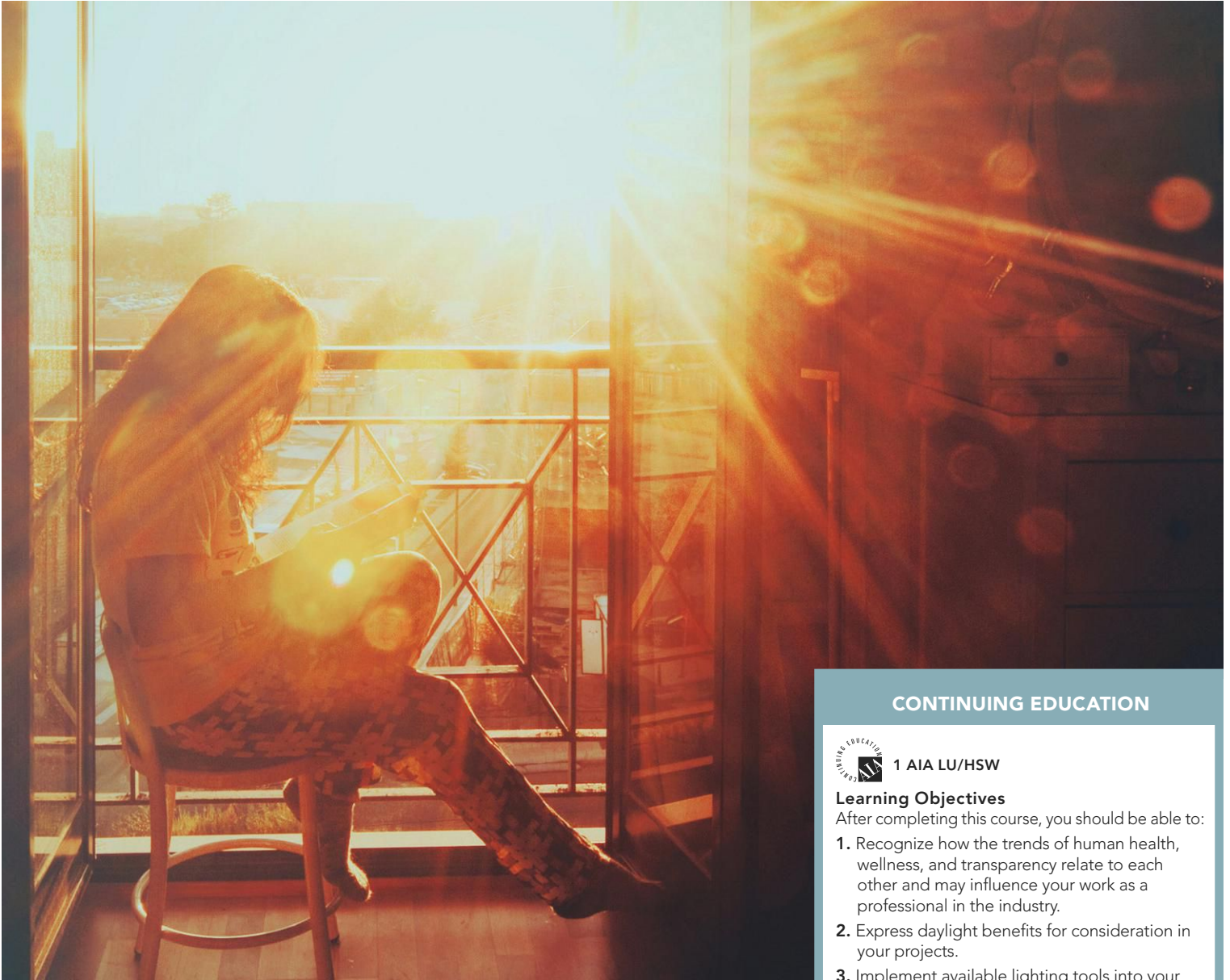
Amanda Voss, MPP, is an author, editor, and policy analyst. Writing for multiple publications, she also serves as the managing editor for Energy Design Update.



The Precast/Prestressed Concrete Institute (PCI) is a technical institute for the precast concrete structures industry. PCI develops, maintains, and disseminates the body of knowledge for designing, fabricating, and constructing precast structures. www.pci.org

Light for Satisfaction

Sponsored by Acuity Brands®



Light for Satisfaction dives into lighting as a key factor of wellness. Two current building industry trends—human health and wellness and transparency—are compelling designers to gain a better understanding of daylighting, the impact of light on our circadian rhythms, and related tools available to designers. This

course will explore a few of the building standards that take a deeper dive into lighting as it connects to the human being, as well as technology and strategies that allow designers to better mimic the 24-hour circadian clock within the built environment.

Continues at ce.architecturalrecord.com

CONTINUING EDUCATION



1 AIA LU/HSW

Learning Objectives

After completing this course, you should be able to:

1. Recognize how the trends of human health, wellness, and transparency relate to each other and may influence your work as a professional in the industry.
2. Express daylight benefits for consideration in your projects.
3. Implement available lighting tools into your daily practice.
4. Choose how to tune lighting best practices in order to reach "destination satisfaction."

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

AIA COURSE #K1812R



Acuity Brands (www.acuitybrands.com) is the North American market leader and one of the world's leading providers of lighting and building management solutions. Its Sunoptics® brand skylights (www2.acuitybrands.com/LightFlex_LED_AR) have been installed in several hundred million square feet of buildings worldwide.

New and Upcoming Exhibitions

Backstage: Menis Arquitectos

Berlin

December 8, 2018–January 17, 2019

This extensive retrospective uncovers the creative working processes of the Spanish firm. Models of planned and realized projects, including the CKK Jordanki concert hall in Poland and the Bürchen Mystik hotel in Switzerland, are presented at the Aedes Architecture Forum. For more information, visit aedes-arc.de.

The Sea Ranch: Architecture, Environment, and Idealism

San Francisco

December 22, 2018–April 28, 2019

The exhibition will bring together original sketches and drawings from the designers of this Modernist development on the Northern California coast. Archival images, current photographs, and a full-scale architectural replica will also be on display. At the San Francisco Museum of Modern Art. For more information, visit sfmoma.org.

Ongoing Exhibitions

Ando and Le Corbusier: Masters of Architecture

Chicago

Through December 15, 2018

The inaugural exhibition at Wrightwood 659, a new space designed by Pritzker Prize-winner Tadao Ando (see page 76), explores Le Corbusier's influence on the Japanese architect. It includes more than 100 Le Corbusier drawings, photographs, and models, as well as 106 small models of Corbu works made by Ando's students. More at wrightwood659.org.

Denise Scott Brown: Photographs, 1956–1966

New York

Through December 22, 2018

The exhibit presents the architect's photographs and shows her focus on the relationship between Pop Art and the urban environment. The photographs are exhibited alongside reproductions of research material and films that were first produced as part of her work on *Learning From Las Vegas*, a book she wrote with Steven Izenour and her late partner Robert Venturi. At Carriage Trade. For more, see carriagetrade.org.

Investigating Where We Live

Washington, D.C.

Through December 31, 2018

The annual exhibit is the product of a five-week program in which teenagers explore and document their interpretation of the city's residents and built environment through photographs, artwork, and writing. The young participants also design and install the exhibit. At the National Building Museum. More at nbm.org.

Contemporary Muslim Fashions

San Francisco

Through January 6, 2019

Designed by Hariri & Hariri Architecture, the exhibition explores the diversity of Muslim dress codes worldwide and examines how Muslim women have become arbiters of style within and beyond their communities. At the de Young Museum. Visit deyoung.famsf.org.

Serious Play: Design in Midcentury America

Milwaukee

Through January 6, 2019

The exhibition explores the projects of over 40 designers who advocated for playfulness and whimsy within their creations for corporations, domestic interiors, and children. It presents play as a serious form of inspiration, experimentation, and problem-solving, through furniture, toys, textiles, films, posters, and ceramics. At the Milwaukee Art Museum. Visit mam.org.

Treasures from the White City: Chicago World's Fair of 1893

Chicago

Through January 6, 2019

Held within a gallery that once hosted a reception for the World's Fair of 1893, this exhibit showcases original objects and memorabilia that were designed for and displayed at that international event. Highlighted objects include items from the respective pavilions of Tiffany & Company and Gorham Manufacturing Company, which were seen as groundbreaking in their use of silver production at the time of the fair. At the Richard H. Driehaus Museum. For more information, visit driehausmuseum.org.

Close to the Edge: The Birth of Hip-Hop Architecture

New York

Through January 12, 2019

The exhibit showcases the work of students, academics, and practitioners at the center of an architectural movement whose works embody the creative energy evident in other expressions of hip-hop. At the Center for Architecture. For more information, visit centerforarchitecture.org.



YOU CALL ME RAIN



HYDROTECH CALLS
ME OPPORTUNITY





ORDINARY ROOFS
WASTE ME



HYDROTECH ROOFS
LEVERAGE MY
POTENTIAL



dates&events

Charlotte Perriand

New York

Through January 15, 2019

Dedicated to this major 20th-century furniture and interior designer, the exhibition introduces visitors to 37 works that Perriand created over the course of an eight-decade career. At Venus Over Manhattan. For more information, visit venusovermanhattan.com.

Renzo Piano: The Art of Making Buildings

London

Through January 20, 2019

This exhibit examines the design process of the Pritzker Prize-winner and his firm, Renzo Piano Building Workshop, through 16 projects. Each building case study consists of drawings, models, photography, and full-scale maquettes, as well as a new film by Thomas Riedelsheimer. At the Royal Academy of Arts. For more, visit royalacademy.org.uk.

Maya Lin: A River Is a Drawing

New York

Through January 20, 2019

Demonstrating the acclaimed artist's passion for the environment, the exhibition presents site-specific installations that are mostly focused on bodies of water, particularly the Hudson River. Using materials such as pins, glass marbles, wire, bamboo, and silver, Lin explores how the river flows and shapes—and is shaped by—the land. At the Hudson River Museum. Visit hrm.org.

Chippendale's Director: The Designs and Legacy of a Furniture Maker

New York

Through January 20, 2019

The exhibition combines original preparatory drawings from Thomas Chippendale's London workshop with a selection of British and American furniture inspired by his designs and aesthetic. The artist's legacy is presented through pieces shown in paintings and by revivals from the 19th and 20th centuries. At the Metropolitan Museum of Art. For more, visit metmuseum.org.

Tutto Ponti: Gio Ponti, Archi-Designer

Paris

Through February 10, 2019

The first exhibit of its kind in France, the exposition showcases the prolific Italian designer's work across four decades, from 1921 to 1978. Over 500 products, including architectural designs, furniture, ceramics, lamps, and glass sculptures, are on display. At the Musée des Arts Décoratifs. Visit madparis.fr/en.

Edward Burne-Jones

London

Through February 24, 2019

The exhibition charts the rise of the Pre-Raphaelite artist's path from outside the British art world to leading figure of fin de siècle Europe. More than 150 works in different media, including painting, stained glass, and tapestry, are on display. Two rooms are dedicated to Burne-Jones's most famous narrative cycles, shown together for the first time. At Tate Britain. Visit tate.org.uk.

Elemental: Alejandro Aravena So Far

Humblebæk, Denmark

Through February 28, 2019

The second in a series devoted to a single architect or firm, this show offers a closer look at the working process of Pritzker Prize-winner Alejandro Aravena's firm Elemental Studio. At the Louisiana Museum of Modern Art. Information at louisiana.dk/en.

Ai Weiwei: Life Cycle

Los Angeles

Through March 3, 2019

Chinese artist Ai Weiwei's first major institutional solo show in this city features new and previously unseen sculptural work made in response to the global refugee crisis. The title installation, *Life Cycle*, using the traditional Chinese medium of kite-making, depicts the inflatable boats refugees use to cross the Mediterranean Sea. At the Marciano Art Foundation. Visit marcianoartfoundation.org.

Dior: From Paris to the World

Denver

Through March 3, 2019

This exhibit surveys 70 years of the House of Dior's legacy and its global influence. A selection of more than 200 couture dresses (along with accessories, costume jewelry, photographs, and drawings) traces the history of the haute couture fashion house, its founder, and the subsequent artistic directors who carried Dior's vision into the 21st century. At the Denver Art Museum. For more information, visit denverartmuseum.org.

Paul Rudolph: The Hong Kong Journey

New York

Through March 2, 2019

Through a series of drawings, sketches, and renderings not previously shown to the public, this exhibition at the Center for Architecture focuses on the American architect's three significant projects in Hong Kong. See paulrudolphheritagefoundation.org.

Lectures, Conferences, and Symposia

Robert Venturi in Rome: An American Grand Tour

New York

January 22, 2019

Martino Stierli will discuss Robert Venturi's two-year stay at the American Academy in Rome of 1954–56 and how this experience shaped his architectural thinking. Stierli will talk about Venturi's interest in (then) contemporary Italian architecture as shown in the architect's landmark 1966 book, *Complexity and Contradiction in Architecture*, published by the Museum of Modern Art, where Stierli is currently the Philip Johnson Chief Curator of Architecture and Design. At a private club; tickets through soanefoundation.com/news.

Daniel Libeskind: Edge of Order

Los Angeles

January 23, 2019

The internationally acclaimed architect, whose designs include the Jewish Museum in Berlin and the extension of the Denver Art Museum, will discuss how phenomena from Greek mythology and medieval manuscripts to Emily Dickinson and the Marx Brothers influence the way he thinks about buildings and cities. At the Getty Center. More information at getty.edu.

Stockholm Design Week

Stockholm

February 4–10, 2019

Architects, designers, buyers, and influencers will come together for a week of events centered on Scandinavian design at various venues across Sweden's capital. More information at stockholmdesignweek.com.

Kitchen & Bath Industry Show

Las Vegas

February 19–21, 2019

The kitchen-and-bath trade show will feature new designs from over 600 leading brands. It will also give attendees and exhibitors the opportunity to network, exchange ideas, and build their businesses. At the Las Vegas Convention Center. For more information, go to kbis.com.

Coverings 2019

Orlando

April 9–12, 2019

This tile and stone exposition will include more than 1,100 exhibitors from over 40 countries and feature the most current innovations

and trends. Education sessions with planned topics include installation demonstrations, project case studies, economic forecasts, industry trends, labor shortages and solutions, and cross-segment collaboration. At the Orange County Convention Center. More at registration.experiencevent.com/ShowTIL191.

Competitions

FORM Student Innovation Competition

Deadline: December 10, 2018

Architecture and interior-design students are asked to design, for residential and commercial spaces, items of furniture that showcase Formica products. Cash prizes will be awarded to the top three projects. More information at formica.com.

Re-Imagining the Garden City

Registration deadline: December 11, 2018

The competition seeks master-planning concepts for a proposed residential development of a site that is north of Letchworth Garden City in England. For more information, go to ribacompetitions.com/letchworthgardencity.

2019 Rudy Bruner Awards for Urban Excellence

Deadline: December 12, 2018

This awards program celebrates urban places that are distinguished by quality design, within the 48 contiguous United States. One Gold Medal of \$50,000 and four Silver Medals of \$10,000 are awarded biennially. More information at rudybruneraward.org.

Waste: Multipurpose Stadium

Registration deadline: December 16, 2018

This competition challenges entrants to design a new multipurpose stadium to be sited at the former Olusosun landfill in Nigeria. Designers are encouraged to consider how the stadium might serve as both a world-class sporting facility and a local commodity. More information at archoutloud.com.

Call for Proposals: 20th Anniversary of the International Gardens Festival

Deadline: December 20, 2018

Landscape architects, architects, and artists are invited to submit proposals for new, temporary gardens for the International Garden Festival, which will celebrate its 20th anniversary at the Reford Gardens in Québec. More at projects.internationalgardenfestival.ca.



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dates&events

Architecture at Zero

Deadline: January 10, 2019

The eighth annual competition for zero net energy building designs will be for a site on the California State University Monterey Bay campus. See more at architectureatzero.com.

2019 Wheelwright Prize

Deadline: January 27, 2019

This open international competition awards \$100,000 to a talented early-career architect to support travel-based research. Applicants must have received a degree from a professionally accredited architecture program in the past 15 years. They are asked to submit a portfolio, a research proposal, and a travel itinerary that takes them outside their country of residence. For more information, go to wheelwrightprize.org.

2019 Lumen Awards

Deadline: January 27, 2019

Hosted by the New York chapter of the Illuminating Engineering Society, the program celebrates excellence in lighting design and honors exemplary projects, lighting designers, their design teams, and project owners. New York-based designers are encouraged to submit projects located anywhere in the world, and designers based outside the city are invited to enter work located in New York. More information at iesnyc.org/Lumen_Awards.

2019 Ceramics of Italy Tile Competition

Deadline: February 1, 2019

This competition awards North American architects, designers, and students for outstanding work on projects that incorporate Italian ceramic and porcelain tile. The selected winners will receive an all-expenses-paid trip to Coverings 2019, in Orlando, along with cash prizes. For more information, see tilecompetition.com.

Urban Zoo Coworking Design Challenge

Registration deadline: February 8, 2019

This competition asks participants for designs to create an identity for interiors in a new chain of workspaces that are set to launch in Latvia's capital. Submitted proposals must be adaptable and applicable to multiple locations. More information at urbanzoochallenge.beebreeders.com

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



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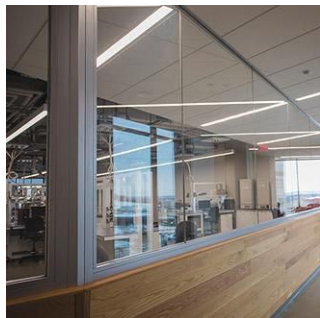
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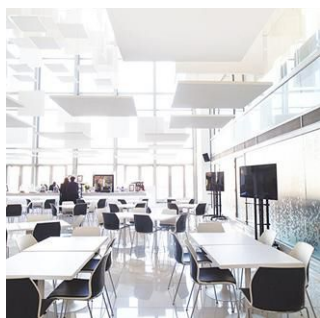
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PROJECT CLOUD VILLA
LOCATION KUNSHAN, CHINA
ARCHITECT KOS ARCHITECTS AND ATELIER ZEREBECKY

FOR YEARS, Kunshan, a small city bordering Shanghai, has been home to many wealthy Chinese. In the spring of 2014, one resident asked Lukasz Kos and Andrei Zerebecky, who had a partnership in Shanghai at the time, to design the interior of her almost new three-story villa, which, like the surrounding houses, was built in a highly ornamented pseudo-Rococo style. In an effort to move away from the historicist motif and toward a more modern concept, the architects reconfigured the floor plan to create a 30-foot-high vaulted central salon that joins the house's two wings. The Venetian-plastered vault is created with a double curvature; the most notable achievement, however, is the elliptical floating stair that rises beneath that form. "By opening up the floor and threading this stair through the three levels, we were able to bring in light and create a visual connection between the recreational upper level and the villa's main floor," says Zerebecky. Though the stair's structural steelwork was completed by the fall of 2014, the glass balustrade wasn't installed until last year, due to its complexity. Says Kos, "The biggest challenge was having faith in the contractor to build the stair as designed. This project became about the suspension of disbelief during the construction process." *Justin Chan*





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