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ARCHITECTURAL RECORD 125 years

VINTAGE COVER GALLERY
This month, view RECORD covers from the 1970s and early 1980s.

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Read the April 1908 article by Russell Sturgis on the Larkin Building in Buffalo, and see the original archival pages.

SURVEY: PICK THE WORST BUILDINGS
For our special anniversary issue in September, RECORD is convening an independent panel to select the best 125 buildings of the last 125 years. But for bad buildings, we turn to our readers. Complete our online survey by August 10 to share your picks of five of the worst buildings constructed since 1891. Visit architecturalrecord.com/worst-buildings.

THE CENTRAL COURT (ABOVE, LEFT) AND FOURTH-STORY GALLERY (ABOVE, RIGHT) OF FRANK LLOYD WRIGHT’S LARKIN BUILDING.

HIGHLIGHTS

ARCHITECTURE FOR HUMANITY LAWSUIT
Read our expanded story about the $3 million lawsuit against the nonprofit organization. [NEWS]

CONSTRUCTION FOOTAGE: TIPPE RISE
Watch time-lapse videos of the construction and installation of the massive concrete sculptures at Tippet Rise Art Center. [PROJECTS]

FEATURED HOUSES
Find photos, credits, and specifications for new residential projects in this monthly online-only feature. [HOUSES]

PODCAST
Listen to 99% Invisible’s recent episode “The Mind of an Architect” about the 1950s personality study to hear the voices of Eero Saarinen, Philip Johnson, and more. Then revisit our essay by Pierluigi Serraino and read excerpts from his new book, The Creative Architect: Inside the Great Midcentury Personality Study. [NEWS]

VINTAGE COVER GALLERY
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**The Way We Work**

Say good-bye to cubicles—and even your own desk—in the activity-based office of the future.

I AM WRITING this letter in a setting that is soon to be obsolete—a small private office assigned just to me, sitting at an L-shaped desk, with a few photographs, mementos, and the odd quotation pinned to the wall. I also confess to having quite a few magazines, folders, and books strewn about, which seems normal and cozy to me.

Yet according to Unispace, a workplace design firm in Sydney, the traditional desk could go the way of the typewriter in the next few years, as workers become increasingly transient—even when they are in their employer's offices. Of course, the open plan has been around at least as far back as Frank Lloyd Wright’s 1906 Larkin Building (page 32). But the recent trend away from working in a designated cubicle—to grabbing a seat at a bench or plopping into a lounge chair with a laptop—is accelerating: more full-time employees no longer have assigned desks at their companies, as rising real-estate costs and evolving work styles make the idea of an individualized work space both a luxury and an anachronism.

In an essay called “Musical Chairs” (page 54), writer Jerry Adler explores this trend and its impact on design—and on users. The space allotted for each worker has plunged from 200 square feet 15 years ago to 100 today and is on its way down to 60 square feet, according to one source. The good news: as personal work space has shrunk, the amount of shared space—conference rooms, huddle rooms, informal lounges, phone booths, cafés, fitness centers—has quickly expanded.

“Activity-based working” is guiding architects in the design of many of today’s offices. In the U.S. Workplace Survey 2016 published by Gensler, the most innovative workers were most likely to have the choice of where (and when) to work—and to have access to such amenities as cafés and outdoor space at the office. (Gensler, by the way, leads the Top 300 architecture firms in revenue, for the fifth year in a row. See page 16.)

While the office plans of many enterprises are still based on hierarchies—with C-suite executives or senior law partners cocooned in their own spaces—most of the workplaces featured in this month’s issue reflect the democracy of current trends. The new offices for Pinterest in San Francisco, for example, echo the sharing culture of the digital platform itself, with lots of casual lounge spaces and long tables for eating and meeting (page 68). A central stair, linking four floors in what was once a warehouse, departs from the trite stadium-style steps of many other contemporary offices and instead is a luminous sculptural element that also fosters serendipitous encounters. Transparency is a big buzzword in office design today, and the way glass is used for Pinterest’s meeting rooms means “there’s no FOMO (fear of missing out),” says Lisa Iwamoto, a founding partner of IwamotoScott, architects of the project.

The Edge, a new 15-story office building in Amsterdam, designed by the London-based firm PLP Architecture, exemplifies all the hallmarks of the workplace of the future (page 74). It is radically energy-efficient (a sustainable office can be a powerful recruiting tool to lure young talent), with state-of-the-art digital technology throughout. Work spaces overlook a vast skylit atrium—flooded with natural light even on gray days—that is packed with informal areas to gather, eat and drink. There are no assigned desks for the staff of the main tenant, Deloitte: the international accounting firm estimates that only 25 percent of its employees are at a desk at any one time. With its highly flexible design, the offices don’t define the work culture. “While the physical building is finished,” points out Ron Bakker of PLP, “socially, it is still developing.”

But despite the longer hours that most people now work—and all the amenities and diversions that tie them to today’s office—everyone should take a vacation. It’s August, and if by chance you’re headed to Montana, do stop at Tippet Rise Art Center, a private sculpture park and music venue in the midst of a ruggedly beautiful ranch. Massive poured-concrete formations called “Structures of Landscape,” designed by the architecture studio Ensamble (2004 RECORD Vanguard winners), were fabricated on-site, in the earth, and then craned into place (page 42). In a world where the only constant is change, these amazing creations look as timeless as Stonehenge.
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Managing the Elements of Fire Through Thoughtful Wall Assembly in Multistory Buildings
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Image courtesy of Owens Corning
I have very little in common with the arguments of the Leave Campaign . . . However, I welcome Brexit as offering an enhanced ability and chance to experiment with new policies that dare more economic freedom.—Patrik Schumacher, director of Zaha Hadid Architects in London, in a July 8 op-ed on Archinect.

New Federal Rules Will Redefine Overtime Pay for Architects

BY RONDA KAYSEN

LOOMING CHANGES to federal overtime rules could have a lasting impact on the architectural industry, particularly among firms that expect junior employees to work long hours for low salaries.

Beginning December 1, salaried workers who earn up to $47,476 a year must be paid time-and-a-half if they work more than 40 hours during the week. The previous cutoff was $23,660 a year. The new rule applies to companies of all sizes, affecting most employees, including those working in creative fields like architecture.

The changes could rattle industries that have long used a federal exemption for so-called “creative professionals” to avoid paying some workers overtime. The Labor Department currently gives businesses wide latitude in deciding who meets the criteria. But under the new rules, no one making less than $47,476 a year could be considered a creative professional exempt from overtime.

Critics worry that the changes could unfairly burden businesses, particularly smaller ones with less financial flexibility. But supporters insist that overhauling outdated labor rules will improve working conditions and ultimately encourage firms to think more carefully about how they run their businesses.

“Architecture is but one of many industries that for decades has gotten a free ride because of the weakness of the regulations,” says Judy Conti, the federal advocacy coordinator at the National Employment Law Project. “This new regulation is going to set a salary guideline that is much more in line with a professional salary.”

In 2015, the median annual salary for a first-year intern architect was $42,000, and $46,000 for a second-year intern, according to a survey by the American Institute of Architects. To comply with the law, employers will have to give employees raises, start paying overtime, or scale back hours. “People are going to get either more money or more hours of their lives back,” says Conti. “Both of those are good things.”

In 2013, Alexandre Hamlyn earned $2,000 a month working 50 hours a week at a large architecture firm in New York. Teams working on competitions put in 90-hour weeks, without additional pay, he said. “Because you don’t get overtime, then the time is not really valued,” says Hamlyn, 27. “So they just make you work and work and work.” Hamlyn, who is now an intern architect in Montreal and paid hourly, requested that the name of the firm be withheld, since he considers the problem endemic to the industry.

Firms may soon have to pay more attention to how their businesses operate, scrutinizing how much they charge clients and how late employees stay at the office. “If you don’t have
On March 14, 2014, President Barack Obama signed a memorandum calling on the secretary of labor to update overtime pay laws. The new rules go into effect December 1.

Sharing their thoughts on the potential impact of the new rule, Matthew Tinder, a spokesperson for AIA, said in an e-mail. The AIA declined to comment any further.

Critics of the changes argue that architecture salaries are often lower than other skilled professions because of the nature of the business. “Our clients don’t want to pay the higher fees,” says Craig Williams, the chief legal officer of HKS Architects, describing the new rules as a government intrusion on the private sector. Some firms will have to raise client fees, potentially making it difficult to compete against firms that can absorb higher labor costs. “There is always someone down the street who’s willing to take a project on for a lower fee,” Williams said.

But clients might be willing to pay more, particularly in a heady real-estate market where architecture is in demand. By giving employees a raise, firms might end up getting one too. Rena Klein, the principal of RM Klein Consulting, which works with small architecture firms, says: “Along with people being underpaid, people are undervaluing themselves in the marketplace.”

On March 14, 2014, President Barack Obama signed a memorandum calling on the secretary of labor to update overtime pay laws. The new rules go into effect December 1.
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Top 300 Firms: Gensler Leads Revenue for Fifth Year Running

BY JAKE BITTLE

Gensler held first place for the fifth consecutive year in Record’s annual Top 300 Architecture Firms list. The list ranks companies based on their earnings in the previous year. Gensler, which surpassed $1 billion in revenue in 2014, increased revenue by more than $100 million in 2015. In response to the news, Gensler’s co-CEOs Andy Cohen and Diane Hoskins expressed a commitment to maintaining a seamless practice across the firm’s 46 international offices, and attributed the company’s success to its “talented global network of employees—Gensler’s constellation of stars.”

Los Angeles–based AECOM Technologies, taking the No. 2 spot on the list for the second year in a row, saw its revenue increase by more than 30 percent, jumping from $605 million in 2014 to $801 million in 2015. Executive Vice President Rebecca Nolan explained that this jump is largely due to AECOM’s recent $6 billion acquisition of the engineering and design firm URS Corporation, a move that made AECOM the largest publicly traded company in the Los Angeles area. Nolan also highlighted the Golden 1 Center stadium in Sacramento as a standout project from the past year.

Meanwhile, Perkins+Will ranked third, climbing the chart from fourth last year and fifth the year before that. CEO Phil Harrison cited the company’s strategic focus on retail and transit projects as well as the launch of an internal research program as key factors in this consistent revenue increase.

See the chart below for a list of the top 25 firms, their annual revenue in 2015 in millions, and some of their notable recent projects. The entire Top 300 list can be viewed at architecturalrecord.com.

### TOP 25 U.S. ARCHITECTURE FIRMS OF 2016

<table>
<thead>
<tr>
<th>RANK</th>
<th>2016</th>
<th>FIRM, U.S. HEADQUARTERS</th>
<th>TYPE OF FIRM</th>
<th>TOTAL ARCHITECTURAL REVENUE</th>
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<td>AECOM, Los Angeles</td>
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<td>Perkins+Will, Chicago</td>
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<td>Hammel, Green and Abrahamson, Minneapolis</td>
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</tbody>
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Key to firm types:
- **A**: Architect
- **AE**: Architect Engineer
- **AP**: Architect Planner
- **EAL**: Engineer Architect Landscape
- **AEC**: Architect Engineer Contractor

See the entire Top 300 Architecture Firms list at architecturalrecord.com/news.
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CIRCLE 203
Tod Williams Billie Tsien Architects to design Obama Library

BY ANNA FIXSEN

BARACK OBAMA’S presidency may be drawing to a close, but work on his presidential library in Chicago is just beginning: on June 30, the Barack Obama Foundation announced that New York firm Tod Williams Billie Tsien Architects|Partners (TWBTA), joined by Chicago firm Interactive Design Architects (IDEA), will design the Obama Presidential Center and Library.

“It is a joy, an honor, and a responsibility to create a place that reflects the optimism and integrity of the President and the First Lady,” firm partners Tod Williams and Billie Tsien said in a joint statement.

But what and where the library will be, exactly, remain a mystery. The Foundation is still deliberating between two historic parks on Chicago’s South Side designed by Frederick Law Olmsted and Calvert Vaux: Jackson Park—the site of the 1893 World’s Columbian Exposition—and Washington Park.

The building design itself is also unknown. Foundation chairman Martin Nesbitt said that the competition process was “an exploration of chemistry between the architects and President and First Lady.” Added competition advisor, architecture critic Paul Goldberger, “It’s really a blank slate.” According to Nesbitt, the Foundation hopes to complete the library by 2021.

Last August, the Foundation received 144 responses to its initial RFQ. Seven finalists were announced in December, including Renzo Piano Building Workshop, David Adjaye Associates, Snohetta, Diller Scopidio + Renfro, SHoP, and John Ronan Architects.

“I think [Tod Williams and Billie Tsien] are among the greatest architects of our time and among the most thoughtful,” Goldberger said.

The Library won’t be TWBTA’s first project on the South Side. In 2012 they completed the well-received Reva and David Logan Center for the Arts at the University of Chicago, where they are pictured (right).

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Architecture for Humanity Sued for $3 million

BY JENNA M. MCKNIGHT

In 2015, Architecture for Humanity (AFH), a U.S.-based nonprofit organization with more than 60 chapters worldwide, abruptly closed and declared bankruptcy, leaving many to wonder what exactly went wrong. AFH’s founders and board members are being sued for alleged mismanagement of funds. RECORD first reported the story July 11.

On June 10, a court-appointed trustee filed a complaint against the group’s founders, Cameron Sinclair and Kate Stohr, who were paid employees, and 10 members of the board of directors, who served as volunteers.

The lawsuit, filed in the San Francisco division of the U.S. Bankruptcy Court, alleges that the defendants acted with gross negligence and breached their fiduciary duties between July 21, 2012, and December 31, 2014. Specifically, the suit accuses the AFH founders and board members of improperly using “restricted funds”—charitable contributions with specific requirements—and violating agreements with donors.

The trustee, Janina M. Hoskins, is seeking $3 million in damages, the approximate portion of the restricted funds believed to have been improperly spent. The money would be distributed to 170 creditors, including companies like Amazon and Nike, universities such as Purdue and Carnegie Mellon, as well as various governmental agencies.

Defendants are expected to answer a summons by August 15. A status conference is scheduled for August 26, at a San Francisco courthouse.

The lawsuit is a dark spot on the history of AFH, an influential nonprofit founded in 1999 by Sinclair, a U.K.-born architectural designer, and Stohr, an American journalist. During its 15 years in operation, AFH evolved into a leading charitable organization that helped design and build projects in distressed communities worldwide. In its later years, the group became known for its work in regions devastated by natural disasters, including Haiti and Japan. Both Sinclair and Stohr left the organization in 2013, during the period when the alleged mismanagement of funds was taking place.

Starting in 2009, AFH experienced a sharp increase in its revenues, according to the lawsuit. Its gross revenue—reportedly generated from public and private donations—climbed from $1.7 million in 2009 to $12 million in 2013. Most of the gifts AFH received were restricted funds, the lawsuit claims. For instance, in January 2013, AFH received a $1 million grant from Nike USA to put toward rebuilding efforts after Hurricane Sandy on the East Coast. Only 15 percent of the grant was allowed to be used for overhead; the rest was to be applied directly to the project, according to public records.

Meanwhile, AFH’s overhead and administrative expenses were growing, due to “payment for fundraising services, executive compensation, the purchase of a building, and staff expenses,” the complaint states. These expenses typically needed to be paid with unrestricted funds, but by July 2012, the organization was running a deficit. By the end of the 2013 fiscal year, that shortfall in unrestricted funds had grown to $1.1 million, according to a 2014 auditor’s report.

According to the lawsuit, the organization “began a wholesale looting of the ‘restricted’ funds” to cover overhead costs. Moreover, the lawsuit alleges, AFH continued to solicit donations and misappropriate funds, despite cautionary reports from its auditor and lawyer.

AFH’s board tried to remedy the problem by reducing payroll and selling its headquarters building in San Francisco in 2014. In January 2015, however, the board announced it had voted to close AFH and laid off approximately 30 employees.

There are laws that protect paid and volunteer directors from being personally liable for an organization’s debt if decisions were made in “good faith,” among other requirements. But the AFH lawsuit alleges that the defendants “acted with such a degree of carelessness . . . as to constitute gross negligence.”

“We were saddened by the news,” Sinclair told RECORD in an e-mail. “We are working with our attorneys to understand the decisions that were made during and after our transition. We hope the case will be dismissed and are glad the chapters are continuing the good work.”

While AFH’s legal issues remain unresolved, its mission endures. In the wake of AFH’s closure, dozens of local chapters banded together to form the Open Architecture Collaborative (OAC). The new organization’s executive director, Garrett Jacobs, who worked for AFH, hopes OAC can build on AFH’s work, but “with a much more grassroots, locally based focus.” Jacobs was astonished at how quickly AFH was dismantled. “I had an inside view, so I felt it coming,” he said in an e-mail. “But I was shocked at the way it unfolded.”

After a strong uptick in May, the American Institute of Architects’ monthly Architectural Billings Index (ABI) remains in positive territory for the fifth month. The June ABI scored 52.6 (any score above 50 indicates an increase in billings) while the new projects inquiry index was 58.6. AIA economist Kermit Baker says high residential demand “suggests strong future growth for housing in the coming year.”
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Jimenez designed the 3,000-square-foot, wood-framed, two-unit house for a longtime friend on the lot next to his architecture studio. The building’s slate-colored brick facade rises above a trellis-like curtain of aluminum infill panels that form the door for Jimenez’s sophisticated take on a carport. (“Garages create bad habits,” he says. “You start accumulating too many things when they’re out of sight.”) Breezes pass through the south-facing metal scrim, which, when retracted, reveals a wide connection from the street to gardens that wrap around the side and back of the house. A gate of the same panels encloses the passage to the front door, providing an added measure of security while preserving a sense of openness.

The linear two-story house’s lower and upper units (occupied part time by the client and his son, respectively) share a staircase and front door but can function independently. On the ground floor, two bedrooms each have their own bath. “The downstairs is almost like a small hotel,” says Jimenez, whose firm recently completed the Hotel Saint George in Marfa, Texas. The entry hall leads to a small kitchen and common room which, in turn, opens through large sliding glass doors to the landscaped courtyard. Upstairs, an elongated loftlike space spans the full length of the house, roughly defined by open-plan kitchen, living, and dining areas and a sizable bedroom, separated from the other spaces by a master bath and closet. Clean lines and refined material choices throughout—terrazzo flooring, Portuguese travertine countertops—unify the minimalist interiors.

Through strategic window placement, Jimenez curated the views to engage with the outdoors while maintaining privacy. “It’s a void of landscape and color,” he says, noting how a low, wide window on the western wall of the upstairs kitchen looks out on an elm tree and the cornflower blue cinder-block wall of his studio next door. According to Jimenez, “Windows are opportunities to make you forget the architecture.”

"These old bungalows had an insightful way of carving out a community in a sprawling city like Houston," says architect Carlos Jimenez, looking down Willard Street in the eccentric inner-loop neighborhood Montrose, where new site-maximizing townhouses threaten to outnumber the original single-family cottages. “Their porches create a collective, a way of understanding a city street. We have to reinterpret that in contemporary ways.” On the block where he works and lives, the architect has created a “small urban community of three,” comprised of his own home, his architecture studio with an attached apartment, and, most recently, a new residential project.

Tungsten in the bricks lends a lavender-gray hue (top, both). A sculpture by Houston-based artist Gail Peter Borden adorns a ground-floor hallway (above, left), while upstairs one of her paintings hangs in the dining area (above) near a custom wood dining table by Joey Benton of Marfa, Texas.
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Casa Verde

Isay Weinfeld imparts a refined informality to a Barcelona restaurant.

BY TOM HENNIGAN

WHEN SPANISH restaurateur and hotelier Tomás Tarruella decided to open Barcelona’s first upmarket vegetarian eatery, he once again turned to Brazilian architect Isay Weinfeld to design the interior.

It was a reunion for the team responsible for the Juana la Loca restaurant in the Colombian capital of Bogotá, quickly hailed as the city’s most beautiful dining space when it opened in 2014. For Green Spot, located in a previously abandoned building in the Barceloneta neighborhood, the client wanted an informal and intimate space that, says Weinfeld, “did not just appeal to the vegetarian public.”

Working with Lucas Dualde Jimeno, a Spanish architect in his São Paulo office, Weinfeld turned what he describes as “a large, difficult space filled with columns” into a series of cozy niches by carving a vaulted ceiling out of the low, arched room. The design team used materials found in Barcelona architecture. “I never enter a place without knowing where I am,” says Weinfeld, emphasizing his respect for local characteristics.

A long, oak-lined entrance hall passes by a copper-topped bar at table height. Here, seated guests are served by bar staff standing on a sunken floor. The path then leads into the dining area, where traditional Catalan glazed earthen floor tiles and European walnut set a relaxed and comfortable tone. Rough linen, used for the upholstered seating, enhances the room’s acoustics; and an eclectic variety of chairs, tables, and light fixtures lend the sense of bonhomie requested by the client.

The architects penetrated the walls at strategic points to create glazed openings on to a garden located in the building’s interior courtyard, its lush green perfectly offset by the interior’s earth tones. According to Weinfeld, “I do not like to undertake projects that do not involve comfort. I cannot do something that is only beautiful but does not call out to people, that does not leave them with the desire to come and frequent a place.”

The architect, recently selected by the owners of the Four Seasons restaurant in New York to design its new location (Record, July 2016, page 48), aims to craft a similarly inviting, albeit more luxurious, aura for that iconic establishment when it reopens late next year. He hopes, he says, “to achieve the same refinement and understated elegance that dazzled people for so many decades.”

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CIRCLE 19
Unfinished Business
MAIO Studio’s flexible designs let spaces define themselves.

BY MIRIAM SITZ

According to the four designers behind Barcelona-based MAIO Studio, a completed project isn’t necessarily done: “There’s always something unfinished that demands someone else take over,” says Anna Puigjaner, one of the founders. “It’s about designing up until a certain moment to engage the user.”

Puigjaner and her colleagues Maria Charneco, Alfredo Lérida, and Guillermo López established the firm in 2005 and have since relocated to a linear, one-story building in Barcelona’s Gracia district. (MAIO renovated the building—formerly a laundry and later a metalworking shop—to create a multidisciplinary coworking space.) From a 40-foot-long worktable, the team designs buildings, public spaces, exhibitions, interiors, and furniture.

This past May, Harvard’s Graduate School of Design awarded Puigjaner the 2016 Wheelwright Prize, a $100,000 travel fellowship. Her winning proposal, Kitchenless City: Architectural Systems for Social Welfare, investigates different approaches to distributing domestic spaces like kitchens, dining rooms, and lounges in multifamily residential buildings.

Puigjaner’s proposal reflects the firm’s interest in flexible spaces, which they explore in their largest and most recent project, a five-story residential building in Barcelona, slated to finish construction this month. “The market, the concept of family, the need for housing in Barcelona—they’re all changing so fast,” says Puigjaner. “The client wanted a design he could adapt over time, depending on demand.”

MAIO delivered a scheme for a 30,000-square-foot building. Currently divided into 22 units, the flexible 110-room building could be reconfigured into as few as seven or as many as 40 dwellings.

“What defines a space is what you put inside it,” says Charneco, neatly summing up one of the firm’s guiding principles while explaining how the apartments are designed to allow the user to determine the program. “If you put a bed in one of the rooms, it’s a bedroom.”

The studio has taken this conceptual position in many past projects and exhibitions. In 2014, MAIO and Brooklyn-based Fake Industries Architectural Agonism collaborated on Rooms: No Vacancy, a finalist in the MoMA PS1 Young Architects Program, which proposed a series of small spaces.

“Parties are about corners, corridors, rooms—spaces that allow you to hide yourself, meet certain people and not others, open and close doors,” says Puigjaner. “We wanted to transform the PS1 space into small individual parties.” Similarly, for the exhibition Species of Spaces at Museu d’Art Contemporani de Barcelona (MACBA), which ran from July 2015 through this April, MAIO created a display system for a circular gallery organized by a grid of small, square rooms painted in a range of pinks. “We defined a set of equal rooms that changed atmosphere depending on the works of art inside,” says Puigjaner.

Bar Nou, an interiors project the firm completed in January 2015, also illustrates MAIO’s interest in repetitive structures. Here the team created a replicable and recognizable visual brand for the Catalan restaurant. “When we design spatial systems, we always make rules that can be repeated in other contexts,” says Puigjaner. “In the case of Bar Nou, the client’s aim was to open other venues around the city.” Through the addition of a vaulted wood ceiling and custom lighting fixtures, tables, and chairs, the architects created a striking and distinct interior.

This summer, the studio is taking part in concurrent exhibitions on different continents. For Sharing Models: Manhattanisms, which opened in mid-July at Storefront for Art and Architecture in New York, MAIO examines how the sharing economy will affect the Uptown Manhattan neighborhood of Washington Heights in the future. And just two weeks later, at the end of July, they reunited with Fake Industries for Occupied at Royal Melbourne Institute of Technology University’s Design Hub in Australia, bringing to life a room from their 2014 proposal for MoMA PS1. The multitalented firm was also selected to design the party for the show’s opening. Says Puigjaner, “Now we’re architects and party planners!”
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The answer to the July issue’s Guess the Architect is KARL FRIEDRICH SCHINKEL, who designed the first public museum on what is now Berlin’s Museum Island. His Altes (Old) Museum, which opened in 1830, houses a collection of antiquities befitting the exemplary neoclassical architecture.

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Quasicrystals by Alberto Adolfo Fernández González and Carlos Benjamin Fernández González, architects Santiago, Chile
It’s All in the Details


Reviewed by Josephine Minutillo

As a practicing structural engineer, Guy Nordenson has been involved in the design of some of the most notable buildings of recent decades, including Steven Holl’s carved-block Simmons Hall Residence at MIT (2002), Richard Meier’s curve-walled Jubilee Church in Rome (2003), and SANAA’s precariously stacked New Museum in New York (2007). He writes about those projects alongside bigger, smaller, and lesser-known ones in Reading Structures: 39 Projects and Built Works.

The tome is not merely a textbook on how these buildings are put together—even if it does include plenty of information about that. It also incorporates in-depth discussions about slip-formed concrete, friction pendulums, torsional buckling, tensegrity structures, and similar topics of interest to engineers. In one example, for Yoshio Taniguchi’s MoMA expansion in New York (2004), Nordenson explains how, upon a museum trustee’s expressing concern, the design team was able to eliminate the only two columns in the addition’s largest space, the 21-foot-tall contemporary-art gallery, by hanging the floors above it from a belt truss. In another, he discusses the evolution of the “grillage” system of steel girders and beams for the roof—intended to be as thin as possible—of the Toledo Museum of Art Glass Pavilion (2006), also by SANAA.

Smaller projects are a chance to test age-old techniques on new materials. For a series of staircases, first in a private loft in New York and later in Ferragamo shops in Bologna and Venice, Italy, Nordenson adapted the principles behind the “cantilever” stair to glass, metal, and wood. It was originally developed during the Italian Renaissance, for stone.

Some of the more fascinating details, however, make up the backstories to these works, not least of which is a series of projects at the World Trade Center following the September 11 tragedy. In other cases, intriguing elements stem from the personal stories. Nordenson’s first encounter with Meier, for instance, had to do with the 1989 competition to design the French National Library. Meier had wanted to work with famed engineer Peter Rice of Ove Arup & Partners, who, it turned out, was already teamed up with another architect competing for the library. Meier, Nordenson writes, “was not at first pleased to be handed off to what he saw as the New York ‘branch office’ of Arup.” (In 1987, Nordenson helped establish the New York office, before founding his own firm, Guy Nordenson and Associates, in 1997.) Eventually, Meier came around and went on to work with Nordenson again on the Jubilee Church.

Nordenson calls his relationship with the much-admired Rice “pleasurable, if distant.” The pair worked side by side only briefly but never completed a project together. Yet, in many ways, Nordenson’s style, or more appropriately his lack of one, is similar to that of Rice, who emphasized collaboration and, like Nordenson, formed a “crafts-based practice.”

Nordenson’s recounting of these 39 projects, selected from nearly 200 since the start of his career in 1979, is, in fact, a story of collaboration. None is more notable than that with Holl, which dates back to the early 1980s. Holl’s buildings—which, aside from Simmons Hall, include the 2 million-square-foot Linked Hybrid complex in Beijing (2009) and several museums in the U.S., Europe, and China—compose a fifth of the book.

Divided into three sections—Engineering Ephemera, Simply Supported, and Building History—the book delves into details without being dry or difficult to understand for the reader who doesn’t happen to be an engineer, or an architect, for that matter. Even for the lay person, Reading Structures offers incredible insight—from inspiration to design to politics—into how buildings, pavilions, parking garages, bridges, and follies get built, or don’t. And, maybe more important, how they stand up.
Soap Opera

Frank Lloyd Wright’s Larkin Building in Buffalo was a singular achievement in architectural history, if underappreciated.

BY JACK QUINAN

ARCHITECTURE was an all-encompassing endeavor for Frank Lloyd Wright, and the creation of his persona an ongoing project synonymous with his work. His penchant for self-promotion was clear in his long relationship with certain publications: Wright’s first recognition by RECORD occurred in April 1904 (page 361), which singled out architects in the West, including Louis Sullivan and the “very able” Wright for their “departure from traditional European forms.” No wonder the subsequent publication in RECORD of Russell Sturgis’s negative review of the architect’s Larkin Building (his first commercial structure) in April 1908 was a shattering moment in his developing career—but more about that later.

Following his departure from Adler & Sullivan in 1893, Wright had turned to domestic architecture with considerable success. Commissions, mostly in the greater Chicago area, inundated his office. When Ladies Home Journal published his scheme for “A Home in a Prairie Town” in 1901, he won more national attention. Soon word of Wright reached the Larkin Company in Buffalo through William Heath, who had joined the company in 1899. The businessman had learned of the modern pioneer through his brother-in-law, a contractor, then building Wright’s J. J. Walser house in Chicago in 1903. Because of Heath and Darwin Martin, prospective clients and Larkin executives, Wright was able to convince the mail-order soap company to let him design its new headquarters. The Larkin office commission offered powerful incentives to the architect: large in scale and lucrative, it promised exposure to untapped eastern U.S. markets.

Completed in November 1906, the Larkin radically departed from the conventions of office buildings at that time. Wright’s essay for The Larkin Idea, a publication for its customers (circulation 600,000), explained the innovations in the steel-framed structure, which was clad in red brick with red sandstone trim. Wright arranged the office areas in and around a five-story light court surrounded by balconies, where secretaries and typists answered mail, and placed the executives on the main floor of the atrium in full view of the 1,500 workers. Wright met the company’s principal concerns about fire safety and worker satisfaction by designing custom metal office furniture and trimming interior surfaces with magnesite (for sound reduction) throughout, as well as installing one of the first air-conditioning systems in a business building in the country, to seal out the pollution from its industrial surroundings. He also provided dining facilities atop the light court. In a bi-nuclear plan, the architect separated business functions in the main block from the various social spaces in the annex, where a branch library, a classroom, locker and restrooms, and a lounge were located.

But what really distinguished the building was the architect’s articulation of its major functional elements—the main building and the annex, the six corner stair towers, the intake and ventilation stacks, and the piers containing air-circulation ducts—meticulously proportioned, unadorned masses that expressed the power of a major American company. For Wright, the Larkin Building was an opportunity to contradict the horizontal open quality that characterized his prairie houses and to demonstrate that he was capable of just about any architectural challenge.

Critical response was meager, however. Charles Illsley gave the building a lukewarm reception in the Inland Architect in 1907, and the Architectural Review (Boston) cited portions of Illsley’s article, though adding, “This sort of thing is absolutely in the line of creative architecture.” Perhaps this is why the review by Sturgis was so devastating. Wright’s expectations had been high: after RECORD’s early mention of him in 1904, the magazine came out with an appraisal in “Work of Frank Lloyd Wright—Its Influence” in July 1905, which pointed to the “more truthful relationship between structure and design, and the frank expression of the quality of material.” This piece set the stage for the magazine’s unprecedented 66-page presentation titled “In the Cause of Architecture,” in March 1908, where Wright himself presented the principles guiding his architecture (“more truly simple; more expressive,” as well as “more plastic; more fluent, although more coherent; more organic”). His essay was accompanied by 87 illustrations of his work, including the Larkin Building.

Wright had little time to enjoy that crowning moment before Sturgis’s critical blast, “The Larkin Building in Buffalo,” appeared in the magazine the following month. Sturgis, who worked only from
The Larkin Building in Buffalo

This textbook building, the magnificent wonder of the modern world, stands tall in Buffalo, New York, a city that was once a center of industry and commerce. The Larkin Building is a masterpiece of architectural design, featuring a combination of industrial and Colonial Revival styles. The building is named after its founder, Charles L. Larkin, who was a successful businessman and philanthropist.

The building is rectangular in shape, with a height of 15 stories and a length of 300 feet. It is built of granite and sandstone, with a combination of glass and steel for the windows. The exterior is decorated with ornate details, including sculptural elements and decorative trim.

The interior of the building is equally impressive, with a spacious main lobby and several stories of office space. The lobby is decorated with marble floors and a grand staircase, while the offices are arranged in a grid-like pattern. The building is also known for its innovative heating system, which was installed in 1896 and consisted of steam pipes that ran through the walls and ceiling.

The Larkin Building is a testament to the ingenuity and creativity of its time, and it remains a symbol of Buffalo's rich history and architectural legacy.
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photographs due to declining health, began with a lengthy, error-filled description that concluded with, “Few persons . . . will fail to pronounce this monument . . . an extremely ugly building. It is, in fact, a monster of awkwardness.” Sturgis then equivocated with an acknowledgement that “the fine arts have nothing to do with the hustle and bustle of daily bread-winning operations.” In conclusion, he suggested how the building might be improved with greater attention to light, shade, moldings, a Ruskinian color palette, and picturesque massing—all formalist-historicist principles antithetical to Wright’s vision.

In a letter to RECORD’s editors, Wright took apart Sturgis’s essay point by point and castigated him for working from photographs, some of which he deemed “murderous, wide-angled slanders.” Wright’s defense of the building’s formal abstraction was combined with an underlying anger that led to an ad hominem attack: “To see an eminent architectural critic picking over, bit by bit, his architectural rag-bag for architectural finery wherewith to clothe the nakedness of the young giant whose very muscularity offends as it confronts him is pathetic.” He further ridiculed Sturgis as “the man who, startled, clutches his lifeless traditions closer to his would-be-conservative breast and shrieks, ‘It is ugly!’ ”

RECORD declined to publish Wright’s reply out of deference to Sturgis, who died in February 1909, but the Larkin Company did come out with its own thin volume in 1909 that included Wright’s essay, “In the Cause of Architecture,” along with the Sturgis review and obituary. Sturgis’s critique was an unfortunate setback for Wright, but the Larkin Building was again depicted in the 1910 Wasmuth Portfolio in Berlin with five lithographic Larkin plates: they excited the enthusiasm of H.P. Berlage, Mies van der Rohe, Erich Mendelsohn, and many other European architects. Indeed Wright never abandoned his belief in the Larkin Building: he rightly said upon hearing of its demolition in 1950—by the city of Buffalo, which then owned the building, in what had become an increasingly run-down part of town—that “it had taken its place in the thought of the world.”

A NEW SCHOOL in the sprawling Nairobi slum of Kibera stands in striking contrast to the informal settlement that surrounds it: the building’s white polycarbonate roof and colorful steel-pipe structure suggest a jungle gym more than an educational facility, and give it a profile that’s easy to spot among thousands of weathered metal roofs. Designed by Madrid-based SelgasCano and Boston-based helloeverything, the fanciful building replaces a dilapidated school that formerly occupied the site.

José Selgas and Lucía Cano were introduced to Kibera when they visited Kenya for a different project, a vaccination clinic in the Turkana region they designed in collaboration with their students at MIT (RECORD, June 2015, page 94). So when the Louisiana Museum in Denmark approached the architects and
their former students (who had since founded helloeverything) in late 2014 and asked them to recreate the Turkana clinic as a pavilion for their campus, the architects decided to use the commission as an opportunity to model a new project instead. This would not just be a folly but a structure that could be disassembled and transported elsewhere, to be put to use after the exhibition was over. For the project, the team used the same scaffolding components they had employed in Turkana—materials similar to those used in domestic constructions across Africa—to create their pavilion and future primary school in Kibera. The firms coordinated the replacement with Nairobi-based architect Abdul Fatah Adam and the Kibera Hamlets community organization.

In order to fit the required amount of classroom space onto the tiny site, the architects followed the two-level construction of the previous school, but, instead of having a shaky ladder connecting the levels, they built a broad staircase. A double-sized classroom and a balcony on the second floor create a range of different learning environments, while a covered courtyard below can host activities involving greater numbers. Crowned by translucent corrugated polycarbonate sheets—whose haphazard-looking arrangement mimics that of neighboring metal roofs—the facility is
BEACON OF HOPE Students and community members enter the covered courtyard off the settlement’s network of labyrinthine pathways (top). The pink pipe structure reflects Kibera’s improvised building materials (above).

drenched in light, while also spared significant heat gain. Two of helloeverything’s principals supervised construction, while all workers and craftsmen came from the neighborhood around the site.

Helloeverything partner Austin Smith says the team wanted to tap into the expressive and even playful potential of commonly used scaffolding materials, but the components also provided a functional advantage. Rebuilding the school proved harder than anticipated—the site was off-level, for example, but the versatility of the materials allowed for easy on-the-fly adjustments.

“We weren’t trying to express anything particular with the form—we just wanted to improve on the school that was there however we could,” said Selgas. “There was no budget for the materials, which, in the end, led to a building that looks very different, almost iconic, something people in the neighborhood can recognize.”

Not only did the pipe-and-polycarbonate-panel kit of parts rise to the challenge during the construction process, it also proved reliable during transportation: the simple pieces were easy to dismantle and pack up. The only hiccups in the shipping process, says Smith, were on the legal side: the container was held by the Kenyan port authority for weeks because no one could figure out how to classify it; it’s not every day you ship a building across continents, the architects noted.
A balcony provides views of Kibera and a place for students to gather in informal groups (above), while boxlike spaces on the lower level are oriented toward traditional classroom learning (left).
Thousands of miles from the densely packed streets of Kibera, in rural Costa Rica, a local mayor asked architect Álvaro Rojas to build a community center for the rural town of El Rodeo, 10 miles west of San José and with a population of around 600. Rojas quickly understood that the commission was a tall order, despite the small size of the proposed project, about 8,000 square feet. For one thing, community centers in Costa Rica serve a wide variety of functions, as classrooms, recreational spaces, and forums for political and civic gatherings. This facility would also be adjacent to a soccer field and have to provide changing rooms and a kitchen to serve players and spectators. Furthermore, Rojas and his team would have to pull all this off with a budget of just $185,000—“less than a third of the budget typically required,” says the architect. “So the financial reality of the project was a major point of decision in how to approach the design.”

In response, Rojas and his wife and partner, architect Sylvia Fournier, have designed a facility that not only maximizes efficiency and provides a flexible, functional space, but also one that gives the people of El Rodeo a unique and compelling place to gather. The circular form of the main building underscores its role as a unifying, democratic place for meetings and social events, and the layered roof structure yields a soaring interior while making a bold pronouncement in the landscape.

The multipaneled roof, which is structurally independent of the volume, flies above the building on steel trusses and beams supported on slender concrete columns, lightening the load on the drum to help make it seismically sound. Corrugated fiber-cement roof panels mimic the steel roofs of many Costa Rican buildings. They also provide thermo-acoustic insulation, preventing the interior from overheating and muting the sound of the region’s heavy rains. In order to reduce the amount of concrete needed for the drum, while also facilitating cross ventilation, the architects used locally fabricated masonry to fill in most of the walls with open brickwork. An ancillary building, rectilinear and made of concrete, holds restrooms and a kitchen. Much of it is clad in mosaics of broken tiles donated by a local distributor, another way the team kept costs down while bringing a rich texture to the surfaces.

The Community Center of El Rodeo, which opened in January of 2015, is already used during soccer games and other sporting events, as well as by a local university for classes and recreation. But the building is also equipped to provide shelter for up to a hundred people in the event of a natural disaster. Living up to its charge of meeting a wide range of needs, Rojas and Fournier have conceived a building that will serve the community during times both of challenge and celebration.
IN THE summer of 2013, when the architects Antón García-Abril and Débora Mesa first visited the 11,500-acre Montana cattle and sheep ranch that’s now home to Tippet Rise Art Center, an hour southwest of Billings, they thought it looked like a lunar landscape. Beautiful, yes, but harsh, with few trees, rolling hills, and snow-capped mountains off in the distance.

The husband-and-wife team, principals of the Madrid- and Boston-based firm Ensamble, a 2004 Record Vanguard winner, had been asked by Tippet Rise’s founders, Cathy and Peter Halstead, and its director, Alban Bassuet, to create site-specific works for the sculpture park and music venue, which opened on June 17. But the task was daunting. How could any manmade object compete with such a vast natural setting? “We couldn’t find any references, any orientation, to hold and start working with,” García-Abril says. “It was very scary and very creative at the same time.”

In response, they designed pieces that seem to emerge from the landscape. **Beartooth Portal** comprises two poured-in-place concrete forms that lean delicately against one another. It’s 25 feet tall and set on top of a barren mesa, like some kind of prehistoric monument. Nearby are the similarly designed **Inverted Portal** and the massive **Domo**, a 98-foot-long sculpture with a flat top and three “legs” that form caverns for music performances. (Tippet Rise is also home to works by Mark di Suvero, Stephen Talasnik, Patrick Dougherty, and two pieces on loan from the Hirshhorn Museum and Sculpture Garden by Alexander Calder.)

García-Abril and Mesa call their creations “Structures of Landscape.” “We like the ambiguity of the works,” Mesa says. “We like that they look natural, like found objects, but at the same time, you have this impression that they are artificial.”

The sculptures appear to have been designed as they were being built, but, in fact, they were conceived in advance using mockups and computer modeling. Structural engineer Matt Hubbard, of the Bozeman firm Beaudette Consulting Engineers, worked out the complicated construction process.

For **Beartooth**, the team brought in truckloads of gravel to form two side-by-side pads. Next, a backhoe scooped out some of the gravel to create oblong forms, which were filled with intricate rebar armatures. A crane then lifted the rebar so the holes could be lined with two layers of plastic membrane. After a partial concrete pour, the rebar was reinserted, followed by more concrete and a top layer of dirt and rocks, shoveled by hand. Once the concrete had cured, two cranes
lifted the 425,000-pound slabs upright and delicately leaned one against the other.

“It’s like an advanced form of stacking two cards against each other,” says Hubbard, who helped calculate the precise angle of the slabs. Unlike cards, however, the pieces sit on 2-foot-deep concrete footings anchored to bedrock. The slabs are further stabilized by a concrete “cap,” which is hidden by layers of dirt.

The rounded exterior surfaces are smooth, with fabric-like folds and wrinkles created by the plastic liner during the concrete pour. The flatter inside surfaces are rougher, covered with dirt and rocks. The entire process was repeated for Inverted Portal, but with the rough side of the slabs placed on the outside.

Guests generally travel the three miles from the visitor center to the portals in electric vans, but may also walk or bike. They see the sculptures and wonder, “How the hell do those things hold together?” says Bassuet, who worked as an acoustician and concert-hall designer for Arup before joining Tippet Rise as its first director. “It’s pure equilibrium.”

For Domo, García-Abril and Mesa deployed a construction technique that was similar to the one used for the portals but did not require any lifting. They formed a mold in a built-up gravel bed for the entire piece, filled it with rebar and concrete, and then—a month of curing—excavated gravel from underneath. The result is a kind of off-kilter three-legged table, nearly 100 feet long and weighing more than 4 million pounds.

Domo’s acoustic qualities were revealed in a recent performance by pianist Christopher O’Riley (Tippet Rise’s music director) and soprano Emily Helenbrook. They performed works by García-Abril’s father, Spanish composer Antón García Abril, within the 16-foot-tall sculpture’s interior.

Mesa says that, despite all the planning, there was still a level of uncertainty in the construction process. The surface wrinkles, for example, were completely dependent on how the plastic sheeting was placed in the mold before the concrete was poured. And, given their exposure to Montana’s harsh climate, the pieces will continue to change over time.

“That’s OK,” Mesa says. “We want nature to take over.”

David Hill, a journalist based in Denver, writes frequently about architecture, design, and urban planning.
Like the Beartooth and Inverted portals, Domo (this photo) is made of reinforced concrete cast on-site. The piece, which is 100 feet long and weighs more than 4 million pounds, has a cavernlike interior that is 16 feet high.
Divide and Conquer
The latest partitions minimize visual distractions, dampen sound, and carve out zones of privacy.
By Julie Taraska

Glass Gradients
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skydesign.com
CIRCLE 100

Glass Gradients

Sipario
These lightweight triangular panels contain layers of densely woven polyester fiber that absorb high, middle, and low sound frequencies, achieving an NRC of up to 1.0. The frameless, double-sided design may be freestanding or ceiling- or wall-mounted. Fire-resistant and 100% recyclable, Sipario is Greenguard Gold–certified.
snowsoundusa.com
CIRCLE 101

Luminous Patterns
This soup-to-nuts solution for producing illuminated architectural surfaces comprises designing a custom pattern for the client, laser-cutting and/or digitally printing it onto steel panels, and then fitting the panels with dynamically programmed Color Kinetics Flex LEDs. Five light effects are standard; 10 preset panel designs are in the works.
philips.com
CIRCLE 102

Luminous Patterns

LineaCube
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maarslivingwalls.com
CIRCLE 104

Legola
Assembled without tools, these double-sided upholstered panels link via a button-like connector; it slots into the channel bifurcating each unit. This joint also allows the panels to support numerous types of seating, backrests, shelves, and work surfaces, all of which may be reconfigured repeatedly. Featuring a hard core of foam on the inside, Legola panels are 27½" wide and come in two heights.
viaseating.com
CIRCLE 103

Legola

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CIRCLE 223
Freeform
The latest addition to KI’s preassembled butt-glazed Lightline architectural wall system allows designers to use standard panels to create curves and angles measuring 90º to 180º. Clear dry-seal connections maintain the unit’s transparency and preserve its adjustability for uneven floors and ceilings. The module’s $\frac{1}{2}$-thick glass also provides a sound transmission class rating of 36 to 39.

ki.com
CIRCLE 106

Elemental
Fabricated from post-consumer recycled paperboard, this flexible material comes in five metallic colorways and may be used in four of 3form’s popular sculptural screen systems (Wovin Wall in galvanized copper, shown). The textural, bio-based Elemental is also Cradle-to-Cradle-certified.

3form.com
CIRCLE 107

GlassScreens
Part of Carvart’s Contract collection, this line of low-iron, tempered-glass privacy screens offers a multitude of heights (low to high), forms (sliding, fixed, and movable), and surfaces (smooth, etched, or writable on one side or two). Each may be specified in three or more standard widths. Pictured is a fixed full-height screen with a smooth opaque finish.

carvart.com
CIRCLE 109

Parentesit Freestanding
Inspired by minimalist art and classic Japanese interiors, these movable modular screens with black metal frames come in multiple square and circular motifs. Each is available in Arper’s full range of Kvadrat and Fidivi fabric options.

arper.com
CIRCLE 108

Clubhouse
This freestanding aluminum structure provides a semiprivate meeting space in open-plan offices. The standard module features soft seating and a frame fitted with translucent screens; add-ons include work surfaces, media walls, consoles, storage units, and electrical integration. Clubhouse comes in two heights, each offered in seven configurations.

allsteeloffice.com
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Take It Outside
These outdoor amenities offer a breath of fresh air.
By Julie Taraska

**Kaskad**
Offering five shapes, three heights, and three colors, this family of powder-coated steel planters (mineral bronze hue, shown) can be used alone or together. Each features adjustable glides and removable internal plant liners; the 20- and 36-inch-high models also come with polybags into which sand or gravel can be added for additional stability.

magnusongroup.com
CIRCLE 110

**LiniLED Marker Lights**
Available in three round and two square sizes, these in-ground accent luminaires create diffused spots of illumination on walkways and streetscapes. Each flush-mounted fixture produces light in a choice of five hues (white, amber, and RGB) and five color temperatures (2400K to 6500K). Cast-polyurethane resin encapsulates the light engines, which use 1W to 3W of energy and can be interconnected to a single 24-volt driver.

organiclighting.com
CIRCLE 111

**Strata Beam Bench**
A twist on classic public seating, this bench features subtly faceted cast end pieces made of the manufacturer’s proprietary Meldstone ultra-high-performance concrete. Continuous spans of wood bridge the gap and slot into the seat ends. Pictured is the backed version of Beam with powder-coated end arms; backless, armless, center-arm, and four-arm models are also available.

landscapeforms.com
CIRCLE 113

**PlayCubes**
Designed in the 1960s by architect Richard Dattner, these colorful geometric elements have been updated for the times, now featuring varying planes, handholds, and recesses that encourage climbing and exploration. The rotomolded plastic cubes come in single models suited to kids ages 2 and up and four preset configurations for those 5 and older.

playworld.com
CIRCLE 114

**Veloport**
This storage shed with a galvanized-steel frame houses two bikes; each sits on its own interior tray and is secured to the door via U-lock, padlock, or a keyed option. Laser-cut ventilation holes modulate temperature within the structure and provide sight lines into its contents. The units, which are surface-mounted with wedge or Titen anchors, may be specified in over 250 TGIC powder-coated colors.

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The modern office used to mean working at a desk. But in the wake of the digital revolution—now many tasks can be performed almost anywhere—the office is becoming a place where people get up out of their seats and move around, if they even have an assigned station. The workplaces on the following pages focus less on personal space and, instead, dedicate more square footage to a range of areas for collaboration, spontaneous interaction, quiet work, or taking a break. Just as shifting trends in how we do business have irrevocably affected interior planning, the design of the workplace will continue to shape office culture into the future, changing it in ways we cannot even anticipate.
Musical Chairs

The office of the future offers many places to sit and work, but no place to call your own.

BY JERRY ADLER

IN THE 1980s, the owner of Newsweek, Katharine Graham, reviewing plans to renovate the headquarters of the magazine, where I worked, questioned the necessity of private offices for the dozens of writers and editors. “I have a city room full of Pulitzer Prize–winners at The Washington Post,” she is rumored to have said. “Why does everyone here need a private office?”

If asked, I could have explained to Mrs. Graham that my infant son woke me most mornings at 5, and a city room was an extremely uncomfortable place to nap. But her question seems almost quaint today, as designers confront the paradox of the modern office, which has grown increasingly functional in its furnishings and materials, even as it is being pressed into service for uses never imagined by the early efficiency expert Frederick Taylor; as a substitute home for employees whose days seldom end at 5 p.m., as a statement of the organization’s environmental and social values, and, of course, as an amenity to attract talent to the company’s ranks.

As it has for at least a decade, the struggle to define the office of the future will be played out in the context of the open floor plan, a partitionless space with desks in facing rows or clusters of four, six, or eight. It would be reductive to blame Dilbert for the death of the semi-enclosed cubicle, but the name of the comic strip, which came up frequently in interviews for this essay, serves as a convenient shorthand for everything workers, especially young ones, find soul-crushingly oppressive about traditional office design. Some variation of the open plan is the overwhelming choice for companies are leveraging their space to take advantage of the fact that most of what people do at a desk—type on a computer and talk on the phone—can now be done anywhere. Architects call this “activity-based working,” which leads to providing dedicated spaces for a variety of tasks. The old office had desks and meeting rooms; the future will hold a proliferating array of “team project spaces”; “huddle rooms” for on-the-fly meetings; “collaboration rooms” for scheduled conferences; pods and booths for making phone calls; “focus rooms” for quiet concentration; and a variety of alcoves, benches, and café tables that can be used for various workish activities.

Energy, transparency, and collaboration are buzzwords associated with the open plan, which gained tremendous prestige because of its connection with successful entrepreneurial organizations from those in Silicon Valley to the New York home of the Bloomberg empire. But its real attraction for many companies is that it can accommodate approximately twice as many workstations in the same space as a cubic plan. “Over the past 15 years we’ve seen offices move from 200 square feet per person to 100, on average,” says Simon Pole, global design director of the Australia-based Unispace. Marc Campolongo, who consults on New York-area real estate for Staples Business Advantage, says that figure is headed down to 60 feet, and he’s not prepared to call a bottom—although in existing buildings, the capacity of elevators, exit stairs, and HVAC may impose one.

Fitting 700 or so office workers into an acre of floor space is premised on the reality that not every desk is occupied at all times; in fact, by various estimates, at any given moment, around half of all office workers won’t be at a desk at all. They will be out of the office on business, or working from home—or actually in the office, but not at a desk. The renovated GSA building has 2,200 desks for exactly twice as many employees. Increasingly, companies are leveraging their space to take advantage of the fact that most of what people do at a desk—type on a computer and talk on the phone—can now be done anywhere. Architects call this “activity-based working,” which leads to providing dedicated spaces for a variety of tasks. The old office had desks and meeting rooms; the future will hold a proliferating array of “team project spaces”; “huddle rooms” for on-the-fly meetings; “collaboration rooms” for scheduled conferences; pods and booths for making phone calls; “focus rooms” for quiet concentration; and a variety of alcoves, benches, and café tables that can be used for various workish activities.

More and more, architects are seeking productive uses for underutilized spaces such as lobbies, rooftops, and the circulation within and between buildings. At the Steelcase headquarters in Grand Rapids, Michigan, “30 to 40 percent of us have assigned desks,” says global director of research communications Chris Congdon; “the rest choose where we want to work on a given day.” And Steelcase is a company that makes desks. In the past, offices allocated one break room or public-area seat for every 16 employees, but that ratio is
being driven to one per four, according to research by Herman Miller presented in June at the NeoCon exposition in Chicago. Among the other findings from a two-year study for the company’s “Living Office” concept: circulation and other unallocated space, which as a rule of thumb used to account for 33 percent of floor area, is now averaging up to 47 percent—at which point, says Joseph White, director of workplace strategy design and management, “the facilities planner’s head explodes.”

Even the definition of a desk as a place where you sit to do work is changing; standing desks are becoming ubiquitous, part of a trend toward “wellness” in the office. Architects who have mastered LEED specs will soon be studying the requirements for “Fitwel” certification by the Center for Active Design—a new program to measure how work environments affect employees’ health. The details are still being fleshed out for a launch in 2017, but Lisa Pool of Perkins+Will—which designed its new Minneapolis offices with Fitwel certification in mind—says it will probably measure parameters such as the availability of healthy food, natural light, and a design that encourages or requires workers to use stairs or to walk to printers or supply rooms that are intentionally located at a distance. (The firm’s space, 11,000 square feet in the 1972 IDS Center by Philip Johnson, was also designed for minimal environmental impact, using only five nonstructural materials: glass, fiberboard, aspen plywood, carpet, and steel marker board.)

The other challenge designers face is maintaining a minimum standard of privacy. Numerous studies have found, as Jungsoo Kim and Richard de Dear wrote three years ago in the Journal of Environmental Psychology, that “open-plan layouts are widely acknowledged to be . . . disruptive due to uncontrollable noise and loss of privacy.” Research, as well as everyday experience, has shown that the greatest distraction comes from intelligible conversation within hearing range; the reason any work got done in a newspaper city office of the future will serve many purposes—as a corporate brand—would have been considered adequate for a junior researcher. For the record, Katharine Graham kept the private offices in my headquarters for Time Inc. on six large floors of Brookfield Place in downtown Manhattan, housing 3,000 employees across 24 brands (or “magazines” as they used to be known). The old Time-Life-Fortune offices were designed to impress visitors with their weighty significance; the new design by Studios’ Joshua Riderprojects a much more engaging and up-to-date image, with a glass-walled reception area that looks out on the test kitchen and video control room. What were originally 100,000-square-foot trading floors in the 1980s complex now are bisected by “boulevards” for circulation and broken into manageable “neighborhoods” of dozens, not hundreds, of desks. There are lounges and snack stations on every floor, and a large cafeteria but no formal dining room, and even as august a personality as the managing editor of Time occupies a glass-walled 120-square-foot interior office that in the old Time—or Newsweek in my day—would have been considered adequate for a junior researcher.

For the record, Katharine Graham kept the private offices in the 1980s, though they were radically altered in the 21st century. The office of the future will serve many purposes—as a corporate brand—statement, multimedia hub, fitness center, think tank, and playroom—but its function as private refuge and status symbol are long gone. Driven by technology, the ruthless economics of globalization, and the delicate balance between the need for squeezing 12-hour days out of employees and keeping them alive and productive, the workplace will no doubt change as much in the next 25 years as it has in the past. Architects—who, after all, inhabit these spaces themselves—are leading the way.

Jerry Adler is a former writer and editor at Newsweek and the author of High Rise, a book about the construction of a skyscraper in New York.
Vacheron Constantin 2 | Geneva | Bernard Tschumi Architects

TIME WARP

Bernard Tschumi expands on his immaculately designed headquarters for a prestigious watchmaker.

BY SUZANNE STEPHENS
PHOTOGRAPHY BY PETER MAUSS/ESTO
Adding on to a successful work of architecture is hard enough. It can be even harder if you designed the original project yourself. How do you make a new, distinctive statement that doesn’t overwhelm the first? Bernard Tschumi, who keeps offices in New York and Paris, faced this problem with his recent commission to provide a 110,000-square-foot addition to his Vacheron Constantin Headquarters and Watch Factory in Geneva (Record, June 2005, page 99).

The architect’s original curved stainless-steel building, completed about 10 years ago, rises elegantly above the industrial park at Plan-les-Ouates on the outskirts of the city—a talisman of the 260-year-old business so effective that the management once again turned to Tschumi when it came time to expand. The company’s CEO, Juan-Carlos Torres, just said to the architect, “I’m in love with the original building—don’t compete with it.” Since Geneva is the home to such Vacheron rivals as Rolex, Patek Philippe, and Piaget, Torres wanted to make sure the architecture retained its singular image.

For his earlier commission, Tschumi designed a 130,000-square-foot, four-story building with executive offices for 90 and an attached factory for 80. This time, he needed to provide offices and workshops for 375 employees, along with dining facilities for both buildings and additional parking.

With the new building, the architect responds to his first scheme by gracefully riffing on its vocabulary of materials and form—such as the perforated stainless-steel cladding that curves around the headquarters—without replicating or dominating the original.

Yet the footprint of Vacheron 2 varies dramatically from its predecessor: it takes on the form of an irregular V in plan, determined partially by the external roadways that bound the seven-acre site. At one point toward the rear, where the...
CRANKED GEOMETRIES

The boundaries of the site determine the addition's distorted-V plan (left). Inside, a central atrium, topped by a circular skylight, links the three levels via an angular stair (opposite, top). On the second level, the curved end of one arm of the V creates an unusual space lined with cherry-wood for informal gatherings (opposite, bottom).
two buildings almost touch, Tschumi connects them with a glazed link.

While the V shape creates a number of acute angles, Tschumi conceals the sharpness along the front of the complex—where the two arms of the new structure jut forth—by wrapping those wings, on the second level, with bull-nosed, perforated stainless-steel hoods. This formal gesture, echoing the contours of the original Vacheron, effectively unites the old and the new for those entering the gate to the complex.

On a lawn between the older structure and its addition, Tschumi has placed an elongated glazed shed covering a stepped entrance ramp that angles down to the poured-concrete underground level. Here, the watchmakers arrive each day and change into lab coats and special shoes next to parking for workers’ cars and bikes.

Trucks delivering materials and picking up goods stop at an open court in the notch between the two arms of the V. One arm even allows trucks to roll inside for protected unpacking and loading. While fewer than 30,000 watches a year are made by Vacheron, they range in price from $13,000 to $242,000, which requires a vigilance against theft. A security firm reviewed Tschumi’s plans; following the firm’s recommendations, the team placed freestanding poured-in-place-concrete walls just inside the truck loading bay—barely visible behind the glass window walls—to protect against the possibility of rogue trucks’ ramming through the building. Offices occupy the other arm at ground level, while at the back of the V—where both wings are joined—the cafeteria and dining rooms open out to a lawn.

At the core of the building, at the juncture of the two arms, Tschumi has carved out an atrium with a cranked stairwell topped by a large skylight. This lobby space not only provides added top light but helps unite the two levels with the one below ground. Tschumi found this formal strategy helped resolve the meeting of its two arms, while acting as an orientation point for those unfamiliar with the plan. The interior effect does not have the gracefulness of the exterior swerves: there is a certain dissonance in the way the angular stairs lurch up to the circular oculus, even with the
ARCHITECTS: Bernard Tschumi Architects (New York), Bernard Tschumi Urbanistes Architectes (Paris) – Bernard Tschumi, principal; Paul-Arthur Heller, Clinton Peterson, Nicolas Grille, Pierre-Yves Kuhn, Joel Rutten (New York team); Véronique Descharrières, Rémy Cointet, Emmanuel Desmazières (Paris team)

ASSOCIATE ARCHITECT: Glauco Lombardi

ENGINEERS: MDI (structural); Amstein + Walthert Genève (m/e/p); Scherler (electrical)

CONSULTANTS: BCS (façade); Securiconcept (worker safety and accessibility)

CLIENT: Vacheron Constantin; Compagnie Financière Richemont

SIZE: 110,000 square feet

COST: withheld

COMPLETION DATE: October 2015

SOURCES

PRECAST CONCRETE COLUMNS, MASONRY: Rampini

METAL PANELS, METAL AND GLASS CURTAIN WALL, RAINSCREEN, GLASS, SKYLIGHTS: Hevron

ACOUSTICAL CEILINGS: Trisax

PAINTS AND STAINS: Léman Group

LIGHTING: Badel

ENERGY MANAGEMENT SYSTEM AND VENTILATION EQUIPMENT: Tech-Building

credits
finely crafted detailing of the steel framing for the translucent glass treads and clear glass balustrades.

The upper level offers dramatic views of the Alps for the watchmakers, who work at chin-high desks in air-locked dust-free and humidity-controlled studios. To provide employees with the soft, even illumination required for their painstaking tasks, the architects inserted circular skylights alternating with smaller circular ceiling fixtures that float above the work stations. Glazed interior walls also help transmit light.

Because of the expansive use of glass, Tschumi installed a movable louvered blind system. In the older structure, he placed the adjustable blinds between an outer panel of glass and interior double-layered glass, which meant the outer panel had to be removed for cleaning the glass inside. In the new building, the architect installed black aluminum blinds outside, which still cut solar gain while nicely articulating the exterior surfaces.

Other stalwart features of sustainable buildings, such as operable windows and natural ventilation, are missing, in large part because the workshops must adhere to strict temperature and humidity requirements. But the design team did install 15,000 square feet of solar panels on the roof, which provides about 10 percent of the building’s energy needs.

Seeing the watchmakers carefully assemble their ornate timepieces—one workshop is named Studio des Grandes Complications—in these calm, clean aeries, you note that the abstract, sleek, and precisely detailed architecture echoes the qualities of the watches created within. Tschumi has reinvented his own vocabulary of curved, glinting metallic forms that encase a concrete structure. While relying on the architectural DNA of the first building, Tschumi’s second take gives it a different twist. It brings something familiar but entirely new to the Vacheron campus.
RAMP IT UP

Two office towers energize Lisbon’s waterfront and embrace the changing workplace.

BY ANNA MARTINS
PHOTOGRAPHY BY YOUNES BOUNHAR

EDP Headquarters | Lisbon | Aires Mateus and Associates
Already a landmark on Lisbon’s skyline, the new headquarters of Energias de Portugal (EDP) was born out of the company’s desire to achieve certain goals: increased efficiency, higher productivity, and improved communication between its employees and the public. With 16 offices scattered around the Portuguese capital, the 40-year old energy company decided to concentrate administrative departments into a single building in Aterro da Boavista, a burgeoning area of the city’s once-industrial riverfront.

In 2008, EDP launched an invited competition, not only for the architectural design of the headquarters but also for the master plan of its surroundings. While the atelier of Carrilho da Graça won the planning commission, Lisbon-based architects and brothers Francisco and Manuel Aires Mateus developed the winning proposal for the architectural design. Their solution thoughtfully addresses the brief as well as responding to the riverfront location as it continues to develop housing and tourism and restore industrial buildings.

Manuel explains the reasoning behind the project as if it could not have been done any other way. First, to avoid blocking the connection to the city on the north and the river on the south, he and Francisco placed all the large programmatic elements underground, including parking, the entrance lobby, and an auditorium. The workspaces are grouped in two slender eight-story towers. To emphasize the sense of flow, transparency, and continuity at ground level, the team created a public square shaded by a lattice-like structure linking the east and west towers. Pedestrian bridges gently lift above the square to connect the towers on the site’s southern and northern edges. Finally, the desire for open, flexible offices, with light and views for EDP’s corporate and administrative departments, led the architects to create a glass facade.
supported by a complex structure of steel columns coated in white prefabricated GRC elements. These vertical finlike forms both shade the interior and lend the building its distinctive, ever-changing appearance.

The architectural design shows an apparently effortless rationality underpinning the building’s steel and concrete structure. Yet the rigorous calculations were as much cultural as mathematical. In order to reaffirm EDP’s profile as a supporter of the arts, the company invited several internationally renowned architects and designers to execute the interiors. Marcio Kogan of Studio MK27 in São Paulo was responsible for the reception area as well as the workspaces; London-based Universal Design Studio took on the communications lounge, to be completed in the future; Shanghai-based Neri & Hu designed the business lounge, now under construction; British designer Jasper Morrison is commissioned to do the restaurant soon to be built; and Miguel Vieira Baptista of Lisbon masterminded the foyer cafeteria, already open to the public. In addition EDP has placed artworks throughout the public areas.

Employees and visitors arriving on foot descend to the entrance foyer via two sym-
metrical staircases located in the plaza beside each tower. There they find the reception area, the auditorium, a public cafeteria, meeting rooms, a gym, and—eventually—the business and communications lounges. From the first to the seventh story, the towers’ flexible open plan spurred MK27 to provide modular furniture that can easily be rearranged according to the needs of each department. In some cases, rows of open desks are divided by low storage furniture; in others, larger workstations allow impromptu meetings. Private offices for department heads, meeting rooms, and smaller rooms for more sensitive conversations also appear on every floor. Yet the main characteristic of EDP’s new interpretation of workspace gives center stage to areas that were once hidden at the back of the offices. Pantries, lounge areas, work cafés, and the outdoor balconies—where employees can take a break, confer in groups, or conduct meetings—have received prominent locations. Standing desks, and picnic-style tables, as well as lounge chairs, are part of the office landscape.

While not yet “at the level of businesses like Google,” as EDP’s real-estate administrator and engineer José Santos Pires puts it, the company had a very clear goal of changing its own office culture through the reorganization of the workplace. To help the staff break away from rigid policies that previously determined in-office behavior, the design offers myriad new informal settings. Leaving the desk for a midmorning snack or working on the terrace encourages increased communication among employees. Surprisingly, noise levels due to office chatter have dramatically decreased in response to the open-space environment.

Workplace organization had to be adapted to EDP’s particular needs and objectives as well as taking into account its conservative past, since the management feared radical changes would undermine efficiency and productivity. Therefore, the top floors of each tower, home to the company’s executive, general, and supervisory boards, abandon the open plan. Instead, large private offices, sumptuously furnished, and lounge areas—plus generously sized board meeting rooms—reflect ties to the old ways of doing things.

Because of this incremental approach, employees have already adapted with relative ease to the new environment. Now, as team leaders actively encourage staff to take advantage of the wide range of task spaces available, the architecture and design of its numerous facilities can truly begin to contribute to the company’s aspirations.

Credits
ARCHITECT: Aires Mateus and Associates
- Manuel Aires Mateus and Francisco Aires Mateus, principals; Francisco Caseiro, Ana Rita Rosa, Pedro Ribeiro, project leaders; Marian Barbosa Mateus, Vania Fernandes, Paolo Agostini, Francesca Lupo, Marco Campolongo, João Ortigão Ramos, project team
ENGINEER: AFA Consult (structural, m/e/p)
GENERAL CONTRACTORS: Mota Engil, HCI
CLIENT: Energias de Portugal
SIZE: 497,530 square feet
COST: $61.8 million
COMPLETION DATE: November 2015

Sources
STEEL FRAMES, CURTAIN WALL: Martifier
GLASS: Saint-Gobain Glass
PRECAST CONCRETE: Mota-Engil Prefabricados
CARPETING: Decoresse, Vorwerk
MOISTURE BARRIER: Mapei Basf
METAL DOORS: Dictator
ACOUSTICAL CEILINGS: Castelhano-Ferreira
DEMULTABLE PARTITIONS: Divilux
LIGHTING: Flos
LIGHT AND SHADOW
Covered bridges look out onto a central plaza between the two shafts (opposite, top). A double-height balcony on the east tower offers views of the Lisbon harbor (opposite, bottom). The sun creates dramatic stripes of light and shadow through the latticework over the central plaza (this page).
How does a startup still feel cozy and cohesive when it has ballooned into an 800-person organization? Many architects in the San Francisco Bay Area have been enlisted by tech companies to foster a sense of communal purpose—that all-hands-on-deck excitement—within corporatescale digs. A new office for the design-focused company Pinterest, which allows users to create and share digital inspiration boards, is a refined example of how to steer people toward each other.

“Pinterest is about a grid that structures all the ideas and images, and architecture provides the grid in building,” says cofounder and chief creative officer Evan Sharp, who studied architecture at Columbia. “We wanted to set up the right architecture to shape circulation and the
qualities of the working environment to reinforce collaborative behavior.”

It’s the second time that Pinterest has tackled the design of a workspace. Its first headquarters, which it continues to occupy, is just down the street from the new offices in San Francisco’s South of Market neighborhood. For this expansion, it tapped local firm IwamotoScott Architecture to design roughly 100,000 square feet of space, taking up the lion’s share of an existing four-story building. The small design firm, led by Lisa Iwamoto and Craig Scott, has other notable offices to its credit, including Bloomberg’s Tech Hub (Record, September 2015, page 88); in this case, they collaborated with larger firm Brereton Architects. The new office brings Pinterest’s software engineering group under one roof and is designed to accommodate up to 700 staffers.
For Pinterest and other tech startups, one of the most desirable attributes of a building is big, open floor plates, the better to accommodate more people on one floor. The building they selected, originally a John Deere tractor factory built in 1911, had 30,000-square-foot floors, good-sized bays defined by concrete mushroom columns, and a large central atrium. Unfortunately, the atrium only came down to the second floor, and the ground floor was oppressively dark.

As part of the renovation, the design team extended the atrium the extra distance to the ground level to bring in much-wanted natural light. They took delightful advantage of the opportunity to add a sculptural stairwell in the center that connects the ground floor to the second level. Clad in white steel mesh and glowing with daylight, the luminous portal is the focal point. It is also replete with interesting angles; the architects designed the two stair runs to cross slightly to create an abstract representation of knitting (a favorite term in the Pinterest lexicon, used to describe its company culture and how various disciplines intersect). Smaller versions of the stair, wrapped in the same perforated steel but outside the atrium, connect the other floors farther up.

The now-bright ground floor is devoted primarily to social areas: spacious front and back lounges flow into a large open dining hall, which doubles as a forum for all-hands meetings. On the three floors above, the work areas are arranged strategically in circles around the atrium, in a natural progression of public to private. The most personal spaces, the individual workstations, are located at the periphery of the building, by the windows; the next ring contains the team meeting rooms, which are assigned to groups for their specific use and cannot be booked; and, closest to the atrium, are the reservable conference rooms.

To create a collegial sense of intimacy, adjustable-height desks are shorter than average and tightly packed. A “library” is outfitted with carrels, casual lounges, and small meeting rooms to accommodate different work styles and situations. Reflecting the current trend in office design, there is a generous allowance of meeting rooms within the open-plan office. They are arranged in a checkerboard fashion, alternating enclosed spaces with open lounges for a more relaxed feel. Eighteen-inch-wide glass panels at the corners where the rooms touch provide a glimpse of what is going on.
Pinterest takes up the lion’s share of the four-story building (above). Meeting rooms are arranged in a checkerboard fashion, alternating enclosed spaces (left) with open lounges (opposite, right). At the corners, 18-inch-wide glass panels where the rooms touch provide a glimpse into other spaces (opposite, left).
“There’s no FOMO [fear of missing out],” says Iwamoto, mindful of Pinterest’s youthful demographic.

The office is finished with extensive expanses of that DIY favorite, plywood, used in some ingenious ways. The reception area’s ceiling treatment is sharp: deep plywood slats in a diamond grid form a contemporary version of a coffered ceiling. Walls of black-stained plywood and gypsum board painted dark gray, in addition to polished-concrete floors and carpeting in varying shades of gray, create a calm backdrop for the work at hand. “It’s a simple, clean aesthetic, but not minimalist,” says Iwamoto. “We wanted to create a richness through materials, spatial and volumetric elements, and architectural detailing, instead of using appliqué or surface treatments.”

Indeed, in keeping with Pinterest’s mission to promote creativity, the space is designed to be a plain canvas that the occupants can make their own over time. The staff has a tradition of “makeathons” and have yarn-bombed structural columns and created art installations in their other offices. “It’s important for employees to feel ownership. It shouldn’t feel like you’re renting someone else’s space—you should be able to paint the walls,” says Sharp. And, in this case, also turn the stairwell different hues by putting colored lenses on the skylight, which employees have already had the fun of doing.

**credits**

**ARCHITECT:** IwamotoScott Architecture

**EXECUTIVE ARCHITECT:** Brereton Architects – Donna Kim Cook, principal in charge

**ENGINEERS:** Amit Wadhwa & Associates (m/e/p); Forell/Elsesser Engineers (structural)

**CONSULTANTS:** Niteo Lighting (lighting); Charles M. Salter Associates (acoustical); The Fire Consultants (code)

**GENERAL CONTRACTOR:** Novo Construction

**CLIENT:** Pinterest

**SIZE:** 100,000 square feet

**COST:** withheld

**COMPLETION DATE:** December 2015

**SOURCES**

**METAL PANELS (STAIR):** McNichols

**ACOUSTICAL CEILINGS:** Polymax, Ecoustics

**CUSTOM WOODWORK:** Mission Bell, Complete Millwork

**SOLID SURFACING:** Caesarstone, DuPont, Bedrosian

**DOWNLIGHTS:** Lucifer

**INTERIOR AMBIENT LIGHTING:** A Light

**LIGHTING CONTROLS:** Crestron

**CARPET:** Interface
THE NEXT WAVE

A SMART BUILDING RAISES THE BAR FOR TECHNOLOGY, INNOVATION, AND SUSTAINABILITY

BY TRACY METZ
CLEAR CUT A paradigm of 21st-century transparency, The Edge was designed to advance workplace standards with an energy-neutral building that not only lowers the cost and environmental impact of power consumption but also enhances the occupant experience.
Amsterdam’s Zuidas financial district is distinguished by the work of an impressive roster of architects, such as Toyo Ito, Rafael Viñoly, and Pei Cobb Freed, all of whose designs fit into a traditionally corporate atmosphere. But a new office building, completed in 2015, has a different agenda: The Edge, by developer OVG and PLP Architects, applies both sustainability and state-of-the-art digital technology to the creation of an innovative and, above all, congenial workplace. This multi-tenant, 15-story concrete structure is energy-neutral and was awarded a BREEAM “Outstanding” new-construction certification with a score of 98.4 percent, the highest since the UK-based Building Research Establishment began its Environmental Assessment Method program in 1990. It was also dubbed “possibly the smartest building on the planet” by Bloomberg BusinessWeek. But sustainability in itself is not interesting, says architect Ron Bakker of the London-based firm PLP. “What people respond to here is the connectedness between the building and the occupants who work here. The building is now part of their team.”

The 430,000-square-foot building’s north-facing atrium is a far cry from the typical marble lobby. The soaring volume, filled with daylight even on gray days, offers welcoming amenities such as a coffee bar cum informal meeting area on broad terraced steps, a restaurant on the second floor, and a generous internal terrace on the fourth floor with a long communal table, armchairs, and tall, green tuxedo-style settees for private conversations. Everywhere you look during a workday there is...
some kind of interaction going on. Even the elevator lobbies above ground level have glazed balconies overlooking the atrium. Bakker compares the atrium to a campfire or, in more modern terms, a “social condenser” or nucleus. “How and where we work is changing,” he says.

The building’s client and main tenant, Deloitte, occupying 60 percent of the space, was previously spread over a number of locations. The international accounting firm wanted to consolidate its Dutch operations in a smart building that would serve as a catalyst for the company’s transition into the digital age—but with the knowledge that only 25 percent of their employees are actually at a desk at any given moment. Another 10 percent are at in-house meetings; 35 percent are working from home; 10 percent are traveling; and 20 percent are at meetings with clients. Deloitte wanted working spaces that are flexible and social, as well as physically and virtually interconnected.

At The Edge—which has two underground parking levels and 1,100 workstations for the 2,800 employees of Deloitte and the five other tenants—there are no assigned desks. The digital and physical meet in a smartphone app, through which occupants can locate colleagues, reserve a room or desk, see a train schedule, and order healthy groceries from an in-house food shop. They can also manage the lighting and temperature of their work zone.

This is one of the first buildings in the world to use a connected lighting system, where more than 6,000 LED fixtures—each with its own IP address and every second luminaire equipped with sensors—link to user smartphones through visible light technology and connect to the building’s IT network via Power-over-Ethernet (PoE) switches. The system senses daylight, ambient temperature, CO₂ levels, occupancy, and motion. In addition to potential energy savings, this technology provides data that improve building efficiency and management—for example, collecting information about which coffee machines need to be replenished and which are the popular restrooms.

Folded on the diagonal, the facade of the north-facing atrium comprises 70 percent glass, allowing the interior to benefit from indirect sunlight without overheating. The offices are located in a U-shaped block on the building’s east, south, and west sides, their large floor plates arranged around the atrium for maximum daylight penetration throughout. Striped with horizontal rows of solid aluminum-paneled spandrels,
9 TO 5  Employees do not have assigned desks but do have views of the lively atrium (opposite, bottom). Within the atrium there is a terrace on the fourth level with a communal table and comfortable seating (opposite, left), a coffee bar cum informal meeting area at grade (above), and bridges that cut cross the large space (right).

The east- and west-facing facades are composed of 45 percent glass balanced by 55 percent concrete, which provides thermal mass. Similarly, the south-facing facade is 40 percent glass but the concrete on that elevation is clad with photovoltaic panels. Electricity is also provided by 65,000 square feet of solar panels on the roof, as well as on rooftops at the University of Amsterdam, which partnered with OVG. The PVs supply the grid, offsetting any additional electricity The Edge might require.

The Edge is said to consume half the energy for cooling as a typical Dutch office building. According to Bakker, “The way the energy calculation works is that it measures the amount of energy used by the building (heating, cooling, and lighting) and balances this against the amount of energy generated.” The building also produces enough electricity to drive the pumps that circulate fresh air, as well as the hot and cold water from the groundwater aquifer 300 feet below the building. The fresh air is cooled, filtered, and dehumidified before being pumped into the offices. The spent air then transfers out through slits above the windowsills into the atrium, where it rises and is sucked out through grills at the top. Developer OVG claims that over a period of 10 years, The Edge will save 42 million kilograms of CO₂ as compared with a “normal” office building.

“While the physical building is finished,” says Bakker, “socially it is still developing.” The workplace is now shaped by layers of technology that alter how people interact with their environment. Architects are looking for ways to use these virtual frameworks to stimulate collaboration and social encounters. Says Bakker, “This is the new role of architecture.”
CONSCIOUS UNCOUPLING

Dividing a building in two increases daylighting and creates lush outdoor spaces.

BY TOM HENNIGAN

PHOTOGRAPHY BY ROLAND HALBE

The major challenge for the design team was to maximize a tight site in a densely occupied part of Rio, home to some of the country’s most expensive real estate, without sacrificing light. Many neighboring buildings, which only receive natural illumination through their front windows, are notorious for their gloomy rear interiors. The solution was to pull the building away from the site’s back party wall, where there is a small service volume that houses the elevators and stairs. The clever move allows daylight to bathe the rear of the main building, making the 70,000 square feet of mostly open-office workspace significantly more attractive. It also creates two internal courtyards on either side of a bridge that connects the seven-story building to the rear service component and gives it a permeable quality that captures the spirit of Rio’s outdoor ethos.

“The company is avant-garde in the way it does things,” says Meier. “They are very open and wanted a building that had the spirit where people communicate easily, where they are able to take an interest in each other’s work and improve their own. They wanted a building that facilitated this openness and communicated the transparency that they foster.”

The front, concrete-framed building is clad in white aluminum and a combination of transparent and translucent glass. This material treatment contrasts with the beautifully raw, exposed concrete of the rear volume, which was inspired by the abundant use of high-quality concrete in Brazilian construction. Initially, the bridges connecting the two parts at each level were to be of glass in order to accentuate the permeability gained by opening up the back of the site. But that plan fell foul of Rio’s labyrinthine zoning and fire codes. Instead, they are made of concrete and clad in the

PUBLIC FACE The building’s glass and aluminum main volume (left) has an urbane street presence. To bring in more daylight, the architects pulled the building away from the site’s back party wall to create two inner courtyards on the second level (opposite) with a small concrete service volume at the rear.
same dark Brazilian granite found throughout the interiors, whose floor-to-ceiling glass provides generous views onto the courtyards. The walls of these protected spaces are shrouded by vertical gardens that echo the ever-present tropical vegetation found in the city beyond and make them welcoming spots in which to relax. The plantings, installed by specialists from São Paulo, also define a distinct transition between the aluminum-and-glass volume and the concrete one.

If refined concrete is the star of the rear of the building, the front facade’s louvers take credit for having a dramatic impact on Bartolomeu Mitre Avenue, one of the neighborhood’s main thoroughfares. They determine the public face of the building while creating privacy for its occupants and shading from Rio’s abundant sunshine. This urban gesture is further enhanced by a series of terraces, which allow for a direct connection between tenants and the street.

A double-height main lobby is integrated with the entrance to the building’s three-level subterranean garage, which makes for a practical if somewhat awkward introduction to the interior. But this leads to a more intimate second, ground-floor lobby and meeting space for anchor tenant Vinci Partners. Here Meier’s discreet, clean lines perfectly offset an elegant spiral staircase, which grants visitors access to meeting rooms on the floor above without having to return to the elevator bank in the main lobby.

The five top levels all employ the type of open floor plan favored by investment firms around the world, (with one level hosting perimeter executive suites enclosed in glass). As the entire main volume is supported on just four columns, each floor enjoys an expansive, uninterrupted sense of space. The open plan also provides the flexibility required by the client, which is leasing several floors to other boutique investment firms. From the elevators, visitors can access the main volume from the left or right, providing the potential for easy subdivision.

The building’s overall effect is a successful series of contrasts—between front and rear, aluminum and concrete, public and private—that are unified by a ferocious attention to detail, evidenced by such features as the beautifully lit back staircase. Here, in what would in many buildings be a little-used emergency fire escape, the exposed concrete walls are studded with glass tubes that let daylight from one of the courtyards penetrate the vertical circula-
tion, transforming it into another social space. With the completion of Leblon Offices, Richard Meier has most sympathetically introduced his signature style to South America.

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

credits

ARCHITECT: Richard Meier & Partners Architects – Richard Meier, managing partner; Bernhard Karpf, design partner; Parsa Khalili, Anne Strüwing, project architects; Brandt Knapp, Ian Lotto, project team
ARCHITECT OF RECORD/ INTERIORS: RAF Arquitetura
CONSULTANTS: Projest Consultoria e Projetos, Bruno Contarine (structural); Cemope Engenharia (m/e/p); MN Consultores Associados (facade); Quadro Vivo (vertical garden)
GENERAL CONTRACTOR: Construtora Santa Isabel
CLIENT: Vinci Partners
SIZE: 75,700 square feet
COST: withheld
COMPLETION DATE: May 2016

SOURCES
CLADDING: Alucomaxx
CEILINGS: OWA
PAINTS AND STAINS: Coral
RESILIENT FLOORING: Tate
SOLID SURFACING: Corian
FURNISHINGS: Knoll, Vitra, Herman Miller
LIGHTING: Artemide, Trilux, Lumini, iGuzzini, Targetti
ELEVATOR: OTIS
WARM RECEPTION
A glass and steel spiral stair (left) leads from Vinci Partners’ intimate ground-floor reception area (above) to meeting rooms one level up (opposite, top). An open-plan workspace looks out to the city through the louvered front facade (opposite, bottom).
FACTORY OUTLET  Last winter, the advertising firm MullenLowe moved into an office inside a renovated tobacco-processing factory in Winston-Salem. The building, once a part of R.J. Reynolds Tobacco Company’s cigarette-manufacturing campus, is now part of a burgeoning technology park called the Wake Forest Innovation Quarter (right). The new space has a number of environments for impromptu meetings and collaborations, including high worktables near the oversize windows (this image).

MullenLowe | Winston-Salem, North Carolina
TPG Architecture

INDUSTRIAL STRENGTH

TPG Architecture converts a tobacco factory into a versatile office space for an advertising agency.

BY ANNA FIXSEN
PHOTOGRAPHY BY ERIC Laignel

Cigarettes built Winston-Salem, North Carolina, just as much as bricks and mortar. By 1916, four decades after an entrepreneurial 20-something named R.J. Reynolds established a tobacco venture there, his company imported so much Turkish tobacco and French rolling papers for its blended varieties that the city became the eighth-largest port of entry in the United States—despite being 200 miles inland.

The metropolis is still known as Camel City for its hit brand of smokes, though the cluster of factories that once produced them by the billions is now evolving into spaces for biotech startups, research institutions, and creative firms. TPG Architecture recently breathed fresh (and nicotine-free) air into the third floor of one of these 1920s-era buildings for the advertising agency MullenLowe. Rather than conceal what remained of the building’s gritty industrial past, the New York-based architects worked with its brawny, poured-in-place-concrete structure and peeling surfaces to foster a flexible and creative workplace for an office of 185 people—without the feel of the oft-replicated techie playground.

“A lot of the advertising firms I work for want to be the next Google, with different themed spaces and different colors,” says Carly Jacobson, the lead project designer. Jacobson, who also completed MullenLowe’s Boston office in 2009, continues, “This building had an overwhelming
number of assets, so our approach was to make it feel as if we didn’t touch anything.”

To accomplish this, the architects inserted a series of three sleek, geometric volumes within the existing structure. This “box within a box” scheme breaks down the L-shaped, 37,500-square-foot floor office by creating spaces for meetings, while still maintaining open, non-hierarchical work areas.

From a glazed atrium, visitors enter a reception area at the crook of the L. It is a cool respite from the Carolina humidity, all exposed concrete and subdued colors. Here, behind the reception desk, Jacobson and her team located the first box, a freestanding T-shaped volume containing a boardroom and three smaller meeting spaces. “They have these intersecting relationships, as if they are puncturing each other,” explains Jacobson, pointing to where an 11-foot, 6-inch-tall drywall volume collides with 10-foot-tall one clad in plywood. The boxes seem to have been slid into the space like ships into a bottle, allowing for just 1 foot of clearance between some of the columns and as little as 2½ feet below the ceiling slab.

Inside the main conference room, inviting finishes provide a counterbalance to the raw industrial surroundings: slate-colored walls are juxtaposed with white acoustical ceiling panels and tawny birch. Neutral-hued modern furnishings echo existing colors in the factory’s walls and columns. Glazed openings in the boxes allow views directly to the factory’s new perimeter windows, while a hefty 10-foot-tall sliding panel opens the boardroom to the reception area for company meetings and celebrations.

The boxes also solve another challenge: how to unify the creative and business sides of the agency. MullenLowe Winston-Salem president Taylor Bryant says ruefully, “Agencies are composed of diverse people—and those people are not necessarily drawn to work together.”

The placement of the independent containers creates natural neighborhoods for different disciplines. Open-plan workspaces with long rows of shared desks for employees on the business side surround another T-shaped set of conference rooms on the south end of the building. (“They sit here because it’s the more private space,” Jacobson explains.) The creative team abuts a smaller volume on the north side. This end of the office includes amenities that the company’s previous space—a converted bank—lacked, including a 30-person screening room with stadium seating, a photo studio, a sound booth, a printing room,
and several editing suites. In these dedicated spaces, MullenLowe can seamlessly develop campaigns for clients ranging from Hanes to a local microbrewery.

Both ends of the office are punctuated by social spaces that include a coffee bar and lounge, a daylight-filled corner “town hall,” and a kitchen. The design team also placed high work tables (hemmed by perforated screens that cleverly double as pinup boards) near the windows to facilitate impromptu meetings and to allow staff members to have a change of scene from their desks.

“We felt the old space was sucking the energy out of people, because everyone was in their own little world,” says Bryant of the former office’s cubicle configuration. “Now you see three people have spun their chairs around. They wouldn’t necessarily call it a meeting, but they are sharing ideas.”

By Bryant’s metric, meetings abounded on a recent afternoon this summer: a group gathered in the lounge to play a round of pool, while others chatted over their microwaved lunches. A full-time barista (brought in from Krankies, a neighborhood coffee shop) made caffeinated beverages for a line of employees. Across the office in the printing room, an employee displayed a freshly inked poster for a staff Tiki party.

They are blissfully oblivious of the subtle particulars that went into creating their industrial-chic habitat. Jacobson and her team, for instance, carefully oriented ductwork over the conference room boxes and rows of desks to emphasize both the volume of the architectural insertions, and to create strong perspectival lines across the work floor. As a finishing touch, the painted concrete columns were lightly sandblasted and sealed to reveal nearly a century’s worth of chipped layers; the effect is something like an abstract expressionist painting. Even with the new additions and new program, the soul of the original Camel City factory still burns bright.

BENCH WARMER At the end of some of the boxes, TPG Architecture added booths and seating, oriented toward the new factory windows (left). The designers used muted finishes and sandblasted the existing walls and ceilings to reveal decades-old textures.

**FLOOR PLAN**

1. Reception
2. Boardroom
3. Café
4. Coffee Bar
5. Huddle Booth
6. Seating Niche
7. Theater
8. Studio
9. Edit Bay/Sound Booth
10. Sound Room
11. Photo Studio

**SOURCES**

- Custom Doors: CKS Architectural Millwork
- Acoustical Ceilings: Green Acoustics Building Products
- Solid Surfacing: Dupont Corian
- Plastic Laminate: Wilsonart; Formica
- Carpet: Interface
- Furnishings: Knoll; Herman Miller; Bernhardt

**ARCHITECT:** TPG Architecture - Larry Berger, studio director; Carly Jacobson, lead designer; Megan Adams, designer; Omar Bustamante, project manager; Pablo Almeida, project professional

**ENGINEERS:** Kibart (m/e/p); Pippin Engineering (structural)

**GENERAL CONTRACTOR:** Landmark Builders

**CONSULTANTS:** Onelux (lighting); Spectra (audiovisual)

**CLIENT:** MullenLowe

**SIZE:** 37,500 square feet

**COST:** Withheld

**COMPLETION DATE:** January 2016
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Stone and Fire: The Museum at Prairiefire

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The Museum at Prairiefire in Overland, Kansas, rises from the prairie landscape in fiery sparks of color reminiscent of prairie fires used for land management. This LEED Silver-rated creation was the vision of Jonathan Kharfen, AIA/LEED senior associate, Verner Johnson Architects. Covering 41,000 sq. ft., Kharfen used regionally-sourced natural limestone and Cordova Stone—a manufactured stone veneer from Oldcastle Architectural’s Echelon brand. “The use of Cordova Stone allowed this project to come in on budget and under a very tight timeframe,” said Kharfen. “Natural stone alone was cost-prohibitive, so it was critical to have a stone veneer that looked as realistic as possible.”

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Echelon Masonry

**PRODUCT APPLICATION**
Masonry veneer, interior and exterior, natural looking manufactured stone

**PERFORMANCE DATA**
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- Repels water and resists mold
- Available in ground, rock, texture face or chisel face and multiple colors and finishes
- Custom sizes and shapes
- Minimum compressive strength 1900 psi
- Maximum absorption by weight 13 lbs./cu. ft.
- ASTM C90-11b standard specification for load bearing concrete masonry units

**CONTACT INFORMATION**
Oldcastle Architectural,
Echelon Masonry
900 Ashwood Parkway, Suite 600
Atlanta, GA 30338
800-899-8455
EchelonMasonry@Oldcastle.com

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Artisan Masonry Veneers® Cordova Stone™, part of Oldcastle Architectural’s Echelon brand, was selected by The Museum at Prairiefire for its realistic look similar to limestone.
Building Envelope Materials

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SERVICE APPLICATION
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PERFORMANCE DATA

CONTACT INFORMATION
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DELTA®-FASSADE S
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THE GROTTO SAUNA, perched on a private island in Lake Huron, drew inspiration from the historical definition of a grotto – a secret water filled cave, concealed within unexpected rock formations.

DELTA®-FASSADE S, a water-resistant barrier (WRB), accommodates the extreme temperature changes occurring inside and outside of the Grotto Sauna. It has high vapor permeability, allowing for the moisture vapor that accumulates inside to escape. On the exterior, DELTA®-FASSADE S acts as a durable drainage plane, channelling water from wind-driven rain and snow to the outside of the structure. It will provide sustainable moisture and UV protection behind the open joint cladding for many years to come.

DELTA®-FASSADE S has a matte black coloring that creates a deep 3D effect making the red Cedar panels visually “pop” forward from the black background.

PRODUCT
DELTA®-FASSADE S

COMPANY
Cosella-Dörken Products Inc.

PRODUCT APPLICATION
DELTA®-FASSADE S is a UV-resistive water-resistant barrier specifically designed for open joint cladding systems.

PERFORMANCE DATA
DELTA®-FASSADE S has excellent stability against ultraviolet light. It provides sustainable moisture and UV protection behind open joint claddings.

CONTACT INFORMATION
Cosella-Dörken Products Inc.
1-888-4DELTA4
info@cosella-dorken.com

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More than 30,000 square feet of Pilkington Optiwhite™ was used to create a stunning glass entrance in Philadelphia's Dilworth Park. The glass provides a bright and welcoming walkway to the city's public transit, allowing light to flood into the concourse.

The glass was cut, edged and tempered by General Glass International (GGI), laminated by European Glass Laminators, and installed by APG International. The glass pavilions are 17 feet wide and curve upwards to almost 20 feet high. The pavilions include a total of more than 90 laminated lites of glass - each one a different shape.

**Philadelphia Dilworth Park**

**Pilkington Optiwhite™**

**PILKINGTON NORTH AMERICA, INC.**

5 laminated lites of 3/8” Pilkington Optiwhite™ for the vertical wall panels. 7 laminated lites of 3/8” Pilkington Optiwhite™ for the roof panels. European standard jumbo lites (6-by-3-meters or 20-by-10-feet) were needed for this project.
Designing for the Dark
Light pollution hides views of the cosmos and causes a host of environmental problems. But architectural and landscape lighting can be designed so that it is sensitive to the night sky and ecosystems yet still responds to clients’ requirements. On the following pages, RECORD explores projects that do just that.

By Joann Gonchar, AIA, and Linda C. Lentz

**ELECTRIC LIGHTING** has allowed us to transform the night. It extends our workday and permits us to punctuate the nighttime landscape with illuminated buildings. Roadway lights allow us travel on foot and by car safely from point A to B. And illuminated signs and advertisements help businesses sell their products and services.

But too much outdoor lighting can have deleterious effects. One of the most obvious is that it masks our view of the stars. An international group of scientists recently attempted to quantify the magnitude of this long-acknowledged problem with an in-depth study that relied on high-resolution satellite data and sky brightness measurements to map the impact of light pollution around the globe. Their research, published in June in the journal *Sciences Advances*, determined that the Milky Way is invisible to more than one-third of the world’s population, including 60 percent of Europeans and nearly 80 percent of North Americans.

However, masking the stars and other celestial bodies from humans is only one of the consequences of light pollution. It can also affect both wildlife and ecosystems. Bright beachfront lights can attract just-hatched sea turtles, drawing them inland rather than toward the water, making them easy marks for predators. City lights can disorient migratory birds, causing them to fly off course or crash into over-illuminated buildings. Light pollution can even interfere with the tiniest of creatures, including Daphnia, a type of zooplankton that helps keep algae blooms in check. The marine organisms, which dwell deep below the surface of the water during the day, float up at night to consume the algae. Nighttime light can prevent them from doing so.

There is also research suggesting that too much exposure to certain types of artificial light can negatively affect human health by disrupting the production of melatonin, a hormone that regulates our circadian rhythms and adjusts our internal clocks.

What is light pollution? Mark Major, principal of London-based lighting design firm Speirs + Major, explains simply that since illumination is a byproduct of energy, if you are using more than is required, or you are putting it where it isn't desired or necessary, “by definition, that is pollution.”
In only slightly more technical terms, light pollution is the excessive or inappropriate use of artificial illumination. A few of its manifestations are urban sky glow, which is a brightening of the night sky over inhabited areas; glare, or brightness that causes visual discomfort or loss of visibility; and light trespass, the term for light cast where it is not wanted or needed, such as illumination from a streetlight cast into a bedroom, making it difficult to sleep.

Not surprisingly, professional and amateur stargazers were among the earliest proponents for controlling light pollution. One example is the International Dark-Sky Association (IDSA), which was founded in the late 1980s by astronomers. The Tucson-based nonprofit organization advocates for smart lighting laws and policies and has an outdoor-fixture-certification program, as well as an initiative that recognizes towns, parks, and developments for responsible lighting practices. “We are not about

806 House  Borrego Springs, California

A two- to three-hour drive from the bright lights of Southern California’s largest cities, Borrego Springs—a small town bordering the Anza-Borrego Desert State Park in northern San Diego County—became the world’s second official Dark-Sky Community in 2009. Drawn to the area’s austere beauty and beautiful night sky, L.A. transplants Richard Orne, an architect, and his wife, Susan Hancock, a landscape designer and color consultant, bought 10 acres five miles from the center of town and built a sustainable house. The glazed moment-frame structure is 142 feet long by 28 feet wide, with deep overhangs on the northeast and southwest sides. In compliance with the community’s guidelines, derived from county codes and International Dark-Sky Association lighting basics, Orne used as little lighting as possible. He limited the outdoor fixtures to shielded 2700K downlights under the overhangs and over four decks on the building’s northwest. These are tied to photosensors programmed to turn them on at dusk and off at dawn. (A manual override allows them to be shut anytime.) The interior, divided into five sections along its length, is illuminated by recessed 2700K to 3000K LEDs on dimmers. In the evening, when a particular zone is not in use, it remains dark. “Very little light escapes from the house,” says Orne. “It’s more like a low-glowing lantern.” There are even nights they turn all of the lights off. During a full moon, he adds, there is plenty of light without them.
Suspenders™ is a delicately scaled, modular system of interconnected elements and suspended LED luminaires. Dramatically powerful in its message of utility and simplicity, Suspenders can be configured as individual lighting sculptures or as a tiered web of infinite scope and variety. Explore the possibilities at sonnemanawayoflight.com.
PANOS | Downlight

PANOS delivers unparalleled LED lighting quality, efficiency and precision with compound material construction inspired by space technology. Installation time is twice as fast as traditional downlights – no housing required.
Located in a previously industrial part of Paris, the 1975 Pont de Sèvres Towers, designed by Badani and Roux-Dorlut, have been reimagined by French architect Dominique Perrault. Renamed Citylights, the once detached office complex now embraces the city with sustainable prism-shaped buildings that illuminate the rapidly developing district (dubbed Trapèze) with a gentle luminosity.

The design team’s goal was to enhance the towers with discreet yet precise lighting that respects area residents and the ecosystem of the Seine’s riverbanks. To do this, they encircled one-third of the aluminum facades, at different heights, with a “bracelet” comprising folded modules (above) made of pronounced metal aprons, two layers of glass (an extra-clear, single-glazed pane forming an outer skin and a double-glazed window within), and an LED system. Sandwiched between the glass, recessed LEDs radiate toward the lintels and metallic facade, which then casts indirect light toward the mullions. Passersby are never dazzled. They see only luminous reflections that, within this urban context, bring a human scale to the architecture.

turning out the lights,” says Pete Strasser, the organization’s technical director. “We are about doing lighting appropriately.”

The outdoor lighting strategies recommended by IDSA include luminaire that are shielded to direct light downward rather than up into the sky, are only as bright as necessary, and shut off or dim after hours. Strasser sums up the basics of outdoor lighting as “light where you need it, when you need it, and no more. Everything else is just waste.” The organization estimates that 30 percent of outdoor lighting in the U.S. is wasted, amounting to $3.3 billion and 21 million tons of carbon dioxide emissions per year.

Proponents of turning down the volume on outdoor light point out that more illumination doesn’t necessarily mean greater security. For instance, bright lighting that causes glare is likely to have the opposite

**Citylights Paris**

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A beautiful revolution.

Lunetta is the new, pedestrian-scale exterior luminaire that changes everything. Unlike traditional, segmented pathfinding lights, Lunetta’s entire body appears to illuminate from the top down, creating a seamless, sophisticated visual effect. Lunetta’s hidden LEDs create a gradated effect, and soft, lambertian ground level light distribution. For form, function, and design creativity, Lunetta owns the night.

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effect and make occupants feel unsafe, points out lighting designer James Benya, a principal and partner at Benya Burnett Consultancy in Davis, California. And the IDSA maintains that there is no clear correlation between increased outdoor illumination and crime deterrence. It cites research including a 2015 study of street lighting in England and Wales that found little evidence of increased collisions or crime when lights were dimmed, turned off at certain hours, or replaced with more energy-efficient fixtures.

To encourage lighting that protects the night sky and is energy efficient but also provides sufficient illumination levels to make users feel comfortable and secure, IDSA and the Illuminating Engineering Society of North America (IES) developed a model lighting ordinance (MLO) that communities can adopt in whole or in part. The document is intended to address inconsistencies in lighting ordinances across the country that vary in technical quality and often use outdated or incorrect terms, says Nancy Clanton, president of Boulder, Colorado–based lighting design firm Clanton & Associates. “Since they are different everywhere, designers don’t know how to comply,” explains Clanton, who chaired the MLO development committee with Benya.

Among the MLO’s key features is the use of five different lighting-zone categories. These range from wilderness, preserves, and unde-
**Petersen Automotive Museum**  
*Los Angeles*

The steely body of KPF’s new shell for this museum’s existing structure is vibrant, yet the lighting was configured to minimize light pollution. This is largely due to the California Title 24 CalGreen section, which limits the amount of uplight per fixture to discourage facade uplighting, floodlighting, or other potentially invasive illumination sources. Horton Lees Brogdon lighting designer Clifton Manahan says, “The brief was to create something mysterious that hints at movement inside the building.” So the team employed dynamic color-changing LEDs, working with one manufacturer for consistent quality. For a wide range of colors and effects, he opted for four-color RGBW LEDs with optics that provide maximum light spread across the facade while minimizing glare. The output of each uplight was coordinated with the architectural shell, which serves as shielding to ensure the state’s limits were met. “Saturated-color light is more visible to the human eye than just white light,” says Manahan. “So the measured output of the fixtures and brightness of the building are fairly low but still visible.” This gives it a strong identity yet also curtails glare and light pollution.
The High Line New York City

“The idea was to create a ribbon in the middle of the canyon,” says Hervé Descottes, principal of L’Observatoire International, about the High Line project. His firm worked with the team leader, landscape architect James Corner Field Operations, architect Diller Scofidio + Renfro, and plant designer Piet Oudolf to convert an abandoned freight line on Manhattan’s far west side into the wildly popular 1½-mile-long elevated park, completed in stages between 2009 and 2014. New York has no restrictions on uplight, as many cities do, according to Descottes. But here the light sources—a combination of metal-halide lamps and LEDs for the first phases and all LEDs for later ones—are hidden, directed downward, and placed low to the ground.

“The approach makes the landscape appear to glow all by itself.”

Although the MLO has not been widely adopted since its release in 2011, its language, including the lighting zones and the BUG rating system, has been incorporated into a LEED credit for light-pollution reduction, helping focus project teams’ attention on responsible outdoor-lighting design. “It has created an awareness of the problem,” says lighting designer Glenn Heinmiller, a principal at the lighting-design firm Lam Partners in Cambridge, Massachusetts.

One aspect of outdoor lighting that isn’t covered by either LEED or the MLO is the color of the light source. But color is an increasingly controversial topic, especially as traditional halogen sources are replaced with
more energy-efficient and longer-life LEDs, which, at least until recently, tended to be cooler or seemingly whiter. In mid-June, the American Medical Association (AMA) released a statement warning of potential health hazards associated with high-intensity bright-white LED streetlights. According to the report, such a lamp “is at least five times more powerful in influencing circadian physiology than a high-pressure sodium light, based on melatonin suppression.” The statement cited recent studies that found that greater residential nighttime lighting is associated with such ill effects as reduced sleep time, dissatisfaction with sleep quality, impaired daytime functioning, and even obesity. The AMA’s recommendations include use of shielded streetlighting, with a correlated color temperature (CCT) of 3000K or lower. (CCT is a specification of the color appearance of light emitted from a lamp measured in degrees Kelvin. Lamps with a higher CCT rating are considered cooler.)

Although the IDSA called the report “groundbreaking” on its website, not all lighting professionals are as enthusiastic. Mark Rea, the director of the Lighting Research Center at Rensselaer Polytechnic Institute, in Troy, New York, says that the AMA analysis is “oversimplified.” Rea and Mariana Figueiro, the research center’s program director, issued a response that
St. Patrick’s Island Park  Calgary, Alberta

When the Calgary Municipal Land Corporation tapped Civitas and W Architecture & Landscape Architecture to create a nature-based park on a 31-acre island in the city’s Bow River, the landscape architects called upon Tillett Lighting Design to provide contextual illumination with the delicate touch for which the firm is known. St. Patrick’s Island had been a park for over a century but suffered from neglect and disuse in recent decades. One of the goals of the design team was to maintain a viable habitat for birds, bats, and other wildlife. To achieve that, principal Linnaea Tillett and her team first identified how much of the park they could reserve as dark space. They layered this approach by also looking at how little light they could use, and only where it was essential for people using the park at night so that they would feel at ease and be able to find their way out. The lighting designers used a warm 3000K CCT for all the lamping, defining a major path (above) through the length of the park with well-shielded metal halide fixtures on tall wood poles. With two 50-foot-tall poles, each supporting four shielded adjustable metal-halide floodlights, the designers cast a moonlike glow on a central berm (opposite, top), used for nighttime sledding. Typically, the floodlights are shut off when the area is not in use. They also scattered low-level LED luminaires along secondary paths and LED wood bollards (right) in more open areas. Says Tillett, “We absolutely minimized our participation to maximize the territory left light-free for the birds.”
Msheireb Doha, Qatar

Msheireb Properties is revitalizing Doha with an eponymous new downtown that has an ambitious sustainable agenda. Asked to create a master plan for the lighting of the 77-acre development, Arup worked with architectural master planner Allies and Morrison to create standards that are compatible with the desired Qatari building style and minimize the number of illuminated facades throughout the project’s various zones—mixed-use and residential, business, retail, heritage, and government. Employing the LEED light-pollution-reduction credit as a reference, lighting designer Emily Dufner and her team devised a concept called Light, Dark, Light that illuminates rooflines—comprising roof terraces and shade structures—as well as ground-level colonnades with shielded downlights, leaving the facades dark. All of the utilitarian luminaires, such as streetlights, are full-cutoff. LEED does allow a certain percentage of uplighting, however, so allowances were made for landmark buildings, structures on key public spaces, and decorative lighting. In all these cases, controls play a critical role in shutting them off at predetermined times. “Sustainability and the reduction of light pollution is inherent in our approach,” says Dufner, “but in this project, it was client-driven.”

criticized the AMA report on a number of fronts, but one of the main arguments is that CCT is not appropriate for characterizing the potential health impacts of lighting since the metric “is independent of nearly all of the important factors associated with light exposure, namely its amount, duration, and timing.”

Meanwhile, Lam’s Heinmiller calls the issue of circadian rhythms “huge and important,” but says the focus on CCT is “missing the forest for the trees.” He points out that converting street lamps to 3000K will not by itself solve the problem. “If we are still over-illuminating the environment, we will be creating light pollution.”

Clearly, the science behind outdoor lighting and its environmental and human health implications is complex. But aesthetics should not get lost in the debate, say advocates of sensitive nighttime illumination. Architects and lighting professionals should not think of lighting after the sun sets as an extension of the day, says Travis Longcore, assistant professor of architecture and spatial sciences at the University of California, Los Angeles. Instead, he says, their goal should be “nocturnal place-making.”

Learning Objectives

1. Define light pollution and related terms, such as sky glow, glare, and light trespass.
2. Discuss the ecological and human-health consequences of light pollution.
3. Discuss policy efforts aimed at reducing light pollution.
4. Discuss the methods used to minimize light pollution in recent outdoor lighting projects.

AIA/CES Course #K1608A

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By Linda C. Lentz

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- Create a sketch on a 5-inch-by-5-inch white paper cocktail napkin.
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- Include the registration form below or from the website.
- You may submit up to 6 cocktail napkin sketches, but each one should be numbered on the back and include your name.
- All materials must be postmarked no later than September 9, 2016.

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Find more information, email: ARCallforEntries@bnpmedia.com with the subject line “Cocktail Napkin”
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Providing Thermal, Moisture, and Fire Barriers In Harsh Conditions

Critical building systems need to hold up to multiple rigors and demands

Sponsored by Acpexpress, Epro, Inpro, and Tremco Commercial Sealants & Waterproofing | By Peter J. Arsenault, FAIA, NCARB, LEED AP

All buildings are designed using a combination of materials, products, systems, and components. Each part is selected and specified to do a particular job, serve a particular purpose, or meet specific criteria. Some are driven by design and aesthetic priorities, while others are driven by functional and performance requirements. The most successful designs are those that allow all of these parts and pieces to work together such that the use of one does not compromise the use of another. In fact, the ideal situation is one where products or components can enhance other materials or systems that are part of the larger building.

This premise is particularly true where thermal, moisture, and air barriers are involved. By their nature, buildings create a barrier or separation between indoors and outdoors. That separation involves restricting or eliminating the passage of unwanted air or water and controlling unwanted heat transfer. The types of products and systems used to accomplish that separation will determine the effectiveness of the exterior enclosure of a building. But more importantly, the attention to all of the areas where those barriers have seams, connections, penetrations, or irregularities determines the ultimate performance and effectiveness of truly critical air, water, and fire barrier systems in buildings need to be designed and installed correctly in order to protect both the building and its occupants, as shown here at the Parkland Hospital in Dallas, Texas.
continuous barriers. This is true not only in building exterior enclosures for thermal and moisture protection, but also within a building, where fire barriers are required to protect human life and safety. Walls, floors, and ceilings may be tested and rated, but if the construction is not truly continuous due to openings, joints, or other features, then the effectiveness of the barrier is compromised.

There is one other concern for the long-term integrity of barriers in buildings, namely the conditions they will face over the life of the building. Most of the manufactured barriers or systems available are tested and rated based on typical, or average, conditions. But, depending on their location and use, buildings may experience more difficult or challenging conditions. Some locations constitute harsh environments due to regular exposure to salt water, high winds, or heat and cold. Others are in active seismic zones that can impose numerous stresses from multiple minor earthquakes over the life of the building. Hence, the long-term safety and durability of these barriers, and the buildings and people that they protect, are directly dependent on their capabilities to hold up and function in all of these conditions.

To illustrate these points, we will look at four types of barriers and the issues related to their performance under normal and harsh conditions. Specifically, we will address exterior cladding, air barriers, moisture barriers, and fire barriers.

ENHANCED EXTERIOR CLADDING
The first line of air and moisture defense on any exterior wall system is the outermost cladding material. Generically, any type of material can constitute cladding, ranging from masonry, stone, metal, wood, or composites. Its purpose is to provide the visible skin of opaque areas of the building and deflect wind, rain, sun, and heat. As such, it needs to be very durable to hold up over time and retain both its appearance and performance characteristics. Usually, this cladding layer is not considered to be air or water tight. Rather, it is intended to take the brunt of weather and sun exposure and protect the building materials and systems behind, while allowing for the management of air and water to drain away. While most cladding materials are up to the challenge, their useful life and need for maintenance will vary by material. Painted surfaces will need repainting, masonry and stone may need repointing, and applied coatings may need recoating. It is not surprising then that factory-finished metal or composite panel systems have become popular for cladding since they often require less maintenance, can be more durable over time, and are lighter weight than some other alternatives.

When thinking about cladding panels, it is common to think of the industry-standard flat panel installations. These may be appropriate for many situations, but their rigidity and ability to withstand high winds or other forces will be directly dependent on the inherent strength of the panel material. If the panel is surface applied directly to a substrate, that may help, but most are designed to be held away from the substrate, creating an intentional drainage space behind the cladding. In fact, the increasingly popular rainscreen systems are specifically designed to perform based on creating just such a space that anticipates water penetrating the cladding joints and being allowed to drain away harmlessly.

An alternative to flat panels is to use metal or aluminum composite material (ACM) panels in three-dimensional (3-D) panel shapes that easily install on building walls. The 3-D shape helps with the rigidity of the panel and avoids distor-
This ACM cladding system shows thermal break pads, insulated Z-furring, base attachment, stiffener attachments, and un-routed ACM panels. In this case, finishing caps are used to hide the attachment joints.

The primary point of differentiation between fabricators of ACM panels is the attachment systems that each provide, usually made of aluminum or rigid PVC channels and clips. Some attachment systems are based on panels coming together in a butt-butt joint approach that is designed for interior installations but not for exterior facades. Others are based on a removable panel system that allows an ACM panel to be removed and a new panel installed into the same attachment clips, all in a matter of minutes. This can be very useful when sporadic, severe conditions are anticipated and replacements are needed in case of damage, vandalism, etc.

More sophisticated systems remove the need for routed returns on the panels by using the design of the panel and attachment system to join panels together securely. Such systems secure the panels to the building wall without the need for screws, rivets, or caulk. This means that the fabrication and installation process is radically simplified, reducing the overall cost of the installed system and shortening the lead time for getting the panels onto a building. Such systems can be enhanced with thermal break pads that can isolate the aluminum attachments from the building wall, effectively stopping the thermal transfer of energy through the cladding. The thermal break pads commonly available are made from a material called polyamide and are designed to easily affix to the aluminum attachment systems. Polyamide has been found to be very effective at stopping thermal transfer of energy between interior and exterior surfaces. This heat transfer control can be further enhanced using rigid insulation behind the cladding that is penetrated only with Z-channels or hat channels to secure the cladding in place. The combination of thermal break pads and continuous insulation helps provide high R-values for ACM panel installations.

Pablo M. Ipucha, Associate AIA, a senior project manager with Gene Kaufman Architect PC, has experienced the use of such a system, and here is what he has to say about it: “Incorporating ACM panels into a building envelope has benefited us in drastically reducing the width of the exterior wall, while meeting the R-value requirements. We were able to add 6 inches of usable real estate to the floor plans all around.”

COMPLETE, COORDINATED AIR AND WATER BARRIER SYSTEMS

Behind a cladding system, the rest of a wall assembly needs to be covered with air and water barriers. In some cases, that can be the same material; in others, it is two different products or materials. Generally, conventional wisdom suggests that the fewer the layers the better for simplicity and cost effectiveness. However, there are other considerations. First is the need for a complete, continuous barrier. That means it is not just about the material itself, but the means to attach it, the connections at seams or joints, and the treatment around penetrations, such as piping, wires, or sleeves. Just one small gap can lead to major problems from air and moisture infiltration, and those gaps can occur in a lot of different ways. The drawings and specifications, for example, may not be all encompassing enough to address different design details. On-site construction conditions might leave wide joints that are impossible to seal with a sealant. During occupancy, differential movement of materials can lead to joint failure. All of these situations need to be considered to achieve a truly durable and continuous system.

Second, the transitions of the barrier systems to other types of construction need to be taken into account. While the window-wall transition is where most problems occur, connections at roof to wall, foundation to wall, corners, penetrations, drift joints, and floor deflection joints are also critical connections with the potential for increased performance problems, not to mention professional liability. All of this underscores the need for continuous, compatible product systems that address all of the connections on the building envelope where most failures occur, especially under harsh conditions, such as thermal and seismic movement, hurricane forces, and blast resistance.

Continuous connections and transitions throughout the building envelope are key to the longevity of the structure and its structural components, energy consumption, indoor air quality, and maintenance. Specifications left to “others” for these connections lead to uncertainty, interpretation on the job, and trial and error. Traditional methods may not work, particularly over the long term after continual exposure to thermal or dynamic movement. Depending on the conditions, they may not even work at the outset if existing conditions leave unsupported gaps that cannot be addressed by sealants, foams, or peel-and-stick flashing membranes.

Fortunately, products are available from single-source manufacturers that are complete, coordinated, and effective. Some have created innovative, engineered solutions for critical connections that provide visible assurance of a secure, continuous seal without voids. For example, one system consists of pre-engineered, finished aluminum and silicone materials that are assembled and attached to a window or wall assembly. These assemblies provide a more secure and flexible option for sealing connections, notably improving air and moisture management at critical transitions. This type of solution also allows for greater movement and deflection beyond what sealants or self-adhered membranes can provide, particularly where dissimilar materials, such as curtain wall and various assemblies, connect—all while main-
Which is why we obsessively engineered our Fireline 520™ Fire Blanket to help protect your building and the people inside from smoke and fire disasters. From factory fabricated transitions to drop-in installation, Fireline 520™ Fire Blankets are made to prevent the usual gaps in fire protection that can leave your building vulnerable. With lives on the line, do you know what’s in your joint?

Contact us today to learn more about protecting your building.
Continuous air and water barriers need to address the application of the material plus the details of seams, transitions, and connections, particularly around doors and windows.

Architects and others who seek to work with an air and water barrier company during design may be pleased to discover that some offer significant assistance related to the most successful ways to use their integrated systems. These companies are as interested as the design team is in mitigating risk by working to prevent barrier failures during construction or occupancy. Such design assistance may include a full review of the building enclosure system, suggestions for integrated product and connectivity solutions, and even project-specific 3-D CAD details with installation instructions. During construction, they can assist with mock-ups to document performance, quality assurance through pre-construction coordination, applicator training, plus inspection and on-site testing, if desired. In some cases, they can even assist with full building enclosure commissioning in addition to providing full-system performance warranties.

**APPROPRIATE LEVELS OF WATERPROOFING**

Some portions of a building need more than air and moisture protection—they need full waterproofing protection. This is true in low-slope roofing systems, but it can also be true in more severe conditions both above grade and below grade. Anywhere the potential exists for bulk water to collect or build up against a wall or floor system, then waterproofing is needed to protect it. There are, of course, multiple ways to achieve such waterproofing, and sometimes the choices can be confounding in terms of determining what is best for a particular project. Further, it is not always appropriate to assume that a standard solution that worked well for one building is appropriate for another.

One approach to determining the most appropriate solution is based on a concept called “redundant field-fabricated composite design,” which is the integration of multiple waterproofing types into one organized.
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Complete waterproofing based on the concept of redundant field-fabricated composite design provides below-grade walls and decks the degree of protection needed based on the choices made for individual component layers.

system. This concept allows architects and designers to customize the system, protecting their structure based upon the site conditions, performance expectations, and budget considerations of the project team. It also allows for an assessment of the severity of the waterproofing needs and allows for a system to be selected based on that need. Essentially, the approach is to be sure that the products and system used will keep building structures dry and safe, but to use the appropriate level of protection needed—not overdue it unnecessarily, nor come up short on meeting the true waterproofing need.

Some manufacturers recognize this approach to waterproofing and have made it easier to understand the differences between different layers or types of protection using their commercial waterproofing products. Essentially, they provide a “good, better, best” approach to waterproof protection through different system configurations that are suitable to protect below-grade foundations and exposed decks. Such field-installed composite waterproofing systems are defined by multiple layers. The first layer is a spray fluid-applied membrane that covers concrete or masonry. Commonly, this is a water-based polymer modified asphalt (PMA) membrane. The second layer is a reinforcing fabric commonly made from polyester to take up any undue stresses from movement. An additional layer can be specified that allows for some added thickness to absorb and drain water away. This layer is commonly made of bentonite or a similar water absorbing and draining material. The final outer layer protects the drainage medium as well as the primary membrane. Such outer layers can be a composite made up of a high-density polyethylene (HDPE) core and nonwoven polypropylene fabric drainage or a polypropylene core and polypropylene fabric.

The goal of this holistic approach to waterproofing is to create a series of barriers, drainage channels, and reinforcing protection over a concrete or masonry wall, slab on grade, or other structure. Each of these layers can be specified or selected based on the particular needs of the project with properties that suit
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the harshness of the building site or the degree of protection required. By working with one manufacturer that provides a complete system with the multiple choices, the design can be simplified and the performance maximized. At least one manufacturer provides such a system that truly combines all types of waterproofing into one coordinated system.

In addition to the actual system, it is important to understand how the edges of these systems are detailed. On vertical or sloped walls, a continuous metal termination strip across the top of a hybrid membrane allows for the transition between the area above and below the waterproofed area, but it also holds the drainage barrier in place. The bottom needs to account for the footing condition and allow the vertical drainage to be picked up, channeled, and moved away from the wall. That may mean adding some products specifically designed to be compatible with the rest of the waterproofing system that can be integrated as a horizontal or sloped drainage medium. Finally, the collected water must be able to drain away from the wall altogether either through drain tiles or piping or through the use of backfill materials that will allow for water dispersion.

Horizontal conditions, such as concrete floor slabs on grade, can be equally demanding, particularly if the groundwater level is high or the soil around and under the slab becomes saturated due to heavy rains. In order to prevent water infiltration, the waterproofing system needs to be continuous under the floor slab and connect with the wall edges to form a continuous barrier to drain and stop the water. This need can be exacerbated if freezing conditions are encountered near the building or if seismic activity is prevalent. In these cases, the waterproofing membrane system is subject to additional stresses and pressures beyond the normal hydrostatic concerns. Hybrid or composite systems that incorporate the multiple attributes of membrane, reinforcing, drainage, and protection into one coordinated system are most likely to perform well under these conditions compared to less complete or less coordinated approaches from multiple manufacturers.

Overall, hybrid, composite waterproofing systems leverage the attributes of multiple waterproofing technologies into a coordinated system. This enables building owners to receive a better overall value by receiving the appropriate level of protection, provided the architect selects the best mix of products and barriers to do the job efficiently. Further, by combining and leveraging the benefits of each waterproofing component, installation times can be decreased while overall protection increases compared to other types of waterproofing systems.

**KEEPING FIRE BARRIERS UNINTERRUPTED**

Fire separations are required in buildings for good reasons—there are too many tragic examples of preventable death and injury from fire and smoke in buildings. While a common reaction is to require fire sprinklers as an "active" means of fire safety, architects are well aware of the "passive" approach of using compartmentalized spaces that are enclosed on all horizontal and vertical sides with fire-rated construction. As in all barrier systems, the main body of the barrier is fairly well understood—in this case, noncombustible construction using protected steel, concrete, or gypsum board. The issue becomes addressing the seams or joints in this construction. In particular, large buildings require expansion joints that are often located in fire-rated construction that separates occupied spaces from each other, from vertical shaft ways, or from adjacent tenancies. The apparent paradox of providing an intentional break in the structure to allow for normal expansion and contraction while still maintaining a fire rating is addressed by providing an expansion joint fire barrier.

There are three common types of fire barrier expansion joint systems, and the suitability of each will depend on the size of the joint or gap as well as the conditions that the joints are subjected to.

- **Compression systems** are typically for 4-inch and smaller expansion gap widths. These products are commonly comprised of mineral wool strips held in place through compression. These are topped with fire caulk sealant to secure the barrier in place and protect from water infiltration. Fire lab testing of compression systems is typically done for both concrete and drywall conditions.
- **Fire-rated foams** are suitable for 6-inch and smaller gaps and conditions where abuse is not likely. These systems are comprised of open-cell polyurethane foam impregnated with a fire-retardant material. These foams can be faced with colored silicone to match a desired décor or design aesthetic. Foams can also provide acoustic and insulation properties. Fire-rated foams are usually lab tested in concrete and cement-board wall conditions (not drywall).
- **Fire blankets** are the most versatile systems, suitable for expansion joint gaps of 2 to 32 inches and able to withstand high rates of movement. Fire blanket systems come in two forms—either ceramic cloths with
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REDUNDANT FIELD-FABRICATED COMPOSITE DESIGN
intumescent layering or graphite sheet goods encasing insulating blankets. In seismic conditions, they allow for approximately 50 percent of joint compression and expansion movement. Some models are able to retain their rating throughout lateral shear movement testing, while others cannot. Fire blankets are tested in concrete, but alternate substrate conditions may also be acceptable.

In all cases, the continuous, uninterrupted installation of the fire barrier is critical for life safety. This is especially true when using fire blankets since they need to be fully and carefully connected to the adjacent concrete surfaces and form a continuous barrier where vertical and horizontal conditions meet. At least one manufacturer has addressed this concern through the use of a modular system that allows separate sections to nest together creating tight, continuous protection. Further, the edges of the blanket are pre-attached to metal flanges, assuring that the proper seal is obtained instead of relying on field installation to create an uncertain seal. These pre-attached flanges drastically reduce labor costs and ensure a uniform installation for a more reliably continuous seal.

Fire blankets can be specified either to withstand water or not. Those that cannot withstand water exposure and become wet are often rendered useless against smoke, fire, and heat, and even after re-drying carry diminished fire resistance. Products that are rated and tested for water exposure during or after construction or for open structures, such as parking facilities and stadiums, provide fire protection even if they become wet. It is important then to select and specify the appropriate material for the water conditions anticipated in the building.

**CONCLUSION**

Barriers of multiple types are needed in buildings to protect not only the building but the people inside. In all cases, the continuity and integrity of those barriers are critical to their performance. This is compounded by the fact that different conditions ranging from moderate to harsh will impact the ability of the barriers to perform as intended. Architects and designers who understand the range of options and the suitability of those options to different conditions can design and specify buildings that are safe, durable, and sustainable over the long run.

**Photos courtesy of Inpro**

Fire barrier expansion joints that have gaps between flanges and the blanket do not provide continuous fire protection. Further, blankets that are wet and not rated to resist water lose their fire rating.

**Continues at ce.architecturalrecord.com**

Peter J. Arsenault, FAIA, NCARB, LEED AP, is a practicing architect, sustainable building consultant, continuing education presenter, and prolific author engaged nationwide in advancing better building performance through design. [www.linkedin.com/in/pjaarch](http://www.linkedin.com/in/pjaarch)
PRODUCT REVIEW
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Fireline 520™ Water Guard™ Series systems are the only fire blankets with a U.S.-patented, UL 2079-rated waterproof design. The Water Guard protects the integrity and performance of the fire barrier from extended exposure to the elements.

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Circle 48
Prefabricated Ornamental Railings

Beauty, safety, and ease of installation all come together when stainless steel railing systems are prefabricated instead of constructed on the job site.

Sponsored by AGS Stainless, Inc. | By Andrew A. Hunt

Metal ornamental railing systems can provide an elegant and functional finishing touch to a building project. However, it is important for architects to understand the difference between the types of materials available, as well as where and how the railing system is manufactured, and how it will be installed. By understanding these aspects of the railing system, architects can better manage this aspect of the building project.

This course will discuss the overall advantages of choosing a custom-fabricated railing system built off-site compared to off-the-shelf products or locally fabricated railings. In addition to looking at the practical considerations of how different fabrication choices affect project time and budget, this course also identifies some ways to address health, safety, and building occupant welfare.

The traditional practice of building railing systems on-site can present architects and building professionals with several challenges that can affect overall project timelines, budget, and safety. When a general contractor builds a railing system on-site, he/she handles the entire process, from design to installation. This approach can add to project costs through time delays since the time spent on the railing system is time taken away from other aspects of the building project. Alternatively, contractors may choose off-the-shelf railing systems, which greatly limit the designer’s ability to provide custom and personalized touches to the overall project design.

Contractors often tend to choose wood, composites, or aluminum as the materials for on-site railing systems because they are easier to work with. Aluminum, for example, is very popular because it is strong, lightweight, and durable. These materials, however, are not always the best choice for a specific project design. Stainless steel railings, on the other hand, are considerably stronger, more durable and offer greater design flexibility than the previously mentioned materials. Whereas these other materials can be bought off the shelf and cut

Ornamental stainless steel railings can add a touch of luxury and class to both interior and exterior designs, and can be easier for builders and architects when prefabricated off the job site.

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Learning Objectives

After reading this article, you should be able to:

1. Explain the advantages of a prefabricated custom railing system and an all stainless steel railing system.
2. Compare and contrast the railing system materials used for posts, top rails, and infill.
3. Describe common challenges with locally fabricated metal rail systems.
4. Evaluate how stainless steel railing systems meet health, safety, and welfare requirements.

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AIA COURSE #K1608C
to length on-site, stainless steel railings must be custom fabricated before they can be installed.

When a contractor chooses to include custom stainless railings on a project, he/she usually hires a local metal fabricator/job shop who will design, manufacture, and install the railing system. While this practice can result in unique work from local specialists, it runs the risk of adding to the overall project cost and completion time. On-site railing work also increases the health and safety risk to the fabricator/installer, the contractor, and the building team, especially when materials need to be welded on-site.

As an alternative, architects and building professionals can choose that the stainless steel railings they specify for their projects be prefabricated. This option is more efficient and more reliable than using a local metal fabricator. It also takes some of the workload off the general contractor. Architects can consult with a manufacturer’s railing specialist to determine the best design choice for the project, and then provide their CAD designs to the manufacturer for customized fabrication. The manufacturer will deliver the finished product to the construction site as a ready-to-install, fully componentized system. The result is a project that benefits from customized, factory-crafted ornamental railings, without the time, expense, and uncertainty of local fabrication.

There are several benefits to using prefabricated railings. First, because the architect can custom design the railing, he/she can make sure that the design works perfectly with the rest of the building design. As noted above, architects can consult with railing specialists from the manufacturer if they have questions about their design or would like to explore design solutions they may not have initially considered.

Once the custom design is sent, the railing system is then produced in a centralized factory, where quality-control protocols ensure consistent product excellence and lean manufacturing processes reduce construction waste, when compared to local fabrication.

Prefabricated systems also mean fewer on-site worker safety concerns because the installation tends to be easier, safer, and quicker than with locally fabricated railings. No on-site cutting or welding is needed, and thus the building site and construction team can avoid the risk of sharp metal debris from the rails, or risk of electric shock or toxic fumes from the welding.

All of the above elements translate into shorter installation times, lower project costs, and improved safety for the on-site construction team. They also contribute to a more streamlined project schedule, which can also mean lower overall project costs.

**ELEMENTS AND EVALUATION OF RAILING SYSTEM MATERIALS**

The basic components of ornamental railing systems include the post material, the top rail, and the infill. Together, these components make up the main visual elements of a railing system. There are many different options for component materials, with either a single material for the whole system or with different materials combined for a railing that is unique to the specific building project. In addition to being designed to enhance the building’s aesthetic elements, railings should be designed for strength, durability, and safety.

**Railing Posts**

Commonly used materials for railing posts include wood, aluminum, composites, or stainless steel. Wood posts provide a classic look, and as long as the wood is treated properly, they should be durable and have a relatively long lifespan. With wood posts, the force is directed to the joist and rim joist connections, and so builders need to pay close attention to post and joists framing procedures and select the most appropriate fasteners. There are a wide variety of framing techniques, each of which carries with it different challenges and costs.

Aluminum posts are commonly used in off-the-shelf systems because of their light weight and easy installation options, and because they tend to be more durable than wood or vinyl. They distribute the load well and are usually coated with a powder-coat finish to help prolong the life of the metal.

Composite railing posts tend to be a low-maintenance option that provides building professionals with a range of styles, colors, and design options. These systems are often sold to complement a manufacturer’s flooring products and thus offer a unified, finished look when installed.

Stainless steel posts tend to combine the best of all worlds in that they are strong, durable, and are usually engineered to exceed most local building codes. Stainless posts can be fabricated with a range of finishes, including brushed, polished, or powder-coated paint, and they resist corrosion very well.
Top Rail Materials
As with posts, the top rail is also usually made of wood, aluminum, composites, or stainless steel. While the top rails serve a different purpose than the posts (i.e., they do not deal with as much force as the posts), the material choices have similar pros and cons. For example, wood top rails make an aesthetic statement and work well for interior railing systems. However, even the best-treated wood will eventually give way to the elements when used outdoors.

Aluminum and composite materials are subject to wear and tear as well. Additionally, some composite materials require a supporting structural component to reduce the risk of deflection in the top rail. And, as with posts, stainless steel works as an ideal material because of its longevity, corrosion resistance, and finish options. For example, a brushed stainless or satin finish can be beneficial for top rails to retain less heat than highly polished surfaces, and thus ensure that the railings can be comfortably used even in the hot sun. This benefit takes into consideration the health, safety, and well-being of building occupants and the general public by allowing the rail to be used regardless of the time of year, all while allowing the designers the freedom of creative design for aesthetics.

Welded Connections
An easy way to identify a custom-made stainless steel railing are the connections between the systems components. Most custom-made stainless steel railings have welded connections. On the other hand, a tell-tale way of identifying a kit is the snap-on pieces. For example, a top mount post on a custom-made stainless railing system will be welded to the base plate. Welding is typically done by hand and allows the skill and craftsmanship of the fabricator to shine through. With a kit, the post material is cut to length and then fitted over a sleeve on top of the base plate. The post and base plate are secured together with either an adhesive, screws, or both. The same is true for end caps. At the end of the run on a custom-made stainless steel top rail, the end cap will be welded to the top rail. When built by a true craftsman, there will be no evidence of a joint. It will be polished to create the illusion of a single piece of solid metal. With a kit, the end cap is inserted into the top rail and secured with an adhesive.

Infill Materials
The infill is an important component of the system and can be made of cable or bar rails (typically stainless steel) that can be oriented vertically or horizontally, glass panels, wire mesh panels, or specialty materials unique to the project. Depending on the placement and purpose of the railings, health and safety considerations will also factor into material and infill choices. For example, a railing system on a multistory apartment building or hotel may include tempered glass panels as infill to provide a solid physical barrier between the decks and the ground. Alternatively, a homeowner who installs a new deck in their yard may desire a railing that provides a clear line of sight to the yard without the frequent cleaning required of glass and, in this case, cable rails may be the perfect solution. Or vice-versa. In short, the project needs will determine the infill solution and the material.

Cable infill, or “cable rails,” as they are commonly known, work well for both indoor and outdoor railing systems. They can easily be mounted to almost any post style or mounting configuration (top mount, side mount, core drill, etc.). Cables are a popular component of railing systems because they are thin, flexible, and yet very strong. In fact, stainless steel cables can usually withstand 1,000 to 3,000 pounds of force without breaking. Cable infill can provide a sleek and modern look, and can appear practically invisible from a distance, providing a nearly unobstructed view of the surroundings. This is why cable railings have become so common on decks where the view is striking (like around the ocean, mountains, lakes, etc.). Cable railing also looks great indoors, as it can tastefully define spaces, while maintaining a feeling of openness within the living areas.

Like all infill components, cables are subject to building code requirements. There are minimum loads to be resisted and maximum openings to be heeded. The load requirement is a 50-pound horizontal force applied on a 12-inch square area. The opening size is governed by a 4-inch sphere. What often happens is that both of these provisions are combined to where the specification documents or the inspectors refer to a 4-inch sphere being pushed by a 50-pound force. The fact of the matter is that the 4-inch sphere is intended to be a measuring device, not a load-delivering implement. Nowhere does the code mention the two requirements acting together.

Glass infill provides a railing system with a clean, transparent look that is ideal for situations where added safety is required. Tempered safety glass is frequently used, providing a strong, safe infill that protects building occupants from accidental injury, while delivering a classic look for the railing design. An added benefit of glass infill is that it also serves as a wind barrier, which can be useful for outdoor decks in coastal areas or on the upper levels of buildings, where winds tend to be strong.

Bar rails are another classic railing infill look. Bars may be square or cylindrical, providing a strong, secure infill for the railing system with an aesthetic appearance that highlights its strength. As a safety feature, railings with horizontal or vertical bars can prevent accidents or serious injury by providing a secure barrier as part of the railing system. Bar rails have traditionally required on-site fabrication and welding, which limited the aesthetic element because the welds could be difficult to “finish” on-site. New technologies now provide prefabricated systems that architects and building professionals can design ahead of time and have custom made at a fabrication facility. These component-based systems remove the need for the extensive on-site construction and welding, and they come perfectly "finished" and ready to be installed.

Understanding Stainless Steel in Ornamental Railing Systems
There are several considerations to keep in mind when selecting the material type for a railing project. First, stainless steel is stronger than aluminum. Tensile strength is measured as force per unit area, and in the International System of Units (SI), the unit is the “pascal” (Pa); a multiple is called “megapascal,” or MPa. The ultimate strength for stainless steel is 590 MPa versus that of 300 MPa for 6061-T6 aluminum. Moreover, the surface hardness of stainless steel is much higher than that of aluminum, and thus it resists scratches and is easier to maintain than its aluminum counterparts. Additionally, stainless steel’s fatigue performance is twice that of aluminum, and that adds to a product’s durability. In terms of railings,
A stainless steel rail will likely provide many more years of safe, aesthetically appealing use than an aluminum system.

The benefits of stainless steel’s additional strength are evidenced in the railing system’s posts and handrails, which can be constructed to be much thinner than those made of aluminum. A “strength-equivalent” stainless post is 50 percent thinner than an aluminum post.

Stainless steel is 100 percent recyclable, making it a material of choice for architects who design with sustainability in mind.

Appearance is also a key advantage of stainless steel. No other commonly used railing material can match the ease of maintenance and stunning good looks of stainless steel. This is one of the reasons you will find it used frequently on luxury appliances like high-end gas ranges and refrigerators.

**Different Types and Grades of Stainless Steel (304, 316)**

Stainless steel is usually divided into five categories: ferritic, martensitic, duplex, precipitation hardening, and austenitic, the most commonly used stainless. Austenitic stainless steel comes in many different grades, used for different purposes, with the two most common grades for architectural applications being Type 304 and Type 316.

Type 304 stainless steel is the most common grade, also known as A2 stainless steel or “18/8 stainless steel” (18 percent chromium and 8 percent nickel, which are the main non-iron constituents). This grade of steel is a popular choice for building materials, machinery parts, and food-handling equipment because it has low electrical and thermal conductivity, and it resists corrosion remarkably well. Because of these traits, Type 304 is a popular choice of material for indoor and outdoor railings.

While Type 304 stainless steel is highly resistant to corrosion (both environmental and corrosive media), it is susceptible to pitting and crevice corrosion in warm environments when exposed to chlorides, namely marine environments. It is also susceptible to stress corrosion, cracking at high temperatures (above 140 degrees Fahrenheit, or 60 degrees Celsius).

Type 316 stainless steel, otherwise known as “marine-grade stainless,” is the second most common austenitic stainless steel. Higher nickel content (10 to 14 percent) and the addition of molybdenum increase this grade’s resistance to corrosion. Like Type 304, this type of stainless steel has a low conductivity of electricity and heat, and so it is appropriate for a wide range of uses. Unlike Type 304, this type of stainless steel resists pitting corrosion very well, making it desirable in exterior and even coastal environments.

**Post Gauges (11, 14)**

Railing systems can fail if the post gauge is too thin, even if made of tubular steel. It is important to work with the railing manufacturer to ensure the tube size and the post gauge specified is appropriate for the application and use intended.

**Spacing and Line of Sight:**

**Steel vs. Other Materials**

The spacing between the rails is a key building code requirement linked to the health, safety, and welfare of building occupants. Complicating matters, the International Residential Code (IRC) regulates single-family dwellings, and the International Building Code (IBC) regulates multifamily and commercial dwellings. Additionally, different codes apply to railing systems installed on stairs vs. decks. Prefabricated railing systems can make meeting these various code requirements easier.

Open stairs greater than 30 inches in height are required to have a guard installed on the open side, as well as a handrail. These rails must be at least 34 inches high, from the nosing of the stair treads. The spacing between the rails must prevent a 4½-inch sphere from passing through, except space where the stair riser, stair tread, and bottom edge of the rail meet, in which case, 6 inches is the minimum. As specified by R311.5.6.3 in the IRC, the top edge of the handrail must be between 34 and 38 inches above the nosing of the stair tread, and the handgrip must provide 1½-inch space between the handrail and the guardrail or wall.

Decks that are designed to be higher than 30 inches above grade are required by code to have a guardrail; however, in cases where a building professional chooses to install a guardrail on a deck below 30 inches, they still must meet the code requirements. For homeowners, the code requirements for single-family detached homes can be found in the IRC, which requires a railing to be a minimum of 36 inches from deck to the top of the rail. However, the railings can exceed that height as long as all other code requirements have been met.

Stainless steel is one of the most forgiving materials, resists corrosion, and is very easy to maintain. The ultra-thin cabling also allows the surrounding natural beauty to be highlighted with minimal distraction, yet the quality craftsmanship and fine detailing are just as breathtaking when in focus.

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

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Millwork molded from high-density polyurethane can be crafted to appear identical to fabricated millwork made of common materials like wood, plaster, and PVC, but has significant performance advantages.

Architectural Millwork: Molded vs. Fabricated

One decision impacts the entire project

Sponsored by Spectis Moulders Inc.

Millwork is a basic component in almost every project, from a remodeled kitchen to a vast new hotel, apartment building, or casino. You can buy millwork pieces at any local hardware store. But, as with almost every other product and material, technology is changing the options available for millwork. The material chosen for the millwork is important, but even before the material is selected, one decision will have an impact on the entire project: molded or fabricated?

Today’s specialized molding manufacturers use high-density materials, computer-aided design (CAD), computer-aided manufacturing (CAM), computer numerical control (CNC), and 3-D printing, combined with traditional craft, to translate virtually any design into light, durable, economical architectural elements for any application. Designs can go from a sketch to a finished product much more quickly and efficiently than was possible in the past. This ability to create precise detail, in single pieces of any size, is based on the molding process. Molding enables the use of millwork designs that would be technically impossible or prohibitively expensive to manufacture, fabricate, and install.

This course focuses on the advantages and characteristics of molded millwork, and the process of taking millwork designs to finished elements in a wide range of projects. The course includes a comparison of the features of millwork materials, an overview of how manufacturing affects product performance, and other considerations for designers about the process of selecting and specifying molded millwork, such as installation, code considerations, and finding the most environmentally sound products.

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Learning Objectives
After reading this article, you should be able to:
1. Discuss the advantages of precast molded millwork over fabricated millwork.
2. Compare the advantages and disadvantages of available millwork materials.
3. Examine the use of molded polyurethane in a wide range of residential and commercial applications, such as new construction, renovation, and historic reproduction, including new possibilities for custom design as well as off-the-shelf components.
4. Evaluate important considerations for selecting and specifying molded polyurethane millwork, including design, manufacturing, installation, and code requirements.

All images courtesy of Spectis Moulders Inc.
Because the finished millwork in a room may look very similar, it is easy to overlook the fundamental difference between molded and fabricated products. Molded millwork is created by pouring liquid resin, of varying composition, or liquid gypsum concrete, into precast molds. (The spelling “moulding” is the traditional version, reflecting the term’s origins in the 18th century woodworking craft in Britain, and still used throughout Canada, Australia, and New Zealand, while “molding” is used in the United States).

Molding allows millwork to be produced in a single section as opposed to building up numerous sections. A single molded section can be installed in a long, seamless length of any measurement. Seams are often weak places vulnerable to moisture, wear, and damage so molded millwork has many advantages, but one obvious one is the reduction in the time, labor, and difficulties involved in installing fabricated millwork.

Fabricated millwork consists of pieces cut from a sheet of material, such as wood or PVC, and then built up section by section to create the finished piece. For example, a crown molding pattern might be formed from three different pieces of wood, each shaped and cut to fit together into the desired pattern (many patterns feature more than that). So, the installers will have to install the entire length of each piece, one at a time, moving all around the space three times, carefully building up and joining the pieces to create the eventual continuous pattern. In fact, installers will need to make a complete additional pass for removing scaffolding, painting, and finishing.

But, with a molded product, the same classic crown molding, identical in appearance down to the surface details, with three or as many layers as desired, can be installed in a single light, precast piece in one trip around the space. Time and labor are reduced both for installation and for call-backs since the single piece is inherently stronger, eliminating problems—even failures—that frequently occur along areas where pieces are joined together.

Molds can be used for the entire range of millwork products from interior and exterior trim to pergolas, sunbursts, railings, and many more applications, either installed or preassembled. Some of the examples in this course include:
- Crown moldings
- Mantels
- Columns
- Ceiling medallions
- Balustrade systems
- Pergolas
- Corbels
- Louvers
- Wall panels
- Decorative features

Although millwork can be molded from a number of materials (discussed in more detail below), when high-quality, high-density polyurethane is used the resulting pieces are completely waterproof, will not decay, warp, or wick moisture, and are light in weight, making them economical to transport, install, and maintain. Molded polyurethane resists many of the problems that affect other types of materials, such as insects, mildew, and cracking, while providing even more options for paint colors, stains, and specialty finishes.

Molding with high-density polyurethane also enables the use of flexible forms (such as those in radius application), and the creation of minute surface textures and other details. Today’s molding process is driven by CAD and CAM, but high-density polyurethane molds can also be machined using traditional woodworker tools, and specialized manufacturers still engage the work of skilled craftspeople applying traditional methods.

A leading millwork manufacturer will have an extensive catalogue of thousands of off-the-shelf products and components, but one of the many advantages of molding is the ability to execute unlimited custom designs—an increasing part of the market. One leading company estimated that 40 percent of its work is now in the development and production of unique, custom designs. The selection of molded millwork will open a wide range of possibilities not available with fabricated millwork.
MATERIAL BASICS

Millwork traditionally is made of wood, plaster, or concrete. These are still used, along with a number of synthetic materials. Each material has its own advantages, disadvantages, and possibilities.

Wood is a familiar, plentiful material used widely all over the world for thousands of years. It can range from very low in cost, as in ordinary, inexpensive trim found in any hardware store, to very high in cost for superior wood types in handcrafted applications. Wood is easily formed into desired shapes. Wood is also considered a renewable resource and can often be recycled or reused for different applications.

Wood as a millwork material does have disadvantages, including the necessity of repeated maintenance to prevent rot, decay, and insect damage. In its ordinary forms, it is combustible, and piece sizes are limited. In the past, long lengths of wood from large, old trees were available, but today most pieces are much shorter. For example, if a piece 20 inches wide were required, it would have to be laminated from smaller pieces.

Fiberglass is another material often used for millwork. It is light, not subject to rot, and can be molded into large, one-piece sections. Fiberglass is relatively difficult to work with, however, and is combustible unless fire rated at a very high cost. Detailed shapes with undercuts cannot be made with fiberglass. Fiberglass products cannot be recycled so there are disposal issues in their life cycle.

Exterior insulation finishing systems (EIFS), on the other hand, are easy to work with and low in cost. But, EIFS will absorb and wick moisture, and they do not typically have a very durable service life, nor can they be recycled at the end. The smooth finishes associated with quality millwork are very difficult to accomplish with EIFS material.

Glass fiber reinforced gypsum (GFRG) is an inorganic mixture that provides a noncombustible product. GFRG millwork can be produced with relatively simple labor and equipment, and is recyclable, although gypsum is a raw material mined from underground, which complicates its environmental impact. It is an extremely heavy material, making it costly to produce and install, and can only be used in areas where it will not be exposed to moisture.

GFRG (Glass Fiber Reinforced Concrete) can be used in wet locations. GFRG is another noncombustible inorganic mixture that can be produced with simple labor and equipment, and is recyclable. But, like GFRG, it is basically composed of a mined raw material, heavy and expensive to produce and install.

Polyvinyl Chloride (PVC) is one of the most widely used materials in current millwork as in many other common products. PVC is a synthetic plastic polymer that also contains many chemical additives and “plasticizers.” PVC does not have many of the disadvantages of other materials since it is inexpensive, available in large sheets, and can be laminated to produce even larger workable sections, and PVC products are often recyclable.

But, for millwork, PVC has its own advantages. It is relatively heavy in weight and cannot be made into individual pieces economically, or installed in long, seamless lengths. PVC also contains chlorine and other chemicals whose safety and environmental impact have been questioned. When machined, PVC in general becomes porous and relatively combustible. At the current time, most PVC millwork products are not considered suitable for applications requiring a Flame Spread Rating of 25 or less (Class A FSR).

HIGH-DENSITY POLYURETHANE FOR MILLWORK

High-density polyurethane solves a number of the problems with other common materials outlined above. There are many varieties of polyurethane, used in a host of common products, but high-density, chemically reacted, two-component polymer systems were invented by American chemists in the 1940s. Rigid polyurethane began to be used in commercial millwork in the 1960s. The material has a virtually limitless useful life due to its thermosetting chemical makeup.

Today, most building components are made with a higher surface density than previous polyurethanes, an average in the range of 14 to 18 pounds per cubic foot, an overall density similar to white pine. The process used to create superior-grade products provides a greater skin density than core density, which increases durability.

Continues at ce.architecturalrecord.com

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

Submissions are due September 2, 2016.

The editors of *ARCHITECTURAL RECORD* are currently accepting submissions for the 2016 Record Products competition. Manufacturers and designers may submit items introduced in the U.S. between September 2015 and September 2016. A panel of architects and specifiers will judge the entries on criteria including innovation, functionality, and aesthetics. Winning products will be featured in the December 2016 issue.

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

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New and Upcoming Exhibitions

Tracing Displacement and Shelter
New York City
October 1, 2016–January 22, 2017
This upcoming exhibit at MoMA will explore how architects and designers have considered the meaning of shelter in light of global refugee emergencies. Works on display examine such trends as the strengthening of national borders in response to influxes of migrants and the growing need for affordable, adaptable, mobile housing for transient populations (currently estimated at over 60 million). For more information, visit moma.org.

Ongoing Exhibitions

Young Architects Project
New York City
Through August 28, 2016
The 17th edition of a long-running exhibition at MoMA PS1 highlights the work of young architecture firms. This year, Escobedo Soliz Studio of Mexico City won the global competition to design a temporary outdoor installation that provides shade, seating, and water in the courtyard of PS1, in Long Island City. Called Weaving the Courtyard, the canopy-like pavilion hosts concerts and other events as part of the museum’s Warm Up series for the duration of the summer. For more information, visit momaps1.org/warmup.

Extraordinary Playscapes
Boston
Through September 5, 2016
Curated by Design Museum Foundation, Extraordinary Playscapes explores contemporary playground design and makes a case for the importance of free play to healthy child development, thriving communities, and social equity. The exhibition features a project that reimagined a defunct ambulance as a children’s playground at a hospital in Malawi, and examples of Danish designs that integrate nature and play, in addition to innovative play-centered design closer to home, on the Boston waterfront. Extraordinary Playscapes includes interactive installations, videos, scale models, and hands-on elements for visitors to explore the art, history, and science behind play. At the Design Museum Boston. For more information, visit architects.org.

Roberto Burle Marx: Brazilian Modernist
New York City
Through September 18, 2016
The Brazilian artist and landscape architect Roberto Burle Marx (1909–94) undertook projects ranging from the mosaic pavements on the seaside avenue of Rio de Janeiro’s Copacabana Beach to the multitude of gardens that embellish Brasilia (one of several large-scale projects he executed in collaboration with famed architect Oscar Niemeyer). This exhibition at the Jewish Museum explores the richness and breadth of the artist’s practice—from landscape architecture to painting, from sculpture to theater design, and from tapestries to jewelry. For more information, visit thejewishmuseum.org

Narcissus Garden at Johnson’s Glass House
New Canaan, Connecticut
Through November 30, 2016
To celebrate the 110th anniversary of the great architect’s birth and the 10th anniversary of his most famous residence’s being opened to the public, Philip Johnson’s Glass House hosts an installation by Japanese artist Yayoi Kusama. Narcissus Garden, initially created for the 33rd Venice Art Biennale in 1966, will be incorporated into the 49-acre site around the Glass House. The piece consists of 1,300 steel spheres floating on a newly restored pond, providing a dramatic view leading up to the house. For more information, visit theglasshouse.org

Model Behavior: Snøhetta at SFMOMA
San Francisco
Through January 14, 2017
This exhibition explores the design process behind Snøhetta’s expansion of the San Francisco Museum of Modern Art. Architectural models, sketches, an interactive app, and a narrated walk-through of the building reveal how Snøhetta responded to the built environment and cultural context of the expansion-to-be and arrived at the space that opened on May 14 of this year. At SFMOMA. For more information, visit sfmoma.org.

Lectures, Conferences, and Symposia

Architectural Record Innovation Conference East
New York City
November 3, 2016
Join RECORD for a single-day conference on architecture and making in the post-digital age. Innovation East (the east coast counterpart to the summer’s conference in San Francisco) will bring together imaginative and forward-looking figures to exchange ideas
about the built world of today and the future. Speakers and participants will range from architects practicing outside the discipline to principals of large firms, and from materials experts and graphic designers. Attendees will leave the conference inspired by brave and original approaches to some of the most relevant problems in the industry. For more information, visit ariceast.com

**London Design Festival 2016**

London
*September 17–25, 2016*

First staged in 2003, the London Design Festival has since become one of the world’s largest conferences for design of all kinds, ranging from interiors to that of the city. This year’s festival, oriented around the theme “Design is in the Detail,” will feature innovative experiments such as a wide wooden structure by Allison Brooks Architects called “The Smile,” an installation about contemporary urban living presented by MINI, and numerous partnership events, networking opportunities, and panels on trends in engineering and design. For more information, visit londondesignfestival.com.

**International Bauhaus Colloquium**

Weimar, Germany
*October 26–29, 2016*

The 13th International Bauhaus Colloquium at the Bauhaus-Universität Weimar is titled Dust and Data. It will reflect on the near century-long history of the Bauhaus at its original sites in Germany—Weimar, Dessau, and Berlin—as well as the history of its international reception. Just as in the Bauhaus and post-Bauhaus years, architecture is again entangled in geopolitical transformations on a global stage. The conference, through the lens of architectural history and methods, will address contemporary political transformations including migration, climate change, and violent conflict. For more information, visit bauhauskolloquium.de.

**World Architecture Festival 2016**

Berlin
*November 16–18, 2016*

This year’s World Architecture Festival, in addition to awarding prizes for building projects both completed and proposed, will include a robust roster of seminar speakers—including Richard Rogers and Moshe Safdie—who will touch on large-scale topics relating to housing: housing in dense cities, housing for refugees, housing and luxury, housing and energy efficiency, and more. There will also be panels focused specifically on the revitalization of post-Wall Berlin and architecture tours of the area running on all three days of the festival. Additionally, there will be on-site “live crits,” where architects and designers can receive feedback on their project ideas in real time. Visit worldarchitecturefestival.com.

**Competitions**

**IDEAS² Awards: Innovation in Designing with Structural Steel**

*Submission deadline: August 26, 2016*

Projects completed in the U.S. between January 1, 2014, and December 31, 2016, are eligible for a prize from the American Institute of Steel Construction (AISC) for innovative use of structural steel. This year, the AISC makes previously separate architectural and structural engineering contests into a single competition that judges the use of structural steel on a comprehensive, project basis. There are three categories, divided by building cost—under $15 million, between $15 and $75 million, and above $75 million. For more information, visit aisc.org.

**AIANY COTE Awards 2016**

*Submission deadline: September 16, 2016*

Established in 2014 by the New York chapter of the AIA’s Committee on the Environment, this awards program recognizes results-oriented projects that are socially and environmentally responsible, promote sustainable design in the urban context, and reveal the process behind innovation. Visit aianycoteawards.org.

**Fentress Challenge: Airport of the Future**

*Submission deadline: October 1, 2016*

Students who enter this contest, sponsored and judged by Fentress Architects, must submit a design for the airport terminal of the future, specifically one that responds to present-day issues and dynamics in airport design and air travel. Designs ought to be flexible and consider security while also responding to long-term trends like globalization and urbanization. A traveler’s curbside-to-airside experience is also a major consideration. Winners will receive cash prizes and a paid fellowship, as well as international exposure. For more information, visit fentressarchitects.com.

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The Floating Piers on Lake Iseo closed to the public on July 3, an estimated 1.5 million people had walked on water. The spectacular project was first conceived by artists Christo and Jeanne-Claude as wrapped inflated piers for Rio de la Plata in Buenos Aires and for Tokyo Bay, in 1970 and 1996 respectively. While those were never realized, Christo revisited the idea following Jeanne-Claude’s death in 2009 and found a receptive audience in the small communities around Iseo, a little-known lake in northern Italy. Composed of 220,000 high-density polyethylene cubes, about the size of milk crates, bolted together to make 328-foot-long sections, the walkway was sheathed in a million square feet of nylon polyamide fabric—the same saffron color of the husband-and-wife team’s The Gates in New York’s Central Park (2005). The Floating Piers extended nearly two miles, wrapping around the small private island of San Paolo and connecting to the larger island of Monte Isola as well as to the mainland. Ropes fastened to 190 concrete anchors on the lake floor held the cubes in place with just enough give to appreciably move with the water. But more than a technological achievement, The Floating Piers was a social phenomenon, attracting almost three times the visitors anticipated over its 16-day run, and uniting a wide spectrum of the public on a golden 52-foot-wide pathway. During divisive times, leave it to a work of art to bring people together. Josephine Minutillo
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