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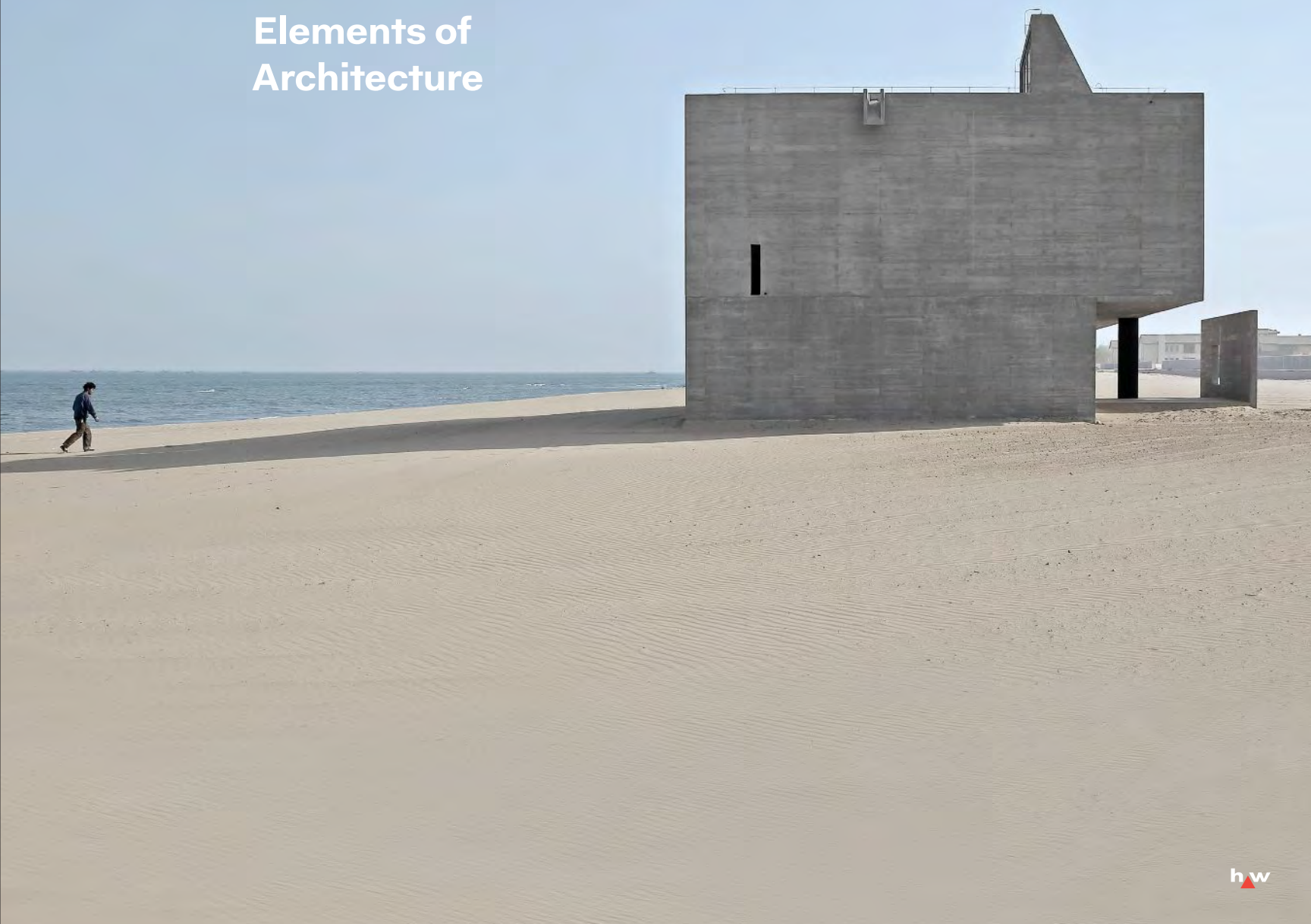

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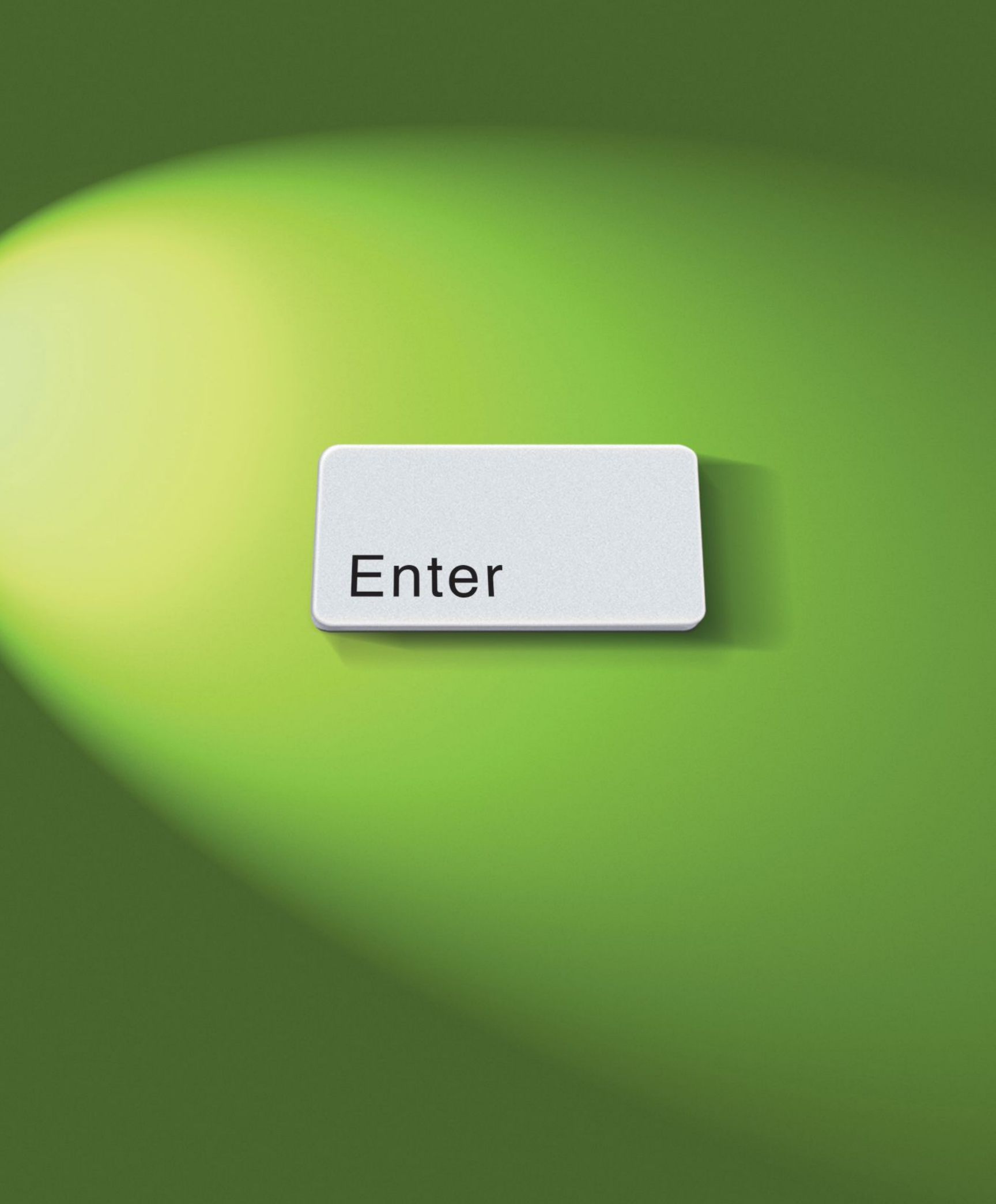
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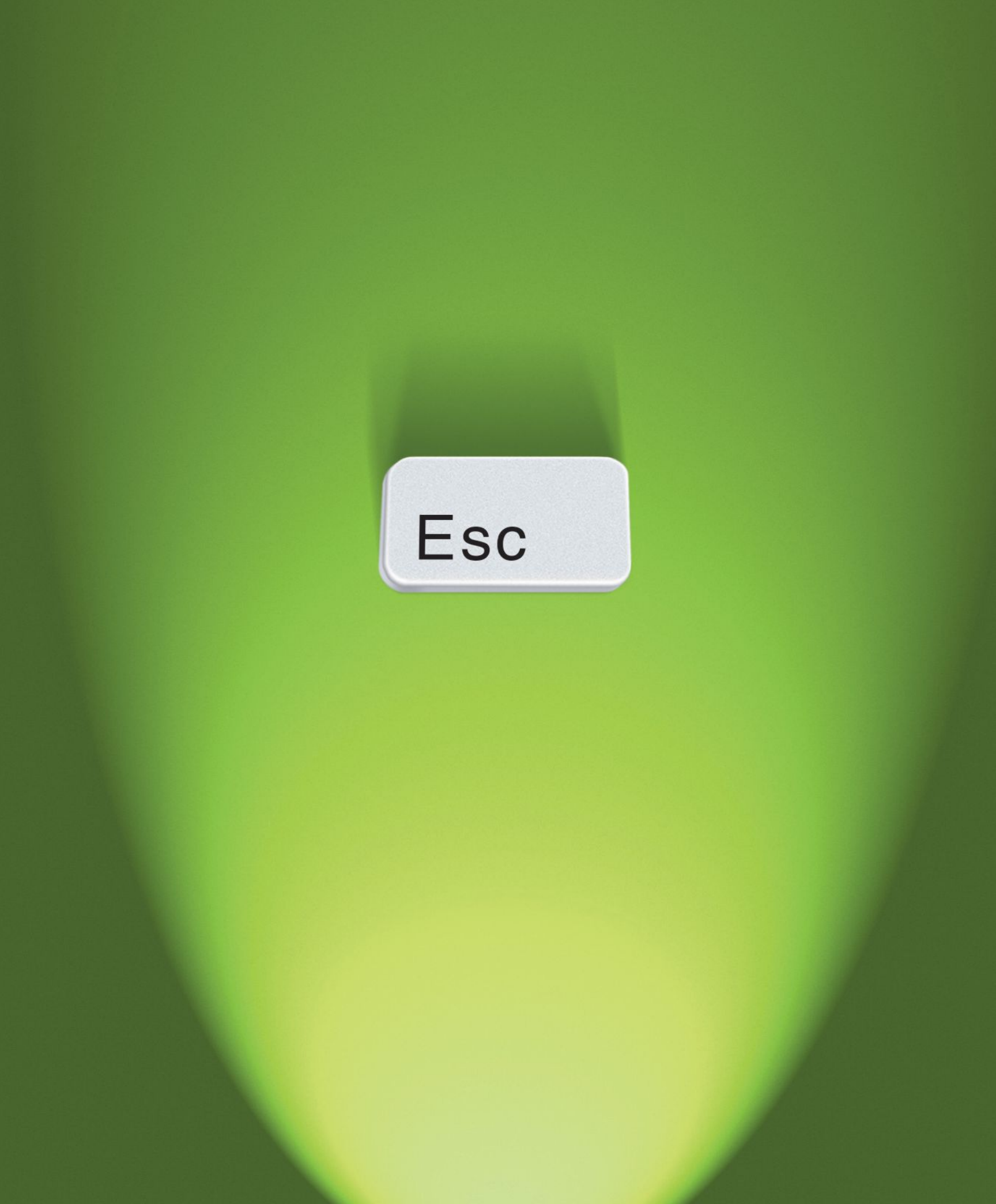
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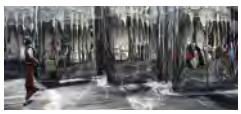

Len Lye Centre
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Residential
Element House
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Volume 104, number 9. September 2015. On the cover: Seashore Library by Beijing firm Vector Architects; photo by Su Shengliang

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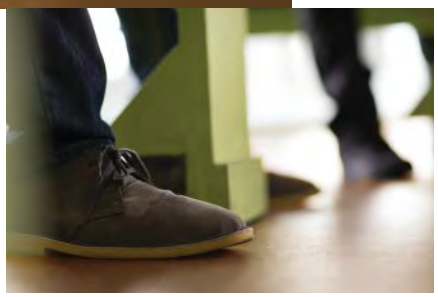

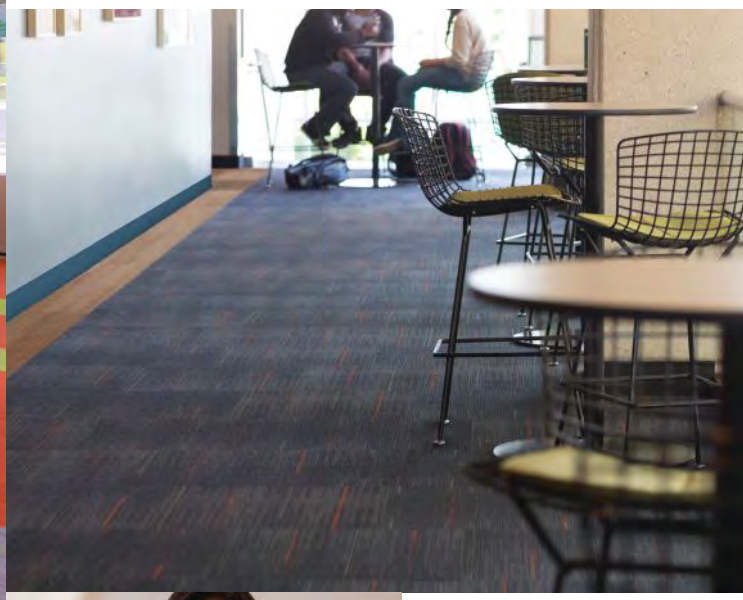

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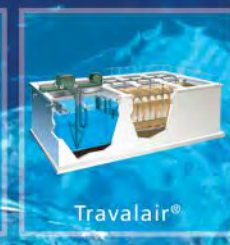
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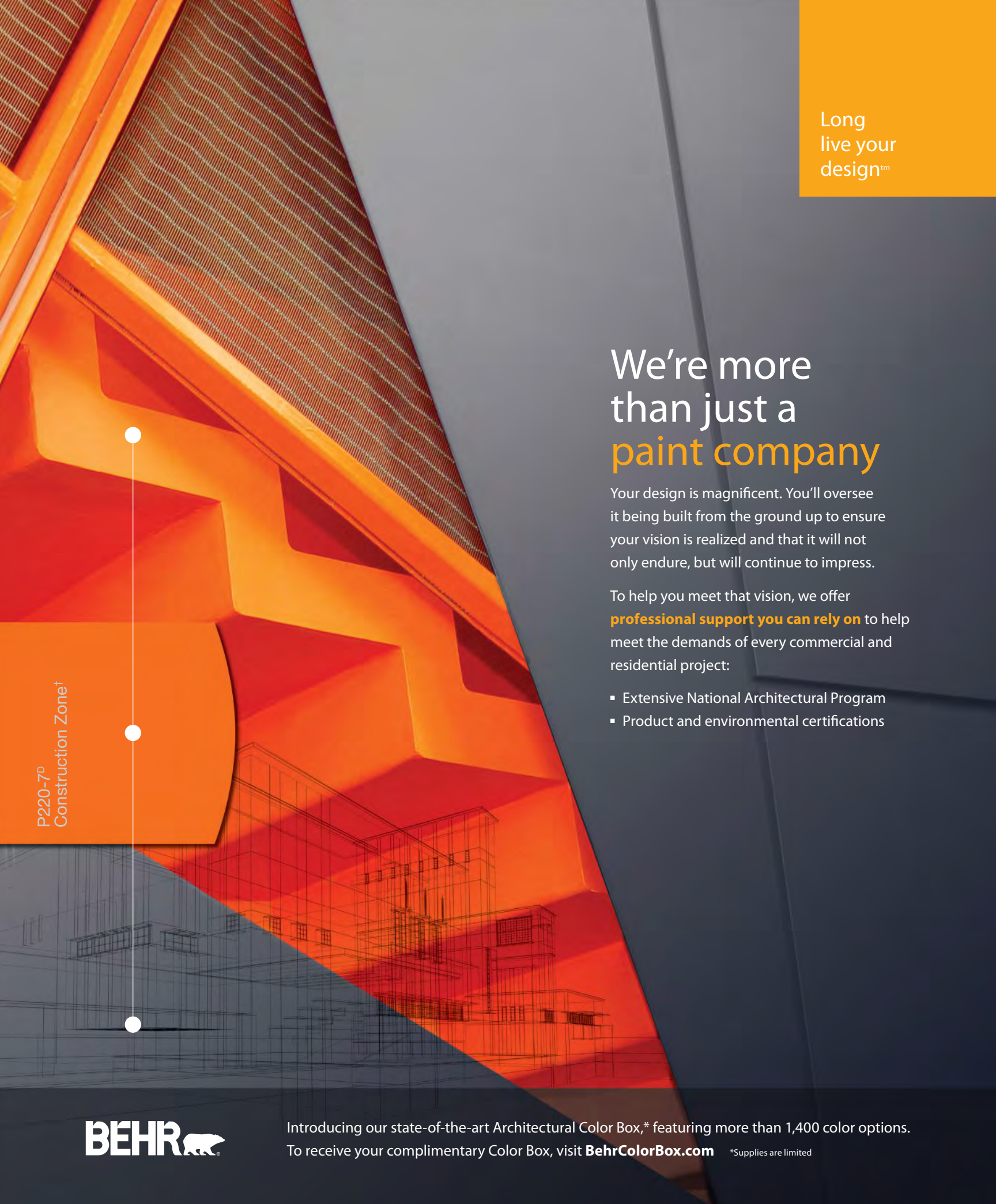
Burning the God of Rain

At the end of August, Syria's director-general of antiquities and museums, Maamoun Abdulkarim, reported that ISIS used explosives to demolish the 2,000-year-old Temple of Baalshamin (above, at rear) in Palmyra, Syria. The ancient Phoenician city of Palmyra is a UNESCO World Heritage Site and the state of the ruins have been under much speculation since ISIS took control of the area in May. The group also beheaded the city's 83-year-old retired director of antiquities, Khalid al-Asaad. ISIS has looted and destroyed other ancient sites during its campaign of conquest, under the guise that they are blasphemous and represent the worship of false idols.

JOSEPH EID/GETTY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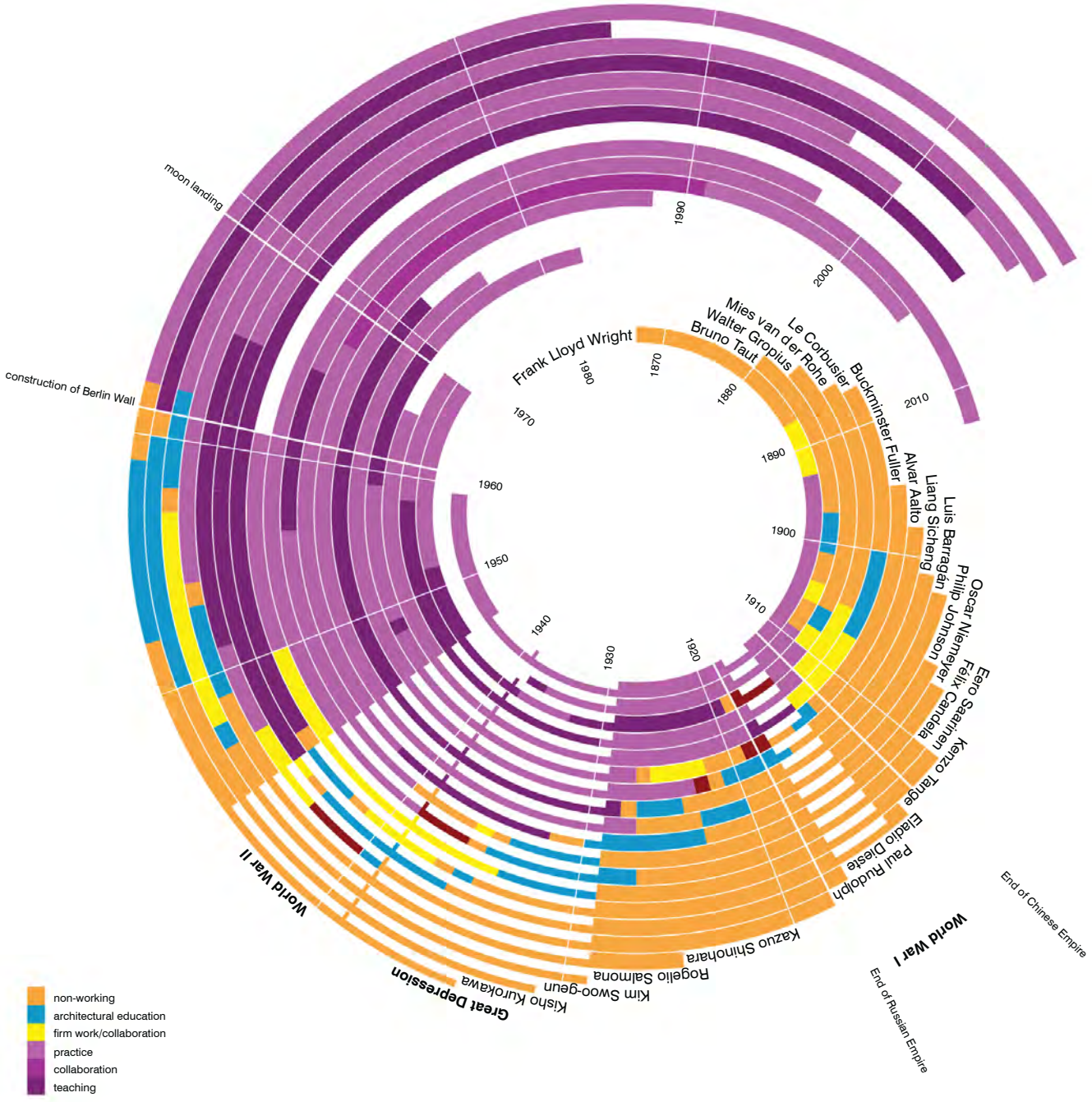

Picturing Architecture

In 150 illustrations, University of Arkansas Fay Jones School of Architecture associate professor Frank Jacobus slices and dices data on unusual aspects of architecture, the profession, and the people who practice it. The topics range from the colors used most often by individual firms (Richard Meier, FAIA, is represented by a field of white) to practitioners most favored by dictators. Jacobus analyzes data associated with each topic and encapsulates the results into a single, often witty graphic representation. For instance, above, you'll find a colorful graph of the career trajectories of some famous architects.

> *Learn more about Frank Jacobus' new book,* Archi-Graphic, *and find more fascinating infographics at bit.ly/ArchiGraphic.*

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Bertoia, Turned Up to 11

The Chicago-based Graham Foundation for Advanced Studies in the Fine Arts has selected 49 architecture-related projects by organizations to receive grants totaling $496,500. Twelve of the grants will go towards programs and exhibitions at the Chicago Architecture Biennial, which starts on Oct. 3. In one of those, "Sonambient Pavilion," Olivia Block and Experimental Sound Studio will take the sounds from Harry Bertoia's sculptures at Aon Center plaza on Randolph Street (shown above), manipulate them, and amplify them using an array of 50 loudspeakers. The 49 grant recipients were selected from a pool of more than 200 submissions.

> *To see all 49 organizations and 63 individuals who were awarded Graham Foundation grants in 2015, go to grahamfoundation.org/grantees.*

A Revitalized Cathedral of Knowledge

In August, the entry nave for Yale University's Sterling Memorial Library reopened after an 18-month restoration. The library, which opened in 1931 and was designed by Yale alum James Gamble Rogers, was restored by New York–based Helpern Architects, which modernized the space and the library's services without adversely affecting the original university landmark. Three services desks were combined in a single station at the north of the building, and the extensive built-in card catalog, a bit of an anachronism in the 21st century, was reduced in size, all to create much-needed space for computer workstations and study areas.

BRIAN ROSE

> *See more images of Helpern Architects' renovation of the library at bit.ly/SterlingMemorialLibrary.*

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An Egalitarian Biennale

The appointment of Chilean architect Alejandro Aravena as the director of the 15th International Architecture Exhibition at the Venice Biennale in 2016 is certainly good news, a promise of a Biennale that argues for architecture that improves the quality of living for all, like the 2001 affordable housing that he designed and helped develop in Iquique, Chile (shown). Having been given the chance to direct a show that attracts as many as 300,000, Aravena will now be able to exhibit work from around the world dedicated to the notion that the basic building blocks of architecture can be assembled to make better daily conditions for all. —AARON BETSKY

> *Read Betsky's complete take on the potential for Aravena's 2016 Venice Biennale, with more images of his work, at bit.ly/BetskyAravena.*

TOP: TADEUZ JALOCHA; BOTTOM: CRISTOBAL PALMA

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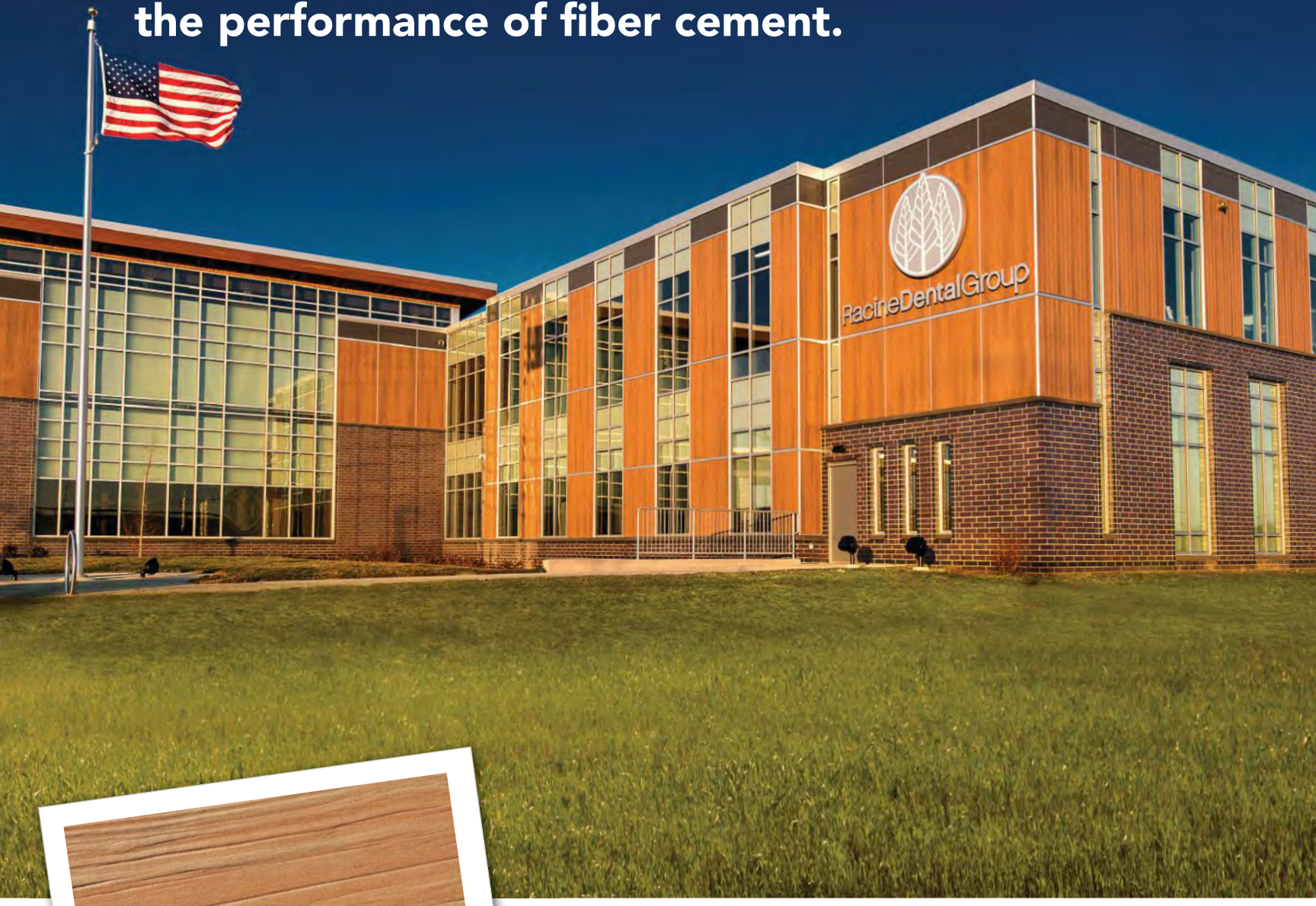

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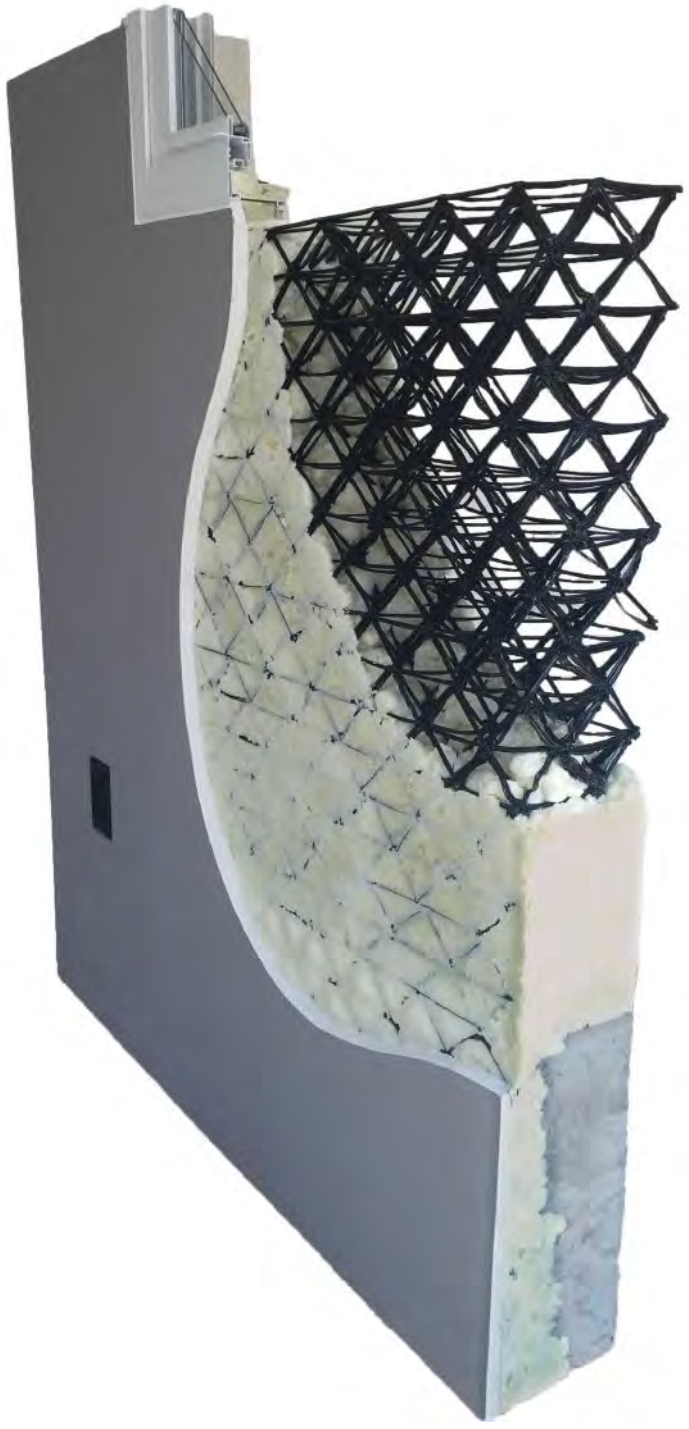

A Roof and Four 3D-Printed Walls to Call Home

Some architects are using additive manufacturing to push scale and form, while others are harnessing it to create parts. Chattanooga, Tenn.'s Platt Boyd, AIA, is working somewhere in between. His company, Branch Technology, recently debuted a large-scale 3D printer that will be used to create wall modules. It extrudes carbon-fiber-reinforced ABS plastic into a vertical grid, which is then filled in with spray-foam insulation and covered with spray-applied concrete. "If a building takes a year to produce, that's not feasible," Boyd says. "On speed we're still approaching that [hurdle], but on cost we feel like it's within the realm of reason." —HALLIE BUSTA

> *For the full story including the details of Branch Technology's process, go to bit.ly/WallWith3DPrintedCore.*

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CASE STUDY

International Magnet School for Global Citizenship in South Windsor, CT–
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Profile: SNAP-CLAD Metal Roofing; Colors: Hartford Green & Dark Bronze

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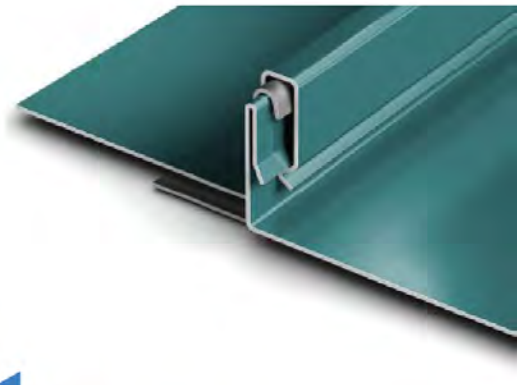

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FILIP WOLAK

Finding Nemo in New York

Everything about the new SeaGlass Carousel in New York's Battery Park, designed by New York's WXY Architecture + Urban Design and open since Aug. 20, is inspired by the underwater world. A throwback to the early days of the New York Aquarium, which was located at the Battery until 1941, the 2,575-square-foot stainless steel and glass structure is shaped like a nautilus shell; indoors, carousel riders hop into massive fish designed by George Tsypin Opera Factory. Technical Artistry New York designed the lighting, which includes LEDs inside each fish as well as light projectors on a custom helical light ring. —SARA JOHNSON

> *For more images and a video from the designers and Battery Conservancy, go to bit.ly/SeaGlassCarousel.*

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JAMES EWING/OTTO

Winning Schools

At the beginning of August, the American Institute of Architects' Committee on Architecture for Education announced nine projects as the 2015 winners of its annual Education Facility Design Awards program. This year's choices are imbued with flexible programs and collaborative teaching spaces. The University Center (above) at the New School in New York City, designed by Skidmore, Owings & Merrill with SLCE Architects, received an Award of Excellence for its multifaceted solution to the complex needs of its client as well as the building's energy efficiency—the LEED Gold building is projected to perform 31.2 percent better than required by code.

> *Read about all nine winning projects in the 2015 CAE Education Facility Design Awards at bit.ly/2015AIA-CAE.*

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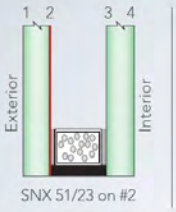

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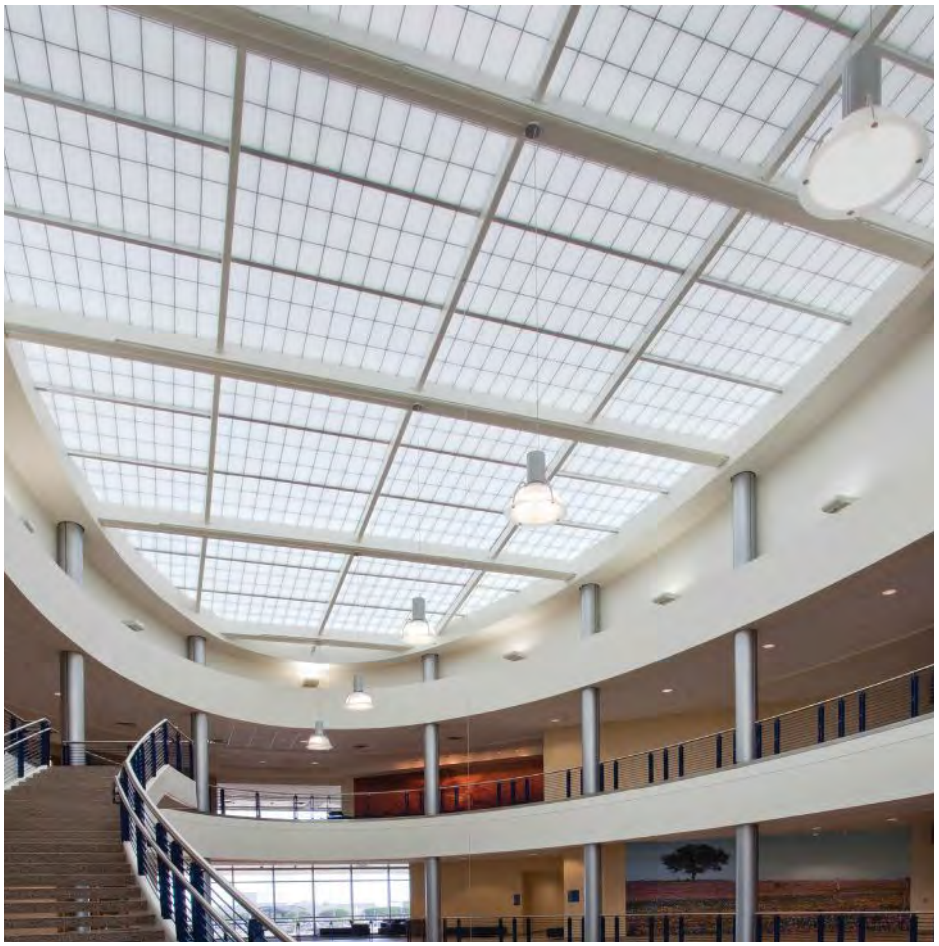

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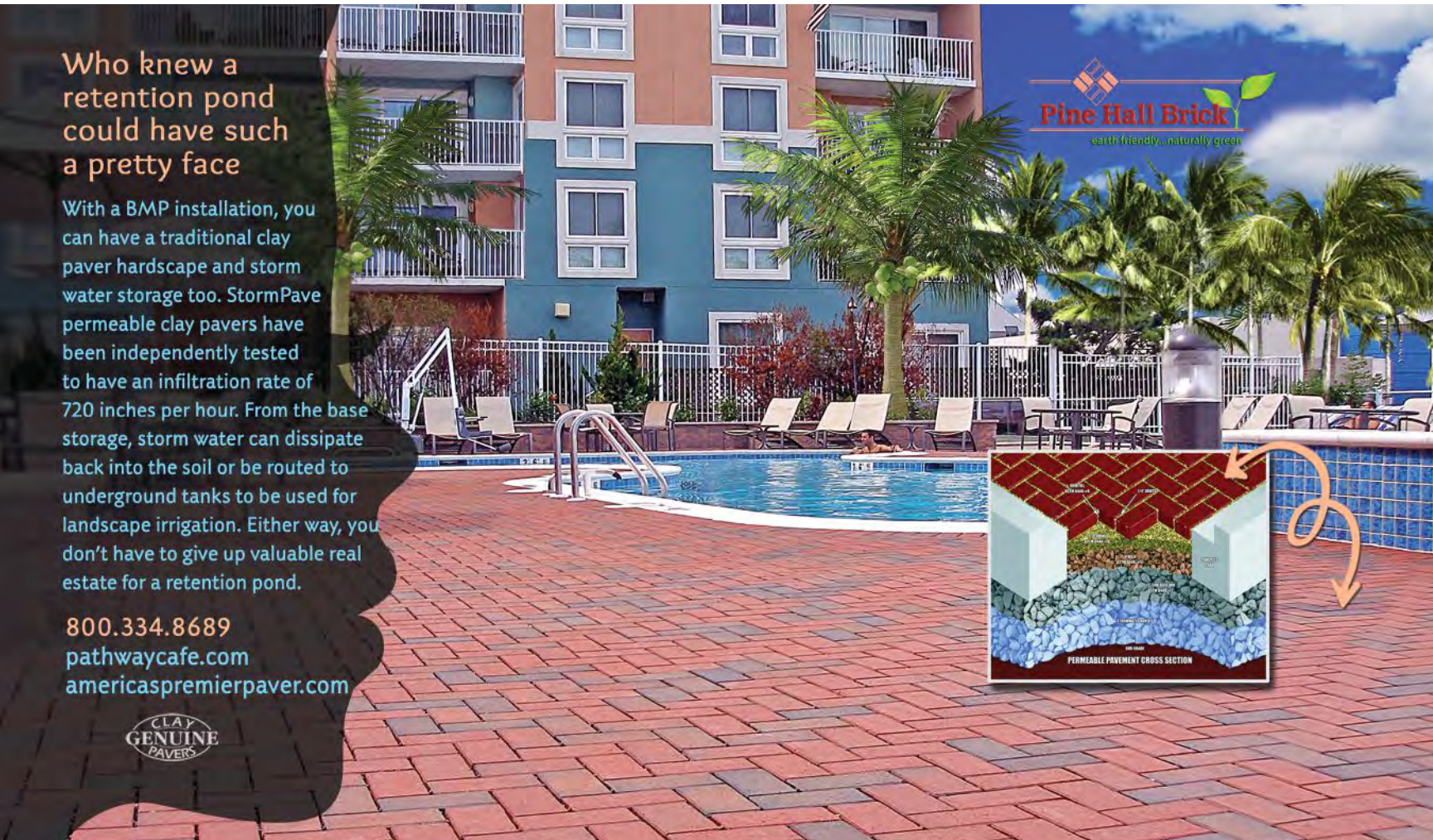

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Best Practices: Diversify Your Firm's Services

TEXT BY NATE BERG

Specializing in a particular sector is a good way for new firms to get a foothold in a crowded marketplace. But being too focused can be dangerous. To hedge the fluctuations of the economy, niche firms can add expertise to their practice.

Spread the Wealth

Based in Venice, Calif., and Hobe Sound, Fla., Hughesumbanhowar Architects founding principal Scott Hughes, AIA, says diversifying locations was an "unexpected business plan." After doing post-graduate work at the Southern California Institute of Architecture in Los Angeles, most of his professional network was contained locally. When family connections created the opportunity to design high-end residential projects in Florida, Hughes left his comfort zone. With few resources in his new state, he turned to the L.A. architects he knew to form a remote office to help him handle the workload.

Eventually, Hughes was able to build up his Florida office, which left room for his L.A. colleagues to explore new territory, "[allowing] us to spread our wings in a broader arena than we would have been able to otherwise," he says. The L.A. office is now doing public sector and institutional projects in the West, leaving most of the residential work and East Coast projects to the Florida office. "We're able to stretch ourselves and not get caught up in that specialty field that we would have if I did not have the luxury of the West Coast office," he says.

> "When you can inject each other with the DNA of each other's firms, then you find real growth opportunities not only for the firms but for the professionals who work there."
>
> —Griff Davenport, AIA, CEO, DLR Group

Find a New Partner

A few years after Joshua Zinder, AIA, opened his Princeton, N.J.–based firm, Joshua Zinder Architecture + Design (JZA+D), he realized he was in an unhealthy business cycle. "We would get busy and then we wouldn't have a lot of work, then I'd scramble to get work, then we'd have a lot of work," he says. "That cycle was stressful, overly challenging, and it wore down not only myself, but even the employees."

Zinder decided that his firm was too reliant on its work in the hospitality sector. "At that point, the number one thing on my business plan was to find a partner," he says. "Somebody who could share the load and had sympathetic experience, but at the same time could bring in another sector of business that we didn't have."

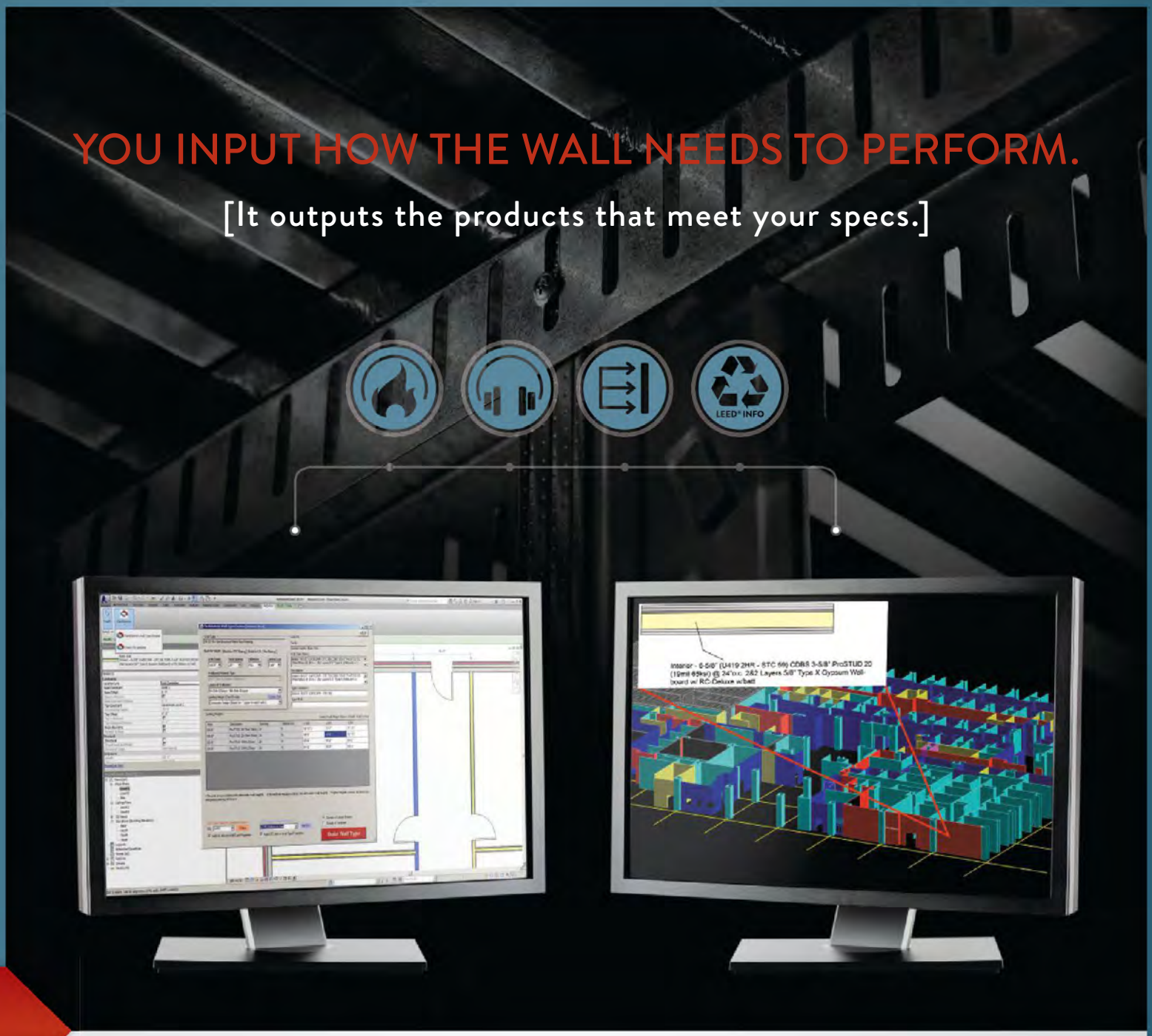
He found that partner in Marlyn Zucosky, ASSOC. AIA, who was leading an interiors department at a larger firm, Trenton, N.J.–based Clarke Caton Hintz (CCH). "Who we marketed to [at CCH] was very different, so I was able to bring a whole new client base to JZA+D," Zucosky says. Now, instead of relying on larger hospitality and residential projects that may come in waves, the firm can bank on more consistent work doing interior fit-outs. "It balances out the other work we have," Zinder says.

Merge Expertise

Global architecture firm DLR Group recently broadened its reach by merging with Washington, D.C.–based Sorg Architects. DLR Group CEO Griff Davenport, AIA, says Sorg offered an entry into the federal sector and the D.C. market—or more broadly, the Eastern Seaboard. Even for a firm as large as DLR Group, it made more sense to join with a local expert than try to wedge into an unfamiliar market.

Davenport says the merger will allow both firms to reach into new sectors and geographic regions. "It's much more difficult to go and find a firm that just does more of what you do," he says. "When you can inject each other with the DNA of each other's firms, then you find real growth opportunities not only for the firms but for the professionals who work there."

Davenport acknowledges that the cultures of the two firms won't automatically blend, and it will take time for things to smooth out. "You have to be patient," he says. "In the case of an acquisition or merger, finding the right partner is so important. It's not a transaction. It's a marriage."



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Practice:
The 2015 AIA Compensation Survey

TEXT BY CAROLINE MASSIE

Average compensation for architectural staff positions is still recovering from the Great Recession, but is nevertheless on the rise—and expected to continue on an upward trajectory, according to the 2015 AIA Compensation Survey released last month. The report, which includes salary data for 39 architecture firm positions (18 shown here) in 27 states, 27 metro areas, and 15 cities, found that average compensation for staff positions rose 3.5 percent since early 2013 (or 1.75 percent per year). This growth is up from the Great Recession, a period during which annual compensation increased less than 1 percent, but the bump is moderate compared to the past two decades, when annual compensation increases ranged from 4 to 5 percent.

The AIA notes that compensation for architectural staff positions should continue to increase as business conditions are set to improve, which healthy figures in the monthly Architecture Billings Index suggest.

To see how your base salary stacks up to the reported national average, see the chart below and find several interactive charts, including more data, on our website.

Mean Base Compensation for Architect/Design Positions

CEO/President	$133,600
Managing Principal	$135,200
Chief Operating Officer	$131,100
Director of Operations	$118,900
Director of Design	$128,100
Senior Project Designer	$93,100
Project Designer	$72,100
Senior Project Manager	$101,300
Project Manager	$81,100
Architect 3	$91,300
Unlicensed Architecture/Design Staff 3	$72,200
Architect 2	$74,800
Unlicensed Architecture/Design Staff 2	$65,300
Architect 1	$64,200
Unlicensed Architecture/Design Staff 1	$58,200
Intern 3	$51,800
Intern 2	$46,600
Intern 1	$41,500

> *For more highlights from the report, including additional positions, salary figures, and firm sizes, visit bit.ly/2015AIACompensation.*

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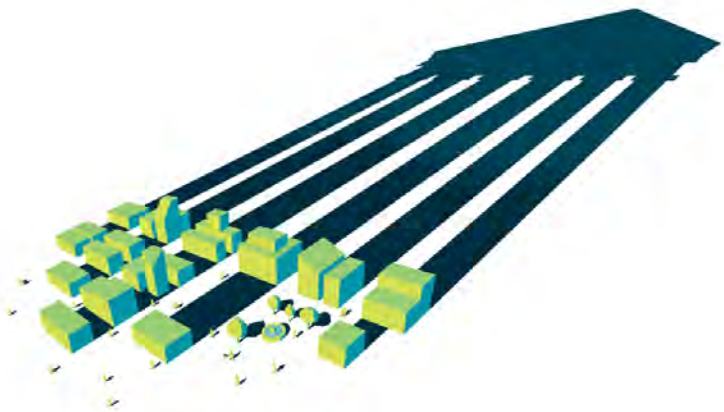

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Detail:
Centre de Congrès à Mons Wall Section

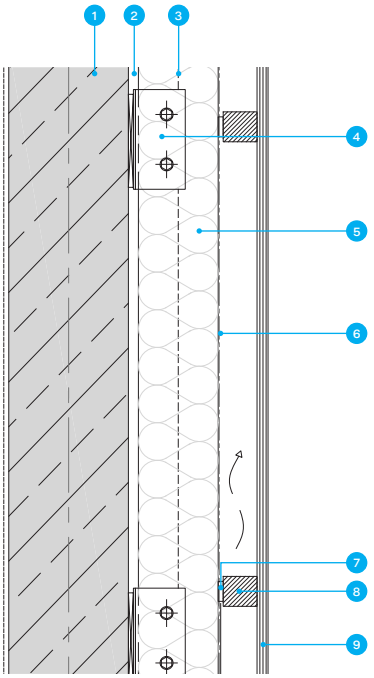
TEXT BY JENNY JONES

As one of the two cities named a European Capital of Culture for 2015, Mons, Belgium, is investing in a development that will transform the medieval municipality into a modern economic hub. At the heart of the master plan is the Centre de Congrès à Mons, a convention center with a spiraling floorplan and wood-and-aluminum skin to match. The juxtaposed materials represent the blending of the city's old and new districts, which can be viewed from a platform inside the cantilevered prow topping the structure.

Designed by New York–based Studio Libeskind with local firm H2A Ingénieur Architecte & Associés as the architect of record, the 12,500-square-meter (134,550-square-foot) center houses meeting rooms and three auditoriums. On its exterior, the lower walls of the encircling envelope are clad in wood lamella, while its upper walls are adorned with anodized aluminum bands in a luxurious champagne hue. "We wanted to use two different materials that harmonize but are still slightly different in color and finishes," says Studio Libeskind principal Stefan Blach, whose team modeled the project using Rhinoceros 3D and AutoCAD.

Robinia wood, also known as black locust, was a natural choice for the lamella: In addition to being regionally abundant, the wood does not require treatment, Blach says. "It ages naturally … so it gets this silvery, beautiful surface."

Totaling 1,900 square meters (20,450 square feet), the array of linear slats creates a pattern that is 62 percent wood and 38 percent negative space. The designers wanted the wood lamella to appear uniform but they had to accommodate the center's ribbon windows. To that end, they hung Robinia boards over the windows, like framed louvers, Blach says. "We created the impression of a continuous surface that just changes its texture where the windows are."



1. Reinforced concrete ribbon wall
2. 20mm construction tolerance
3. 160mm mineral insulation
4. Metal bracket
5. Aluminum rafter (beyond), curved to match wall
6. Self-adhering waterproofing membrane
7. 10mm EPDM pad (1.2m o.c.)
8. 60mm × 60mm Robinia wood lattice
9. 22mm × 6m Robinia wood board, 100mm or 140mm wide (100mm or 200mm o.c.)

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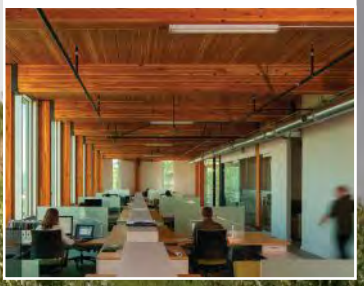

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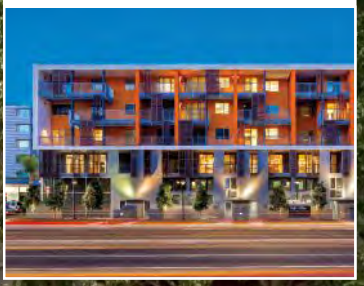

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Next Progressives: Design with Company

TEXT BY ZACH MORTICE

Design with Company's Stewart Hicks and Allison Newmeyer have a modest body of experimental and built projects that exist somewhere between Grant Wood's *American Gothic* and Lewis Carroll's *Alice in Wonderland*. In their investigative studio, the Chicago-based couple explores Midwestern building archetypes and institutions that are bizarrely iconic. Their projects are playful and surreal, but still humbly attached to a vast middle ground.

The Michigan natives returned to the Midwest after a stint in New Jersey—Hicks picked up his M.Arch.

Stewart Hicks and Allison Newmeyer

from Princeton University in 2006 while Newmeyer practiced; she then earned her M.Arch. at the University of Michigan in 2008—giving them the opportunity to re-examine their home region with fresh eyes. They've cataloged Boom Town Chicago's near-mythical traditions of land generation as well as the infamously oversized curios that line highways in the open prairie.

Design with Company tries "to take something mundane and everyday and make it the outlier," Hicks says. Their practice straddles the line between a loving homage to their native Midwest and a critical riff on it.

The pair's sense of irreverence made them an attractive prospect for University of Illinois at Chicago's School of Architecture director Robert Somol, who lured them from the University of Illinois at Urbana-Champaign in 2012 to teach. "What we try to see with the offices and people we engage with is work that is rigorous and funny," Somol says. "Their work hits those registers."

Design with Company thinks of its creative process as narrative. Newmeyer and Hicks tell the stories of contemporary architectural conditions in a sepia haze that gives each project the air of a timeless myth or fable—even when the subject is a ripped-from-the-headlines preservation battle: Their submission to the Chicago Architectural Club's *Reconsidering an Icon* exhibition to save Bertrand Goldberg's Prentice Women's Hospital lionizes not the structure itself but the wrecking ball used to tear it down.

The duo's built work often features domestic objects that signify welcoming and community, arranged with a performative and barn-raising spirit. Shaw Town, a temporary performance venue at an artist retreat in suburban Chicago, abstracted elements of local architect Howard Van Doren Shaw's buildings into a giant toy box of a stage complete with pastel foam furnishings that audiences pull out and arrange at their leisure.

For the Porch Parade pavilion in Vancouver's Robson Square, Design with Company crafted a series of interconnected neon porches made with materials sourced from yard sales. Likewise, Pavilion MMM... ("Miami Many-a-chair Monument..."), installed in Miami in 2014, comprised intricate scaffolding that suspended chairs picked up at garage sales, with every scuff adding a new layer of narrative and personal history.

Two of their earliest projects loom large over the young firm's theoretical explorations. Farmland World and Animal Farmatures propose a hybrid theme park/working farm where "agro-tourists" leave their technocratic cubicle grayscapes to work the land for fun alongside robotic, behemoth Archigram-styled cows, pigs, and sheep.

The fetishization and idealization of agricultural icons appear consistently in Design with Company's work, in different contexts. "It might look weird, but it's everyday," Newmeyer says. "We're revealing the absurdity to the world," Hicks adds.

Along with completing their first built projects this year, the young designers moved into new office space on the 14th floor of Daniel Burnham's Monadnock Building, where they're getting ready for their biggest venue to date: the 2015 Chicago Architecture Biennial, slated to be the largest architecture exhibition in North American history.

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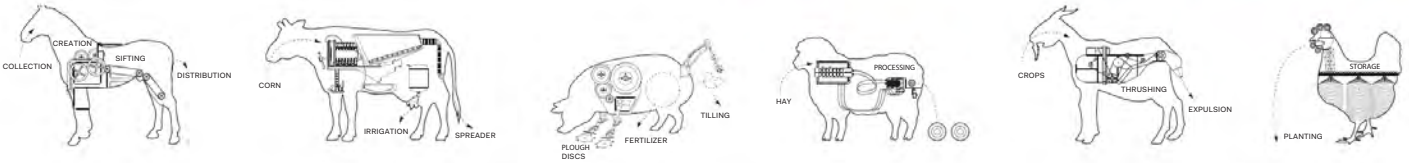
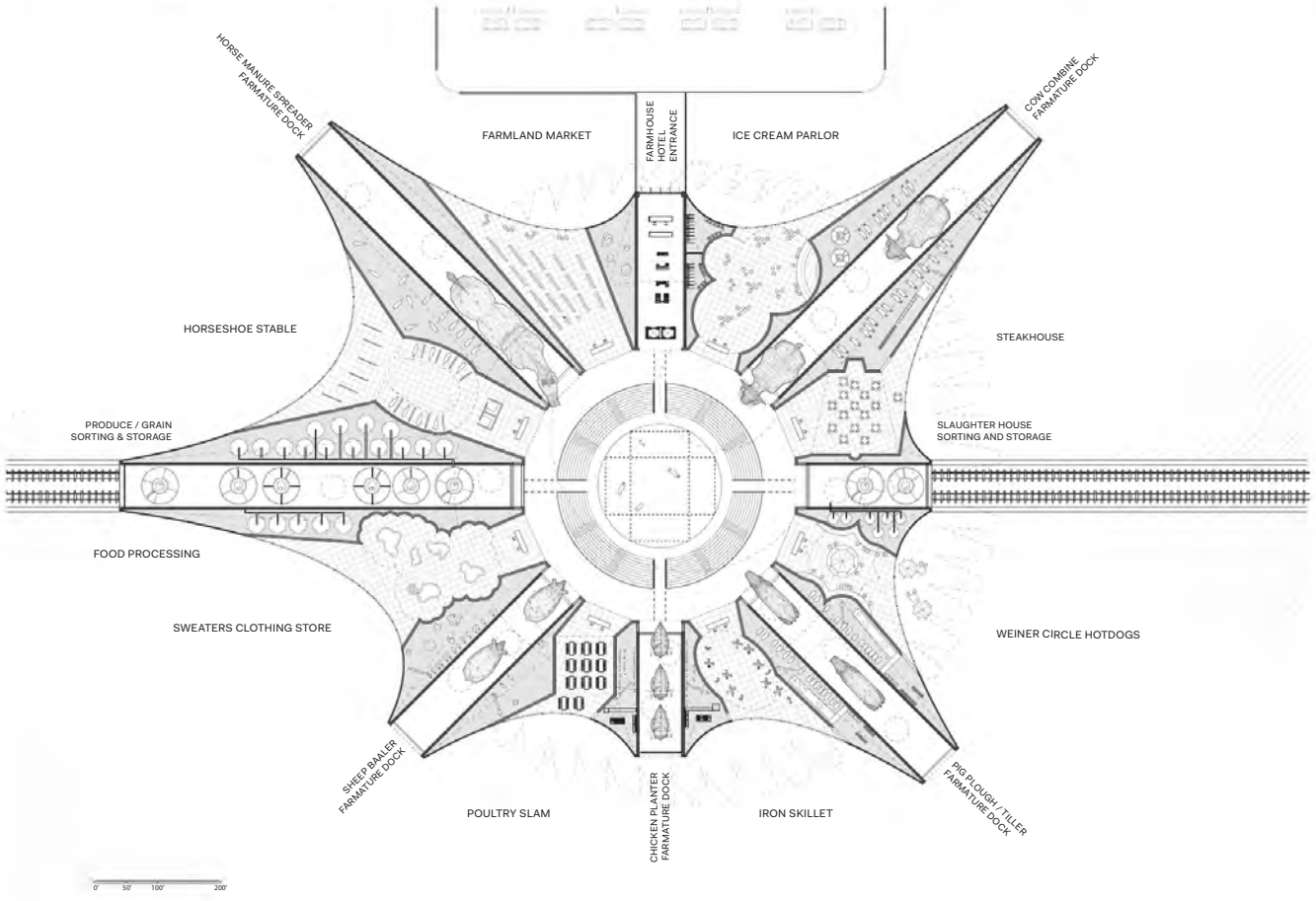
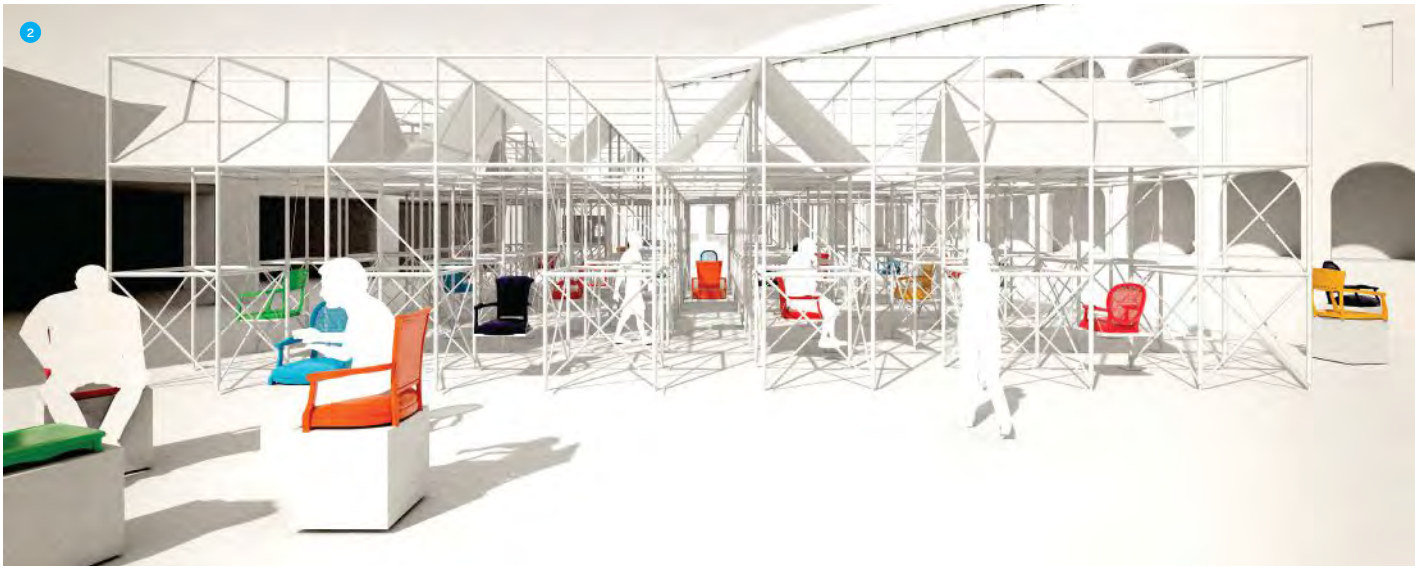
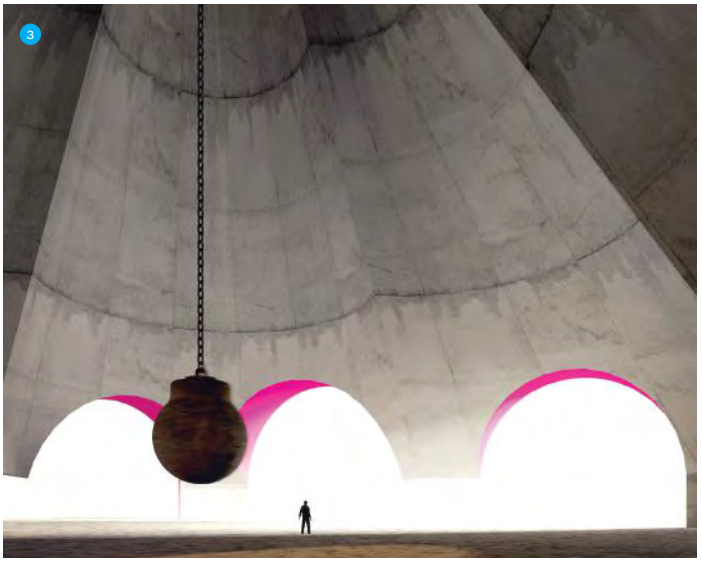
Next Progressives:
Design with Company









1. Two of Design with Company's recent explorations celebrate the agricultural milieu: Animal Farmatures (top), conceived as over-scaled animatronic farm equipment, inhabit and cultivate Farmland World (bottom), a speculative agricultural tourism venue. **2.** In 2014, Hicks and Newmeyer won the DawnTown Miami competition with their entry, Pavilion MMM... (Miami Many-a-chair Monument...), which suspended worn yard sale seating from the pavilion's scaffolding outside Philip Johnson's Miami-Dade Cultural Center. **3.** The studio's response to the Prentice Women's Hospital demolition was a "design fiction" entitled "The Monument to Bruce," an edifice to a wrecking ball that, following the demolition, would become a pendulum eternally tracing the quatrefoil outline of the building it destroyed. **4.** As the winning entry for the Ragdale Ring competition, Shaw Town examines the work of Howard Van Doren Shaw, reimagining components of his buildings as ruin-like foam pillows arranged around the competition's namesake landscape, an outdoor theater Shaw designed in 1912. **5.** Porch Parade comprises a colorful arrangement of front porches opening onto Vancouver's Robson Street, with each decked out in locally sourced garage sale finds that will be donated back to the community after the installation closes.

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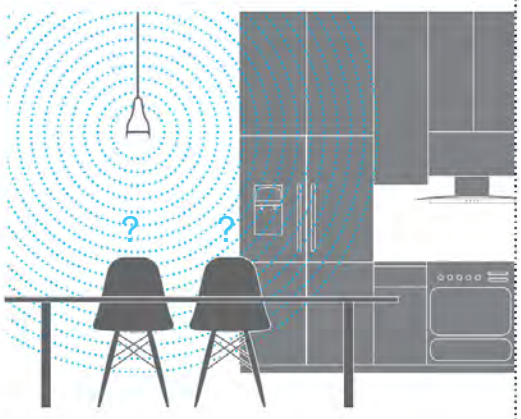
Technology: The Internet of Places

TEXT BY WANDA LAU

Steve Sanderson had grand plans for the kitchen in Case Inc.'s upcoming office in New York. Because his colleagues at the building information and technology consultancy always seemed to gather in their existing space's eating area, he and the fit-out team carved out a spacious, light-filled spot in the new floor plan and equipped it with a communal table and a stocked refrigerator.



But his assumptions about the kitchen's popularity turned out to be wrong—a fact that Sanderson, now the vice president of building intelligence at WeWork, which recently acquired Case, learned through Case's in-house experiment with indoor positioning and the Industrial Internet of Things (IIoT).

Catapulting off the Internet of Things (IoT), in which sensored products—such as the Nest thermostat—relay information within a local, closed system, the IIoT aggregates data collected from broad networks of sensored objects to optimize large-scale systems, such as building occupancy. (This article will use the IoT to reference both concepts.)

Myriad open-source and proprietary IoT technologies are now available, with light fixtures well positioned to host sensors due to their ubiquity. Case's research team, in conjunction with RMIT University doctoral candidate Mani Williams, stuck Apple's Bluetooth-enabled iBeacons on walls throughout the new office. These sensors tracked each employee's movements using trilateration and a cellphone app. Six weeks and 7 million data points later, the 33 staff members became exemplars of the next chapter of post-occupancy evaluation: validating architectural program through big data.

The potential of the IoT in architectural design is huge. Architects working with clients on iterative projects, such as an office campus, will be able to see which design decisions were successful and which were not, and apply these insights to the next building on deck.

The IoT also can lead to savings in building energy usage. Tanuj Mohan, founder and chief technology officer of Enlighted, in Sunnyvale, Calif., recalls a client experimenting with a hoteling concept on an office floor. The facility manager had programmed the HVAC system to condition select areas of the floor under the assumption that workers would occupy the offices closest to the ingress first. However, Enlighted's data showed that occupants actually preferred to spread out upon arrival, filling the floor's periphery first.

Healthcare projects also stand to benefit from big data. Daniel Davis, now the lead researcher at WeWork, says line-of-sight and travel distances between points A and B are thoroughly analyzed during pre-design, but rarely validated for their effectiveness after the facilities are in operation.

Perhaps the most immediately available and obviously profitable use of the IoT is in the retail sector. From an architecture standpoint, sensors can reveal how customers navigate store layouts, says Joel Vincent, senior director of product marketing at Sensity Systems, in Sunnyvale, Calif. "By making the design itself more critical to the core business, it becomes more valuable than a generic design," he says.

Pre- and post-occupancy studies are nothing new, of course. But while surveys and focus groups reveal the respondents' perceived notions of an environment, says Gensler principal and workplace sector leader Janet Pogue McLaurin, AIA, sensor technology will capture "the reality of what's happening" and be comparable to what architects can gather from observation—if they were able to watch their projects 24/7.

In the long run, having digital armloads of post-occupancy data will help architects understand the "role of the physical space in being a catalyst for how organizations change," McLaurin says. "[Because] we're designing for the future, we'll have a vision of how people will want to work differently."

> *To read the entire story on the IoT's potential uses and problems in architectural design and post-occupancy evaluation, visit bit.ly/IoTplaces.*

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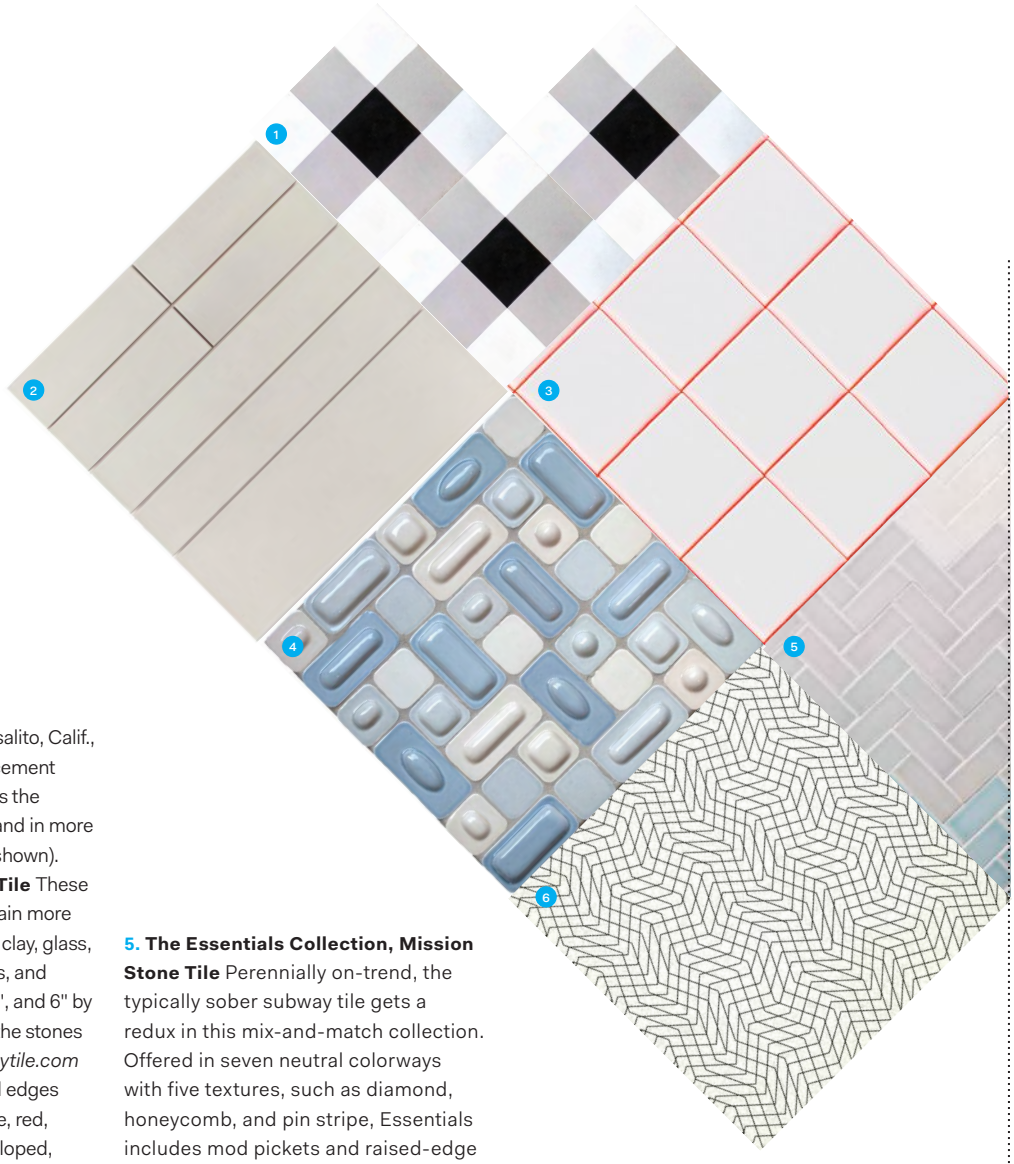

1. Cement Tiles, Clé The Sausalito, Calif., studio now offers its encaustic cement tiles in a ⅜" thickness, two-thirds the weight of the typical ⅝" profile, and in more than 150 patterns (Checkmate, shown). *cletile.com* **2. Edge, Fireclay Tile** These modular, large-format tiles contain more than 70% recycled content from clay, glass, waste porcelain, spent abrasives, and granite dust. In 3" by 9", 3" by 18", and 6" by 18" with 12 finishes named after the stones and minerals they mimic. *fireclaytile.com*
3. Scales, Peronda Two raised edges in neon blue, green, pink, orange, red, or yellow turn these diagonally sloped, 12cm-square wall tiles by Valencia, Spain, studio MUT Design for Peronda into a vibrant, textural array. *peronda.com*
4. Merge, House Fifty Two New from designer Erin Adams' brand, Merge punches up conventional wall ceramics with raised forms and a rustic color palette. *housefiftytwo.com*

5. The Essentials Collection, Mission Stone Tile Perennially on-trend, the typically sober subway tile gets a redux in this mix-and-match collection. Offered in seven neutral colorways with five textures, such as diamond, honeycomb, and pin stripe, Essentials includes mod pickets and raised-edge mosaics. *missionstonetile.com* **6. Filo, Ceramiche Refin** From Italian architects Alessandro and Francesco Mendini, this line of 30"-square porcelain tiles features four illusory printed patterns based on an abstracted orthogonal grid. In four muted colorways and a natural finish. *refin-ceramic-tiles.com*

> *For more of the latest tile products for floors and walls, visit bit.ly/newtile.*

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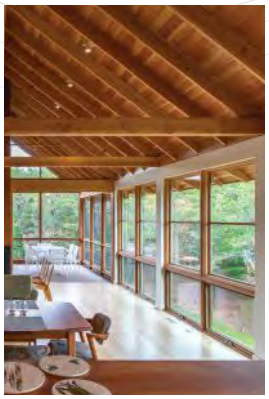

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A 50

THE 7TH ANNUAL ARCHITECT 50

INTRODUCTION BY ERIC WILLS
TEXT BY ELIZABETH EVITTS DICKINSON

Gordon Gill, Adrian Smith, and Robert Forest from Adrian Smith + Gordon Gill Architecture, this year's top firm

Who had the best 2014? The competition for this year's ARCHITECT 50 was especially fierce, as many firms posted massive gains in revenue. We updated our methodology (see page 74) to include new metrics: percentage of women and minority designers; range and value of employee benefits; rate of employee turnover. Many respected firms missed the cut; some small boutique firms rose through the ranks. The result? A list featuring a diverse array of great practices.

A 50

1 **Adrian Smith + Gordon Gill Architecture** Chicago
••• $$$ □1 ○17 △24 300.0
Read about AS+GG's big year on page 68.

2 **Skidmore, Owings & Merrill** Chicago ↑ from 12
••••• $$$$ □4 ○6 △2 296.1
It was a year of high-profile projects for SOM, including One World Trade Center, Denver Union Station, and the New School's University Center.

3 **Gensler** San Francisco
••••• $$$$$ □47 ○2 △7 281.2
Gensler's Legal Innovation Lab explored design strategies for the future of the legal workplace; the firm's portfolio was headlined by the Shanghai Tower.

4 **EYP Architecture & Engineering** Albany, N.Y.
•••• $$$$ □3 ○1 △40 280.8
Discover why EYP was tops in sustainability on page 70.

5 **Perkins+Will** Chicago ↑ FROM 20
••••• $$$$ □7 ○10 △4 273.5
A remarkable 78 percent of Perkins+Will's designers were licensed in their respective fields; also, the firm unveiled its striking Shanghai Natural History Museum.

6 **Lake|Flato Architects** San Antonio, Texas
•• $$$ □73 ○8 △9 251.7
Lake|Flato's work "beautifully showcases the potential of ordinary building systems and industrial materials," said the design judges.

7 **Westlake Reed Leskosky** Cleveland, Ohio
••• $$$ □17 ○16 △20 248.5
Westlake Reed Leskosky dedicated 17 percent of billable hours to pro bono projects, designing a new $6 million building for a nonprofit dedicated to mental illness.

8 **WRNS Studio** San Francisco
•• $$$ □6 ○14 △37 247.4
WRNS enhanced its tech cred by designing an addition to the AirBnB headquarters in San Francisco.

9 **Leers Weinzapfel Associates** Boston ↑ FROM 45
•• $$ □99 ○5 △18 246.8
"Uniformly excellent," said the design judges about a portfolio that included the surprisingly elegant Ohio State East Regional Chilled Water Plant.

10 **Richärd+Bauer** Phoenix
•• $$ □111 ○7 △5 245.2
Richärd+Bauer's portfolio exhibited "a playful use of often common materials employed in an extraordinary way."

LEGEND

EMPLOYEES
• 1–10
•• 11–99
••• 100–499
•••• 500–999
••••• 1,000+

GROSS REVENUE
$ Less than 1 million
$$ 1–9.9 million
$$$ 10–99.9 million
$$$$ 100–999.9 million
$$$$$ 1 billion+

RANK IN EACH CATEGORY
□ Business
○ Sustainability
△ Design

↑ Biggest movers
+ First time making the Top 50

PREVIOUS PAGE: © ADRIAN SMITH + GORDON GILL ARCHITECTURE

11 **Sasaki Associates** Watertown, Mass. ↑ FROM 126
••• $$$ □75 ○4 △47 244.2
Sasaki championed resilient design in its hometown with its "Sea Change" project.

12 **ZGF Architects** Portland, Ore.
•••• $$$$ □24 ○11 △34 244.0
ZGF is targeting net-zero-energy with its building for Stanford University's Central Energy Facility.

13 **Mithun** Seattle ↑ FROM 46
••• $$$ □29 ○28 △14 242.5
Mithun boosted net revenue by 31 percent with projects like the Google Engineering Training Center in California.

14 **Payette** Boston
••• $$$ □68 ○9 △32 236.6
Winner of the AIA's IDP award, Payette pursued the 2030 Commitment with thermal bridging research.

15 **THA Architecture** Portland, Ore.
•• $$ □13 ○44 △19 236.2
THA brought a refined design sense to the net-zero-ready Unitarian Universalist Fellowship of Central Oregon.

16 **NADAAA** Boston
•• $$ □111 ○40 △1 235.1
Discover why NADAAA led the design category on page 72.

17 **CO Architects** Los Angeles, Calif.
•• $$$ □13 ○24 △39 234.8
This AIA California Council Firm Award winner added 13 new positions and promoted three employees to principal.

18 **William Rawn Associates** Boston
•• $$$ □53 ○13 △41 233.3
William Rawn had another profitable year; the firm renovated Philip Johnson's Boston Public Library.

19 **The Miller Hull Partnership** Seattle
•• $$$ □67 ○32 △11 232.7
The design judges praised Miller Hull for designing to a "range of scales, from the infrastructural to the modest."

20 **Kirksey Architecture** Houston ↑ FROM 38
••• $$$ □2 ○20 △82 228.5
Kirksey boosted net revenue 77 percent with projects such as a petroleum research building at Texas Tech University.

21 **Leddy Maytum Stacy Architects** San Francisco
•• $$ □90 ○12 △41 227.0
This firm pursued its socially conscious mission with two green affordable housing projects in the Bay Area.

22 **Studio Gang Architects** Chicago
•• $$$ □89 ○55 △3 225.8
"There is a sense of inventiveness that successfully operates on many levels," said the design judges.

23 **CannonDesign** Grand Island, N.Y. ↑ FROM 43
••••• $$$$ □69 ○46 △12 225.5
CannonDesign's Brantford YMCA/university complex in Canada "skillfully integrates landscape and architecture."

24 **HOK** St. Louis
••••• $$$$ □42 ○15 △60 225.0
HOK acquired 360 Architecture, spurring the launch of the firm's Sports + Recreation + Entertainment practice.

25 **HGA** Minneapolis
•••• $$$$ □38 ○57 △17 224.9
HGA exhibited a commitment to research and unveiled its Ordway Center for Performing Arts in St. Paul, Minn.

26 **SRG Partnership** Portland, Ore.
•• $$$ □15 ○29 △56 223.3
SRG had a 64 percent increase in net revenue.

27 **Hastings Architecture Associates** Nashville, Tenn.
•• $$$ □50 ○38 △28 222.1
Hastings landed a dream project with the Ryman Auditorium, "The Mother Church of Country Music."

28 **Eskew+Dumez+Ripple** New Orleans
•• $$ □63 ○40 △26 218.9
Eskew+Dumez+Ripple bagged some nice honors, including the AIA's IDP Award and Architecture Firm Award.

29 **Ayers Saint Gross** Baltimore ↑ FROM 44
••• $$$ □17 ○19 △75 218.7
Ayers Saint Gross had a 45 percent net revenue increase and started an employee stock ownership plan.

30 **NBBJ** Seattle
•••• $$$$ □51 ○64 △15 217.8
NBBJ's portfolio of large projects were "remarkable for their thoughtfulness in relating to the human scale."

31 **FxFowle Architects** New York
••• $$$ □22 ○54 △36 217.6
FxFowle's strong financial year was buoyed by a host of international projects, including the Allianz Tower in Turkey.

32 **HKS** Dallas
••••• $$$$ □16 ○30 △74 214.2
HKS enjoyed a 17 percent increase in net revenue and invested heavily in the study of hospital design.

A 50

33 **Clark Nexsen** Virginia Beach, Va.
●●● $$$ □83 ○23 △51 213.8
Clark Nexsen's Raleigh Durham airport project illustrated the sustainable benefits of renovation vs. demolition.

34 **ELS Architecture and Urban Design** Berkeley, Calif.
●● $$ □61 ○21 △65 211.9
ELS had one of the most diverse staffs of designers, with 40 percent women and 50 percent minorities.

35 **Koning Eizenberg** Santa Monica, Calif. +
●● $$ □117 ○49 △6 209.5
"The work is formally sophisticated and not gratuitous," said the design judges.

36 **Marlon Blackwell Architects** Fayetteville, Ark. +
●● $$ □105 ○62 △7 209.5
Marlon Blackwell doubled its net revenue with projects that exhibited "a thoughtful understanding of place."

37 **HDR Architecture** Omaha, Neb.
●●●●● $$$$ □57 ○79 △16 209.4
HDR scored well in design with its post-occupancy healthcare research and portfolio of international projects.

38 **Lord Aeck Sargent** Atlanta ↑ FROM 103
●●● $$$ □37 ○43 △63 209.0
AEC firm Lord Aeck Sargent offered a strong suite of benefits and support for young architects.

39 **LPA** Irvine, Calif.
●●● $$$ □55 ○63 △29 207.9
LPA's portfolio of higher education and office projects averaged 25 percent below California's strict energy code.

40 **Ross Barney Architects** Chicago
●● $$ □64 ○65 △22 207.5
Ross Barney made its mark in its hometown with its Riverwalk expansion and transit authority station.

41 **ZeroEnergy Design** Boston +
● $ □106 ○3 △113 206.0
ZeroEnergy's residential projects aggressively exceeded AIA 2030 Commitment targets.

42 **Mark Cavagnero Associates** San Francisco
●● $$ □30 ○86 △23 205.7
Mark Cavagnero enjoyed a 37 percent increase in net revenue and earned a "Nice work" from the design judges.

43 **LMN Architects** Seattle
●●● $$$ □74 ○49 △45 205.5
LMN's Brooks Sports Headquarters met the goals of Seattle's Living Building Pilot Project.

44 **Arrowstreet** Boston +
●● $$$ □10 ○75 △53 205.0
Arrowstreet had a 53 percent increase in net revenue and did significant research into resilient design.

45 **RMW Architecture & Interiors** San Francisco
+ ↑ FROM 73
●● $$$ □60 ○18 △84 204.6
In the Bay Area, RMW restored Market Square (the Twitter Building) and a 1970s tilt-up that's now net-zero energy.

46 **Bruner/Cott & Associates** Cambridge, Mass. +
●● $$$ □79 ○39 △54 203.7
More than half of Bruner/Cott's designers are women; the firm is pursuing its first Living Building Challenge project.

47 **Ann Beha Architects** Boston
●● $$$ □75 ○34 △64 203.5
Ann Beha's addition to Myron Taylor Hall at Cornell University Law School achieved LEED Platinum.

48 **DLR Group** Minneapolis
●●●● $$$$ □43 ○45 △67 203.3
DLR Group enjoyed a 17 percent increase in net revenue; 18 percent of its design staff are minorities, up from 7 percent four years ago.

49 **Studios Architecture** Washington, D.C. ↑ FROM 139
●●● $$$ □8 ○66 △69 203.3
Studios Architecture had a big financial year, adding 19 new positions.

50 **SmithGroupJJR** Detroit
●●●● $$$$ □58 ○47 △62 202.0
SmithGroup's Chesapeake Bay Foundation project is on target for Living Building Challenge certification, the firm's first such project.

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A 50

BUSINESS

1 **Adrian Smith + Gordon Gill Architecture**
●●● $$$ 100.0

2 **Kirksey Architecture**
●●● $$$ 65.9

3 **EYP Architecture & Engineering**
●●●● $$$$ 61.9

4 **Skidmore, Owings & Merrill**
●●●●● $$$$ 61.8

5 **Blair + Mui Dowd Architects**
●● $$ 61.6

6 **WRNS Studio**
●● $$$ 58.4

7 **Perkins+Will**
●●●●● $$$$ 57.9

8 **Studios Architecture**
●●● $$$ 57.4

9 **PBDW Architects**
●● $$$ 57.2

10 **Arrowstreet**
●● $$$ 56.9

Adrian Smith + Gordon Gill Architecture

For Adrian Smith + Gordon Gill Architecture (AS+GG), ranked first overall and first in the business category, years of hard work paid off in a big way in 2014. AS+GG completed its first two megabuildings, the FKI Tower in Seoul, South Korea, and the Waldorf Astoria Beijing, and undertook a massive project for the Astana Expo City 2017 in Kazakhstan, including the design of a comprehensive master plan and 19 buildings. The Expo City, fueled by renewable energy, will become a permanent part of the city's infrastructure and provide a center for building research. "Astana was done in one year because it had to get out the door quickly and get constructed by the end of 2016," says firm co-founder and partner Adrian Smith, FAIA. The project helped boost firm revenue by 313 percent over the previous year.

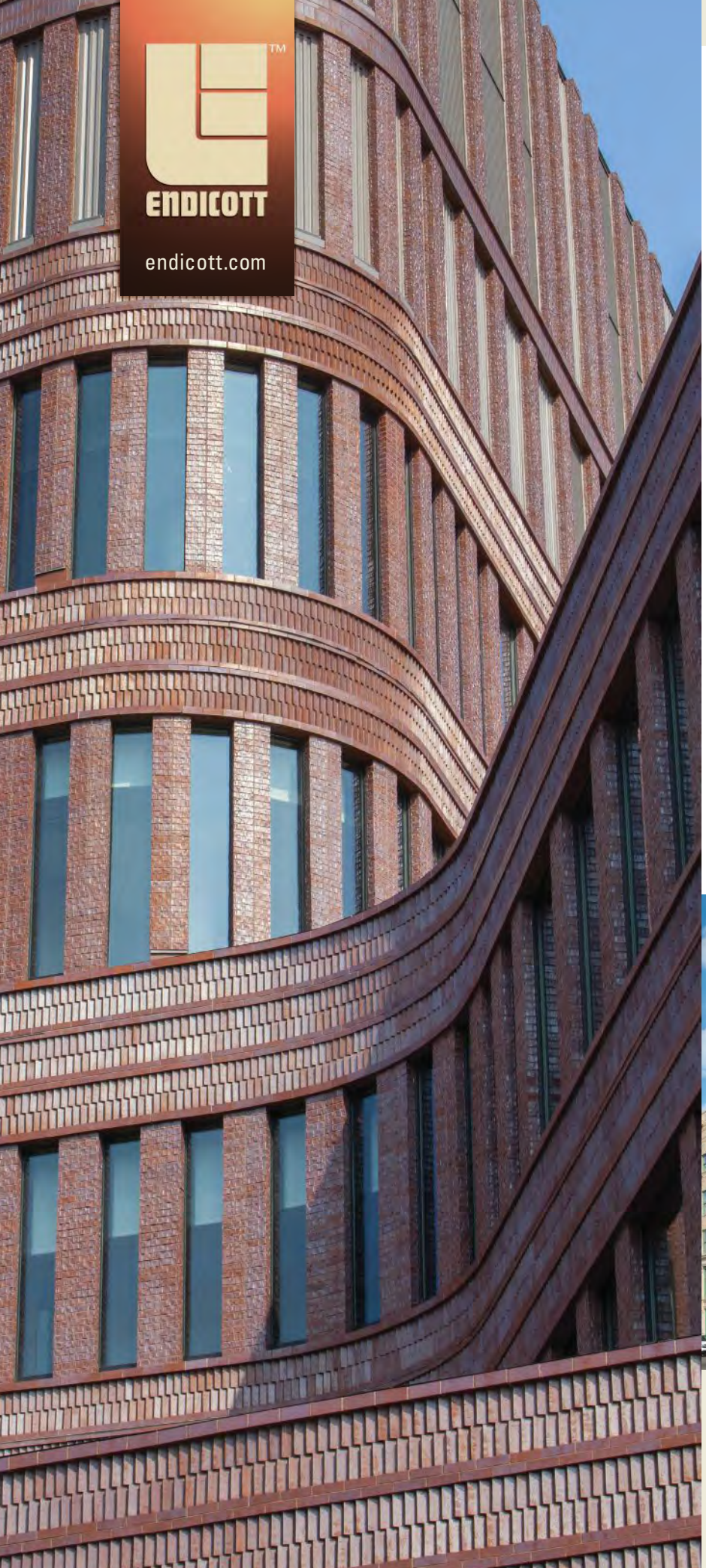
While 2014 was a great year for the Chicago-based firm, partner Robert Forest, FAIA, says, "It didn't sneak up on us. We've had a tremendous amount of work since opening nine years ago, and last year saw the culmination of a lot of things."

Projects like Astana, for example, benefited from extensive research that began in earnest during the global economic crisis. "We had a tremendous amount of work in Dubai in 2008," Smith says. "We had 23 projects on the boards, all large, and then the crash hit in October." The firm decided to focus some of its staff on the question of how buildings might better meet the goals of the 2030 Challenge, and in 2012 it published the book *Toward Zero Carbon: The Chicago Central Area DeCarbonization Plan*. Today, the firm dedicates 20 percent of its profits to research.

AS+GG has also started taking on new project types. "We have quietly built up the firm on a number of levels," says co-founder and partner Gordon Gill, FAIA. "We have eight or so theaters and museums right now."

For all of AS+GG's success last year, the partners have no intentions of growing the business too much. Everything still comes through the Chicago headquarters. "Often, we've been asked, 'Why don't you have more offices?' " says Gill. "The reason is because we believe in a manageable approach to the quality of design. The three of us are involved in every single project from day one to the last day."

With four other supertall towers in the works, the challenge now, the partners say, is maintaining the perception that all clients are welcome. "We've had people say things like, 'We have now gotten to the point where we believe we can come and talk to you about a project because it's big enough.' The myth of that is that we are not interested in the size of the project; we're interested in the quality. Even if it's a small project, we care about the quality of it," Gill says. —E.E.D.



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A 50

SUSTAINABILITY

1 **EYP Architecture & Engineering**
•••• $$$$ 100.0

2 **Gensler**
••••• $$$$$ 98.9

3 **ZeroEnergy Design**
• $ 94.2

4 **Sasaki Associates**
••• $$$ 91.2

5 **Leers Weinzapfel Associates**
•• $$ 88.5

6 **Skidmore, Owings & Merrill**
••••• $$$$ 86.3

7 **Richärd+Bauer**
•• $$ 84.4

8 **Lake|Flato Architects**
•• $$$ 81.5

9 **Payette**
••• $$$ 80.5

10 **Perkins+Will**
••••• $$$$ 80.2

EYP Architecture & Engineering

EYP has long been committed to high-performance building design, and incorporating energy modeling into every project is part of what helped the firm secure the top spot in sustainability for the second year in a row. Tom Birdsey, AIA, EYP's president and CEO, calls it "day one thinking."

"We don't let a building get to schematic design and then bring on energy modelers to analyze performance," he says. "We have the energy modeler working hand-in-hand with the design team from the start."

The firm uses proprietary software called NEO (Net Energy Optimizer), which assesses the implications for everything from massing to orientation to material choice. "We can sit with a set of plans with the owner or operator and analyze different bundles of materials, control systems, mechanical systems, glazing. In real time, the software can analyze how that bundle of materials performs against other bundles."

EYP has also committed to post-occupancy benchmarking. "It's great to try and predict performance, but what's really valuable to our clients is when we can demonstrate to them that our predictive modeling makes sense," Birdsey says. The firm now has some 15,000 buildings in a benchmarking platform called B3 and is working with the Clinton Global Initiative on a project to make university and college campuses more energy efficient. Administrators will use B3 to help them discover which buildings at their institutions have the greatest potential to realize energy savings.

The next step: proving that zero energy can be affordable. EYP partnered with SUNY Polytechnic Institute's Colleges of Nanoscale Science and Engineering in Albany, N.Y., to adapt a typical spec office building to zero energy (the project is now under construction). The goal is to prove that the design could be scaled and used elsewhere. —E.E.D.

Breaking the Curve

Architects designing Legacy Junior High School faced a challenge: create a space to inspire and excite students. Through lively community collaboration, the project came together, incorporating sinuous and sophisticated green metal contours hip enough to intrigue students.

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LOCATION: Layton, Utah

ARCHITECT: VCBO Architecture

CONTRACTOR: All Metals Fabrication

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3 **Studio Gang Architects**
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6 **Koning Eizenberg**
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7 **Gensler**
••••• $$$$$ 85.8

7 **Marlon Blackwell Architects**
•• $$ 85.8

9 **Lake|Flato Architects**
•• $$$ 84.1

10 **nArchitects**
• $$ 84.0

NADAAA

For the renovation and expansion of the Daniels Faculty of Architecture, Landscape, and Design building at the University of Toronto, NADAAA proposed a seemingly complex, warped ceiling surface in the main studio. Conventional construction methods suggested the ceiling could only be realized using expensive and time-consuming hand-troweled plaster on metal lath. But the firm built a 1:1 mock-up of a simple frame with drywall, proving the viability of the concept and convincing the construction team to reduce its estimated costs by more than half.

That's why NADAAA—the top firm in design for the third straight year—invests so much in research (14 percent of its annual profits). "With each project, we look at its innate qualities not only in terms of its material behavior, but also how it engages the protocols of the construction industry," says NADAAA partner Nader Tehrani. "We reach out to the building industry at an earlier phase to understand the logic of construction."

NADAAA frequently partners with the trades to design building elements, but also experiments in-house with its own fabrication lab. "This is where we do the making and research of pieces for which there is no precedence or that are speculative," Tehrani says. "Sometimes we hand them off to the building industry; other times we deliver them ourselves."

The firm's portfolio was lauded by the design judges, one of whom wrote that "the projects exhibited a very unique, sincere, and sophisticated voice … and made me feel convinced and happy that architecture with a capital 'A' is alive and well." —E.E.D.

JUDGES

Stephen Kieran, FAIA
Kieran is a partner at KieranTimberlake in Philadelphia, a leader in practice-based architectural research and innovative buildings. The co-author of five books, he teaches a design-research studio at the University of Pennsylvania School of Design.

Roberto de Leon, AIA, and M. Ross Primmer, AIA
De Leon and Primmer co-founded De Leon & Primmer Architecture Workshop in Louisville, Ky., which focuses on cultural, civic, or not-for-profit projects. Both partners earned master's degrees in architecture from the Harvard Graduate School of Design.

Mary-Ann Ray
Ray is a principal of Studio Works Architects in Los Angeles and a co-founder of the experimental lab BASE Beijing. A professor of practice at the University of Michigan's Taubman College of Architecture and Urban Planning, Ray is a winner of the Rome Prize.

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METHODOLOGY

ARCHITECT advertised the ARCHITECT 50 program in print and online, and also sent direct invitations to firms that either requested entry forms or that had been invited to participate in previous years. In all, 124 firms qualified. Data was from the 2014 fiscal year and was self-reported. Projects completed or in progress during the calendar year were included. Data was checked for consistency, and outliers were fact-checked. Karlin Associates LLC, a third-party research firm based in New York City, compiled the ranking and assured the confidentiality of the data.

The ARCHITECT 50 ranking is based on scores in three separate categories, with data weighted as follows:

BUSINESS

- 40% Net revenue per employee
- 20% Profitability (positive change in net revenue from 2013)
- 16% Business practices, including the percentage of repeat clients, percentage of women and minority designers, and voluntary staff turnover rate
- 24% Employee benefits, including insurance, ARE benefits, stock options, and other fringe benefits

SUSTAINABILITY

- 22% Participation in the AIA's 2030 Commitment program and percentage of the gross square footage of projects completed between 2011 and 2013 that were verified as meeting 2030 targets
- 38% Energy and water metrics: the percentage of gross square footage of a firm's projects that pursued a potable water reduction beyond what was mandated by code, that incorporated energy modeling or daylighting studies, that included features of resilient design, or that were designed using performance-based contracts. Credit was also given for the percentage of projects completed between 2012 and 2013, on a gross-square-footage basis, for which energy data was collected and verified as having met the project goals
- 20% The percentage of a firm's employees with LEED AP or Green Associate credentials
- 20% A score for the green project that best demonstrated a firm's commitment to sustainability (scoring by ARCHITECT editors)

DESIGN

- 80% A design portfolio, scored individually by three judges whose numbers were combined to create an overall score
- 5% Licensure, as measured by the percentage of designers licensed in their respective fields and the average percentage increase in salary upon licensure
- 5% Pro bono work, as measured by participation in Public Architecture's 1% program and the percentage of billable hours dedicated to pro bono
- 5% Design awards, including awards issued by architect, the AIA, ASLA, and other prominent institutions
- 5% Research, as measured by the percentage of profits invested in it and its scope and significance

The weight assigned to each data point was formulated after consulting with industry experts. After the scores were tabulated in each of the three categories, they were rescaled. The top ranking firm in each of the three categories was assigned a score of 100. The rest of the firms' scores in each of the three categories then were recalculated as a percentage of the top score. Finally, a firm's scores in each of the three categories were added together to create the overall ranking. Those scores were also normalized, with the top firm given an overall total of 300, and all the other firms' scores calculated as a percentage of the top score. Each firm's performance was calculated relative to the performance of other firms. The firm with an overall score of 300, for example, did not necessarily top out on every indicator and category; it accumulated the highest composite score. Any ties were broken by favoring the firm that achieved the higher score in the Design category.


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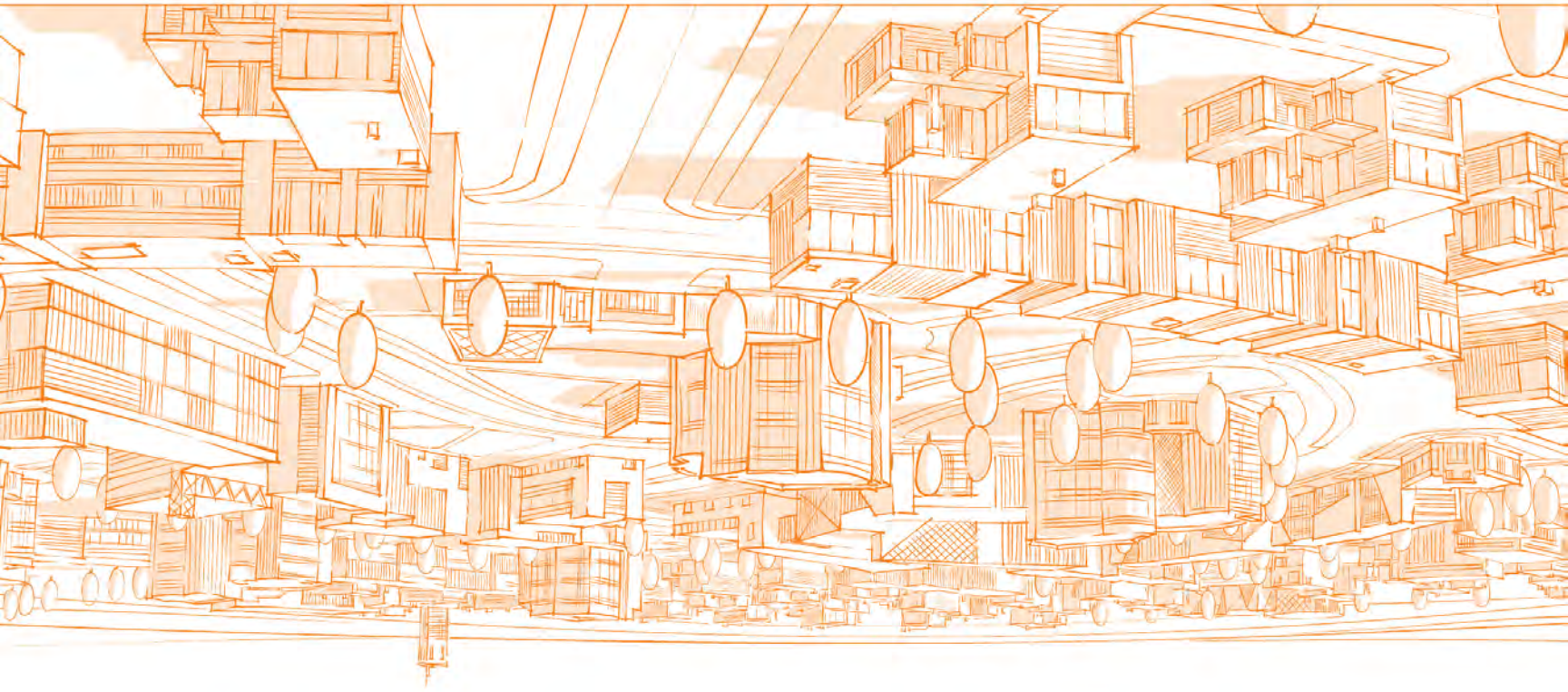

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PHOTOGRAPHY: CARL BOWER

The Chicagoan

Creating connections for a divided city.

Amanda Williams is a Chicago-based artist who explores cultural identity and the politics of race and urban space through her collaborative projects, public installations, painting, and photography. A native Chicagoan who teaches architecture at the Illinois Institute of Technology (IIT), Williams says that while personal experiences are often our foundation for design, the ritual nature of how we move between work and home limit our possibilities for full engagement with the city.

As told to William Richards

It's difficult for me to not think of architecture and other art forms as equal partners. They require equal investment as categories of making. Growing up, I went to school in one part of town and lived in another—and to constantly operate in different worlds is an important part of who I am. You have to, in architecture, have a rationale for what you're doing—no matter the client or community or critic. Other art forms don't always demand that level of justification. I don't know if it's generational, I don't know if that's just me, but in architecture what you're doing has to mean something. Even the more conceptual work I'm doing now, which is not "functional" in the traditional sense, still has to have a sense of purpose. That, to me, represents integrity.

The project that got the attention of the biennial committee was a series of abandoned houses I painted in Englewood, on the South Side of Chicago. It was initially an internally rooted question about my own contextual approach to architecture, but has evolved into a larger, more public provocation about neighborhood and audience. That was my struggle, merging the two. My attitude was: Let's take a zero-value landscape that has become invisible in plain sight, and let's test out the relevance of architecture as an object that is isolated through abandonment yet integral to its context.

The goal for my contribution to the biennial is two-pronged, and it deals with a desire to tell all sides of the story—to make sure all Chicagoans understand that they should take ownership of the condition of the entire city. The audiences for the biennial are the residents of Englewood as much as visitors from Berlin. I'm trying to get people to move around as if they were actively exploring their own cities, but at the same time make it clear that engagement is reciprocal and not an anthropological tour of "the hood," so to speak. And the question I'm asking is: What actions bring value to certain landscapes? AIA

→ Amanda Williams is one of more than 60 official participants in the Chicago Architecture Biennial (Oct. 3, 2015–Jan. 3, 2016), sponsored in part by the AIA. Learn more at *chicagoarchitecturebiennial.org*.

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AIANow

By William Richards
Art Direction by Jelena Schulz

Economies of Scale

$108 billion: Estimated cost of Hurricane Katrina, the U.S.'s costliest natural disaster
60,000: Estimated number of New Orleanians stranded by Katrina
33,500: Estimated number rescued by the Coast Guard after Katrina
150: Number of houses the Make It Right Foundation pledged to build after its founding in 2007
105: Number of houses the foundation has completed to date

77: Number of partners and sponsors (including the AIA) for the 2015 Chicago Architecture Biennial
62: Number of firms, architects, and artists officially participating in the biennial
13: Number of weeks the biennial will be open, starting Oct. 3
5: Number of principal biennial venues in Chicago

12,000: Number of plans and policies held by the AIA Trust, a provider of benefit programs and a risk management resource for AIA members
1952: Year the AIA Trust was established
40: Number of insurers listed in the AIA Trust Professional Liability Insurer Database
22: Number of member benefit programs available
9: Number of authors that the AIA Trust is working with to publish white papers on emerging practice risks

1,975: Number of Custom Residential Architects Network (CRAN) members
870: Number of attendees that CRAN has hosted at its annual symposium
8: Number of symposia CRAN has held since 2010
6: Number of episodes of CRANtv the group has produced for YouTube to educate potential clients

ILLUSTRATION: LAUREN NASSEF

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AIAFuture

Superhuman?

We need a new definition of the architectural hero.

ILLUSTRATION: MICHAEL GLENWOOD

Peter Eisenman, FAIA, the iconoclastic architect and teacher, member of the American Academy of Arts and Letters, and AIA/ACSA Topaz Medallion recipient, thinks that architects have their priorities backwards. "In a time that we have a lot of star architects, we have few heroes," he told a rapt audience at the 2015 AIA National Convention in Atlanta. "[These] form-makers," he said, "tend to be capricious without a formal or critical heart."

Whether you agree or disagree, Eisenman raises two good points. First, there's a difference between making form, so to speak, and formalism. One is about product, one about process, and his argument is that only a process can lead to a credible work of architecture. The second point is that star status does not always denote design leadership. In his argument, the analogy is clear: Star architects ("starchitects") are to mere form-makers as true heroes are to exegetical thinkers. (Less clear, however, is why calling someone a hero is any less capricious than balling up some modeling clay and calling it a building.) Nevertheless, the underlying question for our cynical age, with Internet altruists straining toward "upworthiness,"is: What is a hero anyway?

Self and Society

Morality connects all heroes and, by definition, heroes demonstrate good judgment, courage, and selflessness. The emphasis here is on "demonstrate." Heroes are people of action, not just intention. They may personify *Volksgeist* and anchor nationalistic spirit and values—Thor, Marianne, Lincoln, and so on. Heroes may also be more personal and less obvious figures who deeply influence fewer people than their famous counterparts. In other words, you may struggle to name the last three Nobel Peace Prize recipients, but you can easily name the three most influential teachers in your life.

Heroism has also been framed by Carlyle, Marx, Nietzsche, Spencer, and a dozen other philosophers as part of a debate about the so-called Great Man theory, which centered on whether history is written by extraordinary individuals or by groups, and, indeed, whether extraordinary individuals are uniquely sovereign or merely products of their environments.

That said, the fact remains: Heroes are singular figures whom we celebrate, value, and need in order to make sense of the world. It's why we put posters up on our walls; it's why we put pictures in lockets; it's why we erect statues; and it's why we have commonly held standards of fortitude (Robert Peary at the North Pole), grace (Althea Gibson at Wimbledon), and achievement (Bobby Fischer in Reykjavik). Even the most vehement nihilists—those who troll the comments section of websites to lament the human condition—can point to one example of individual heroism that is, somehow, meaningful.

If morality connects heroes, and heroism is something we need as people, then identifying heroism in architecture is about identifying moral individuals who have acted justly and admirably. Architectural historians will remind you that morality and the enterprise of architecture are connected along a spectrum of intent and impact—that over time a building's impact on its city can change as its function changes, or as the city changes around it. Social activists concerned with the built environment will tell you that design decisions have a direct impact on people, and that such an impact must be made humanely. Environmental activists will tell you that design decisions have a direct impact on local ecologies and regional conditions, and that such an impact must be made thoughtfully.

If there are heroes in architecture, then, they must understand that good intentions do not guarantee positive impacts, that the life cycle of a building is equal in importance to its design, and that one must balance humane decisions for the social good with thoughtful decisions for the environmental good. Because they are not, as it turns out, mutually exclusive realms of influence. The emphasis here again—as with the enduring definition of a hero—is on action, not just intention.

Eisenman would have us believe that heroes are in short supply and stars are all too abundant. Indeed, contemporary architecture is about more than the cult of personality or fame. If "hero" is too reverent a word, then identifying examples of heroism seems like an easier sell. So long as one is prepared to design adaptively, humanely, and thoughtfully, then the rest of us should be prepared to recognize that person's heroism when she or he succeeds in making a positive impact. After all, lamenting a dearth of heroes is about as productive as grousing about too many starchitects. **AIA**

William Richards

AIAFeature

Recourse for Resiliency

A new school of sustainability stokes the Iron City's renaissance.

Dominic Mercier

PHOTOGRAPHY: DOMINIC MERCIER

The Pittsburgh region, long polluted with industrial waste and wracked by poor air quality, once garnered the unfortunate descriptor of "hell with the lid taken off." Things are better today—Pittsburgh even tops many most-livable-city lists. It also seems to have found its Garden of Eden in a bucolic 388-acre farm 20 miles north of the metro area in Gibsonia, Pa., where Chatham University is building a school of sustainability from the ground up. Gifted to the school in 2008, Eden Hall Farm now serves as a satellite of Chatham's downtown site and the new home of the university's Falk School of Sustainability.

With plans for future expansion, the Falk School now runs four degree programs: a bachelor's and master's in sustainability, a master's in food studies, and a dual master's in sustainability and business administration.

In the first decades of the 20th century, the area served as a farm and a retreat from smoggy Pittsburgh for the H.J. Heinz Co.'s female employees; it was established by Sebastian Mueller, a German immigrant who worked with his cousin Henry J. Heinz for 50 years to create the eponymous food empire. The location is a perfect fit for Chatham, which counts environmental activist and author Rachel Carson as an alum, to create a living lab to support its sustainability education efforts.

Guided by a master plan created by Kansas City's BNIM and Philadelphia's Andropogon Associates, Chatham welcomed its first students to the new Eden Hall campus this fall. To reach this phase, the university has invested roughly $46 million and is apt to spend even more in the next five

ABOVE: Matt Kelterborn, Eden Hall Farm assistant, discusses benefits of the campus' movable hoop house. A variety of vegetables are grown year-round, many of which are served in the university's dining hall. | OPPOSITE: Eden Hall's Willis Amphitheater offers performing arts programming.

AIA Feature

CONTINUED

to seven years to complete the next phase, which includes additional residence halls to reach the ultimate goal of accommodating 1,500 students.

Early projects completed on the campus, with architectural, interior, and landscape design by Seattle's Mithun, have all the trappings of a forward-thinking, green oasis: the adaptation of existing horse and dairy barns, new buildings designed for net-zero operation, LEED Platinum certification, living building aspirations, solar arrays, on-site water treatment, and more than 40 geothermal wells feeding the campus' energy loop. But it's the way in which Falk dean Peter Walker is attempting to equip his students to have a postgraduate impact and a job that makes Chatham's efforts stand out.

After years with the International Red Cross and running a research lab at Tufts University focusing on humanitarian crises and war zones, Walker joined Chatham 12 months ago. With years of tackling disasters under his belt—years of observing what happens, as he says, "when you get sustainability wrong"—Walker was ready to head upstream where long-term solutions can begin.

In his eyes, studying sustainability doesn't mean "wearing hair shirts and going back to nature," but rather taking an overarching healthy approach to education and, subsequently, life. Placing students in a setting like Eden Hall, he says, where they can live and work on a fully sustainable campus in small cohorts (Falk has about 120 students across its four programs) while creating a welcoming and engaging setting for the surrounding community, is key to the school's success.

"Like many cities, Pittsburgh has some of the worst extremes of racial segregation, poverty, rich-versus-poor educational areas, and unemployment," says Walker. "On the positive side, this part of Pennsylvania also has family farms, and we have a mayor and city that want to start connecting back to those farms. Part of our job is solving our own problems, and if we can do that I think it provides a brilliant basis for our students. They leave here as people who can solve problems, and that's what every employer wants."

Walker's premise of community engagement in sustainability is clear in the campus plan, which offers public wooded walking trails, a gorgeous amphitheater that features performing arts programming, and space for large-scale art installations. But that ideal seeps out of the campus, too, predominantly through the work of the school's graduate students.

Shauna Kearns, an apprentice baker, was attracted to the Falk's masters in food studies program after struggling with what to do with her undergraduate business degree. While Eden Hall provides an expansive setting to study food and its overarching issues among the organic gardens, apiaries, and vintage root cellar located on the grounds, Kearns' thesis plan was to research and write about the impact of community wood-fired ovens—common in Canada but less so in the United States.

Along the way, Kearns figured she should be baking in one, too. Some Internet sleuthing led to the discovery of an oven down the Monongahela River in the suburb of Braddock, Pa., which has struggled with a declining population since the collapse of the Pittsburgh steel industry. She began making regular bus trips, rising sourdough in tow, to bake there. It wasn't what she expected. Built in 2008 as part of a mayoral initiative to revitalize the town's main drag, the oven

"This is a pioneering venture; no one has tried to build a campus from the bottom up like this. I think we've got to be very careful not to fall into the trap of doing it the comfortable way."
—Dean Peter Walker

ILLUSTRATION: EDEN HALL PLAN. ©BNIM

ABOVE: The Falk campus master plan includes: 1. Eco Center; 2. Greenhouse; 3. Academic Building; 4. Residential Building; 5. Commons; 6. Constructed Wetland 7. Amphitheaters; 8. Mueller House; 9. Lodge; 10. Sports Complex; 11. Studio Arts Building; 12. Facilities Management; 13. Pedestrian Bridge; 14. ADA Parking; 15. Thoreau Cottages; 16. Townhouse Community; 17. Springhouse; 18. General Parking. | A. Orchard and Green Facility; B. University Meeting Center, Dining Facility, and Classrooms; C. Aquaponics and Living Machine; D. Academic Building; E. Guest Facility; F. Bunkhouse and Common Building; G. Wellness Center; H. High Tunnels, Greenhouses, and Market; I. Animal Barn and Pasture (rotating acreage). OPPOSITE: Two completed barns sit on Chatham's new Falk campus, which occupies a 388-acre farm 20 miles north of Pittsburgh.

could only handle 15 loaves of bread and its construction wasn't quite up to snuff.

"A lot of people in Braddock were interested in buying this bread," Kearns learned, "so I sold the mayor on the idea of building a much larger outdoor oven." Using proceeds from the sale of loaves at a local farm stand (Braddock residents receive a significant discount) and in the Chatham community, she was able to raise enough capital to fund the construction of a new oven.

"Initially, that's what helped make the whole initiative sustainable," she says, "because I was just trying to cover my costs. The Chatham community played a key role in that."

Kearns further engaged the community by partnering with the nonprofit Trade Institute of Pittsburgh, which teaches trades to people with significant barriers to employment, many of them living in halfway homes in Braddock, to tackle the masonry work. The result of her efforts is an oven with a tremendously increased capacity. Kearns can now crank out 100 loaves per bake, after which the hearth is opened for community use. She's also developing a baking training curriculum as part of her work in the community.

"That's what I think is so cool about bread," Kearns says. "Everybody connects with it."

Curriculum and Community Combine

The Chatham community places a priority on seeing ideas like Kearns' become reality. That is especially true when it comes to the school's two-year dual master's program in sustainability and business administration. Partnering with major business accelerators in the Pittsburgh area, students are learning not only how to create sustainable products but also how to make them viable business ventures, says MBA program director Ting-Ting (Rachel) Chung.

"At the end of the day, you can have a very sustainable idea or product, but if nobody is using it, what is the point?" says Chung. "You can't really change the world until you can change the consumer's behavior."

To drive home that point, Chung says Chatham turns to local innovators. One of these is the accelerator program startup AlphaLab, which provides an extensive mentoring network and a selective program that provides six to eight companies with funding and office space to get their ideas off the ground. Chatham also has a number of

AIAFeature

CONTINUED

marketing gurus on its professional faculty. Meredith Grelli's background in brand management for Heinz has led to her co-ownership of hip craft whiskey producer Wigle Whiskey, where past and present Chatham students on staff help develop a new flavor each year. Access to the vibrant community of entrepreneurial expertise also inspires Chatham students to explore social innovations to drive sustainable changes. Brian McCombs, one of the school's first dual master's students, recently joined PittMoss, a Pittsburgh startup that produces a sustainable alternative to sphagnum peat moss.

This integrated approach isn't relegated to the dual-degree program at Chatham. In the bachelor's and master's of sustainability tracks, students are required to take courses in everything from scientific systems to the political economy. Molly Mehling, an assistant professor of ecology and sustainability, notes that with such a broad concept, and a diverse set of student interests and backgrounds, both programs are seeing a number of concentrations blooming around the base curriculum. Those explorations have the added benefit of helping students "discover their own passions" and instill a sense of open thinking she sees as critical to 21st-century problem-solving.

"We have very defined sectors that go about very complex problems with one approach and a narrow focus," Mehling says. "When you open them up and combine them with something else, new solutions appear. I don't think there's any other way forward. We have to take this integrated approach to think beyond the short term."

While Chatham seems to have figured how to approach sustainability on an institutional level, dean Walker isn't ready to rest on his laurels. As he ponders future program offerings and growing Falk's enrollment—he's thinking big about global health and continuing to tap into the idea of rural livelihood.

Walker asks himself the same question every day, whether in his office or running the 1.5 miles from his house to Eden Hall. "

This is a pioneering venture; no one has tried to build a campus from the bottom up like this. I think we've got to be very careful not to fall into the trap of doing it the comfortable way," he says. "What does it really mean to be a sustainable campus? I don't think I'm ever going to answer that question fully, but I always have to be asking that every time we look to what courses we teach or how we interact with the community." AIA

AIAPerspective

PHOTOGRAPHY: CARL BOWER

Boom or Bust?

Seeking a steady path.

Three years ago, the U.S. economy was just beginning to see the first green shoots of recovery. Since that time, what had been tentative signs of hope has grown into a vigorous revival of the design and construction industry. Yet even now there are still voices counseling young people to avoid choosing architecture as a career. Is ours an obsolete profession?

No, certainly not. Faced with population growth and tremendous infrastructure needs, the world needs architects more than ever.

As the mother of two young women who chose architecture as their life's work, I see a bright future. Their passion for making a positive difference in the world is energizing. Like many of their generation, they understand that some of the most pressing issues of the 21st century lend themselves to design thinking. The opportunities opening up almost daily to engage these issues are a profound source of their optimism—and mine.

There remain challenges, however. The first one is economic. By pursuing business as usual, the fate of our profession has been subject to the booms and busts of the business cycle. In this, it's time to follow the lead of our emerging generation. Like them, we need to be less timid and more entrepreneurial, applying our talents in new, creative ways.

Our world is increasingly interconnected. More than one-third of financial investments are international, and this percentage will surely grow. Preparing architects to expand new services and participate in the global marketplace was the inspiration behind July's AIA Entrepreneur Summit. This summit explored new business models that boldly and creatively leverage our skills and talents. (The sessions are available on AIAU.)

A second challenge arises from the public's perception of architects and architecture. We enjoy a reputation higher than most professions, yet the public knows very little about what we can do. The AIA awareness campaign launched last January is increasing public attention of the relevance of architecture to such critical issues as resilience and health. But we need to ramp up these discussions by getting out of our studios and into the streets to engage the public.

The term of a single AIA president will not achieve the objective of an entrepreneurial profession broadly understood and respected for its leadership. But I am confident that we can do this together, and that those young men and women who, like my daughters, chose architecture as a career will see a golden age for their profession. AIA

Elizabeth Chu Richter, FAIA, 2015 AIA President

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“The Villages
continues to
be popular.
The American RV
community continues
to expand.
The Costa del Sol
appears to be
rebounding again.”

Deane Simpson’s *Young-Old* Interview by Amanda Kolson Hurley

In his new book, Deane Simpson, an architect who teaches at the Royal Danish Academy of Fine Arts in Copenhagen, chronicles the rise of communities built for older people—not the infirm elderly, but the active or "young-old." Demographic and political forces have combined to create this new life phase, also known as the Third Age—when people are retired yet in relatively good health, roughly from ages 55 to 75. In *Young-Old: Urban Utopias of an Aging Society* (Lars Müller Publishers, 2015), Simpson deciphers the appeal, the unusual urban logic, and the future of these communities, from a Dutch-style retiree village in Japan to the dispersed, mobile communities of American RV drivers.

Why were you drawn to young-old communities as a research topic?

It started on a road trip in the southern states of the U.S. that I went on with some fellow students in 1997. One evening we ended up in a bar in St. Petersburg, Fla., and we were the youngest there by about 40 years or so. We were given some really unwelcoming stares. It was this very strange domination of an area by what felt like, at the time, a singular age group. I became very intrigued by this social and spatial condition, where the rules of what I was normally used to were put aside.

Arizona's Youngtown (1954) and Sun City (1960) were the first large-scale active retirement communities. How did they set the pattern for those that followed?

Youngtown introduced a structural framework for age segregation. Sun City developed that into a new scale, approaching the scale of a city. The other key aspect of Sun City is that it brought a shift from the idea of selling houses to, instead, what I would consider urban lifestyle products. It's not just about a house to live in—it's a larger structure that has spatial and temporal elements. It is spatial in the sense that it encompasses a comprehensive environment for pursuing leisure: clubhouses, sports facilities, golf courses, and so forth. And in the temporal sense, these programs are designed to discipline leisure time.

I was really struck by the role of golf in young-old urbanism. In many of the places you describe, tees and greens organize the landscape; the network of golf-cart roadways in the Villages, in Florida, is almost 90 miles long. Why is golf so integral to these communities when, as you note, many residents don't even play?

In places like the Costa del Sol in Spain, it is surprising—the sheer extent and intensity of golf in the environment. It's also interesting how it has become an economic instrument. In the case of the Costa del Sol, there was a political decision at a certain moment to stabilize the seasonal tourist economy through golf. It was intended to punch up the sales of homes but also to attract tourists in the wintertime for year-round golf. The golf courses would produce a second coastline, a green coastline. In that sense it becomes a kind of land speculation instrument. For people who don't play golf and also those who do play, they see golf as a kind of brand, a symbol of affluence, prestige, and status.

At the Villages, there's a large proportion of residents who don't golf but who ride around in these golf carts. There, it's become a branding technique for another kind of mobility that's presented as fun and playful. It's an alternative to the automobile, which is associated more with the drudgery of commuting.

Nearly 90 miles of golf cart lanes (depicted here in blue) at the Villages, in Florida, which weave under and over main roads

DEANE SIMPSON WITH STUDIO JOOST GROOTENS, *YOUNG-OLD*, LARS MÜLLER PUBLISHERS, 2015

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Huis Ten Bosch, in Japan, a themed community featuring replicas of Dutch buildings

In the case of the Villages, the golf cart is represented as an object of liberation.

From Florida to Spain to Japan, amusement-park-style "theming" is a major design strategy in young-old communities. It produces environments that seem paradoxical: British retirees in Spain seek out a faux architectural style because of its supposed authenticity, and the Villages touts itself as a "hometown" despite being the hometown of no one at all (since it's restricted to people 55 and over). What are the dynamics at work here—surely there's more to this than pure escapism?

These are sites that are rich in paradoxes and contradictions. On the Costa del Sol, theming reinforces the exoticism of the "permanent vacation." It's exotic, but familiar enough that a newcomer can also navigate within it: There's the Irish pub or the British supermarkets, the global accessible interfaces such as the ATM machine.

At the Villages, the theming structure is directed in a different direction, toward the idea of the hometown. We see a kind of 3D storytelling to return residents back to the time of their own youth. There are themed

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Examples of residential textures from young-old communities, from top to bottom: the Villages, Huis Ten Bosch, the Costa Del Sol, an RV community in Quartzsite, Ariz.

DEANE SIMPSON WITH STUDIO JOOST GROOTENS AND ANI VIHERVAARA, *YOUNG-OLD*, LARS MÜLLER PUBLISHERS, 2015

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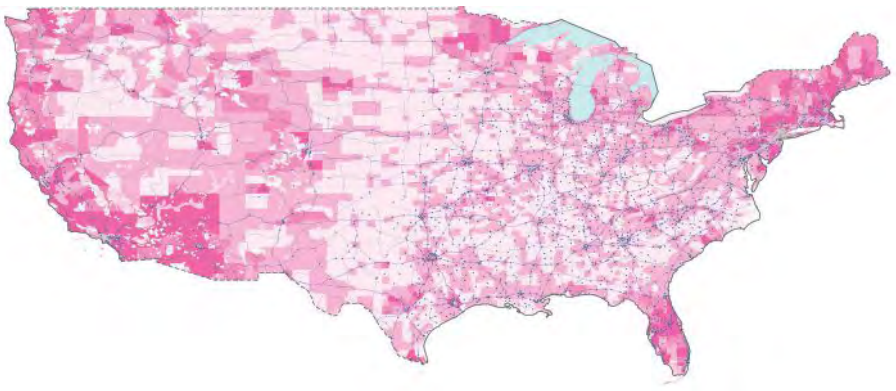


An urban context map of senior RV parks/campgrounds/resorts, with dark pink indicating the highest densities and dots representing Walmart stores

diners from the 1950s, a classic car parade, the fountain of youth as a public space. All of these things transport one back to this particular youthful period. It was interesting that residents describe themselves as being reborn or rejuvenated there.

This resonates with the *Counterclockwise* study by a Harvard psychologist, Ellen Langer. She was studying the effect on seniors of transporting them back to the environmental context of their youth. In 1981, a group of men in their 70s was taken to a monastery, set up to be as it was in the 1950s. After several days, she realized they were behaving in an entirely different way. Their physical and mental performance had improved.

You mention criticisms by Lewis Mumford and Margaret Mead that age-segregated communities isolate the elderly, and that "aging in place" might be a better social model. But that's not how the residents of these communities see it. What did they tell you about why they like living there among other people their age?

In general, you could summarize two forces: push factors that push people away from their existing homes, and pull factors that are attracting people to these kinds of environments. Two critical push factors would be an inability to maintain one's own home physically, and the sense that one's housing or neighborhood or both are inadequate for someone of advanced age. There are other things that are also frequently mentioned: an adverse climate, a high living cost in relation to limited income, insecurity or fear of crime, and the destabilizing effect of losing a spouse.

Common pull factors include better weather, safety and security, social life and activities, and the affordability and availability of healthcare. In addition,

an environment where there's no stigmatization around age, and there's the ability to reinvent oneself through leisure.

I think the push factors relate to the potential to romanticize aging in place. What place is one aging within? It's an important question. A low-density suburban environment based primarily on mobility through the private automobile is deeply problematic when one is not able to drive.

I largely support aging in place as a model, but I would question it as an orthodoxy, as it is becoming. We should not simply discount those who are moving into these retirement environments as escapists or isolationists, because they have their own particular reasons for doing so.

The image of the RV is far from cool, but you argue that the senior RV community is a sophisticated form of networked urbanism and quite transgressive in some ways. What are the overlooked, radical qualities of RV living?

The RV community challenges the familiar model of the formal, sedentary city, by replacing it with an informal, nomadic network of vehicles. Based upon relatively recent technology, it is possible for this community to produce social coherency between large numbers of people across great distances. This allows for coordinated, near-instant settlements to occur.

It resonates with radical projects of the 1960s and 1970s, such as Archigram's Instant City, and with theoretical models of contemporary urbanism addressing themes such as informality, networks, infrastructural urbanism, and extended urbanism.

The lifestyle of the young-old utopia is accessible only to affluent citizens of developed countries. Baby Boomers in the U.S., Europe, and Japan have enjoyed a long run of prosperity. Will Generation Xers and Millennials be able to retire to these places, eventually? And will they even want to?

There are definitely questions regarding this paradigm of urbanism representing a particular moment. The Baby Boom generation is a quite different social group from the Eisenhower generation. Baby Boomers, many of whom are just starting to retire now, have been called the first predominantly urban generation, and they produced a youth culture based on the importance of individualization. This suggests that these larger, more standardized retirement communities might be less attractive going forward, especially when we head from the Boomers into Generation Xers and the Millennials.

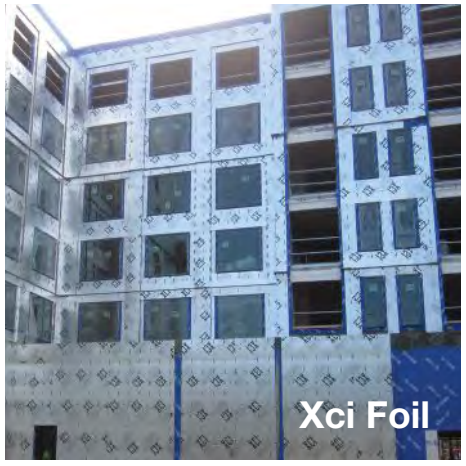
What we will see is an increasing diversity of offerings. There's a much finer grain of market segmentation that's beginning to take place now, and further development of self-organized, smaller collective housing.

At the same time, nonetheless, environments like the Villages continue to be popular. The American RV community continues to expand. The Costa del Sol, despite being hit by the crash, appears to be rebounding again.

The book attempts to problematize the wider phenomenon of urban segregation and fragmentation—not only according to age, but also in terms of socioeconomic status.

In a way, you could say that the case studies are emblems of a much larger problem. They are based in many instances on constructing an image of community, often at the cost of society.

THIS INTERVIEW WAS EDITED FOR CLARITY AND LENGTH.



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"Booker T. Washington insisted that design and construction of the buildings should be handled locally, to guarantee the active involvement of the community."

Remembering Rosenwald by Witold Rybczynski, HON. FAIA

Before there was Samuel Mockbee and Rural Studio, there was Julius Rosenwald. In the early 1900s, Rosenwald oversaw a self-help construction program for schoolhouses in the rural South. By 1928, one out of every five schools in the region was what became popularly known as a Rosenwald School.

Rosenwald was not an architect. He was a tycoon, the man who turned Sears, Roebuck & Co. from a small Chicago-based mail-order house into the largest merchandiser in the country. Like many American tycoons, he was a philanthropist. The son of poor German-Jewish immigrants—his father was a peddler—Rosenwald had experienced anti-Semitism, and he was particularly sensitive to the plight of black Americans. After reading *Up from Slavery*, he sought out Booker T. Washington and became a major benefactor of the Tuskegee Institute in Alabama.

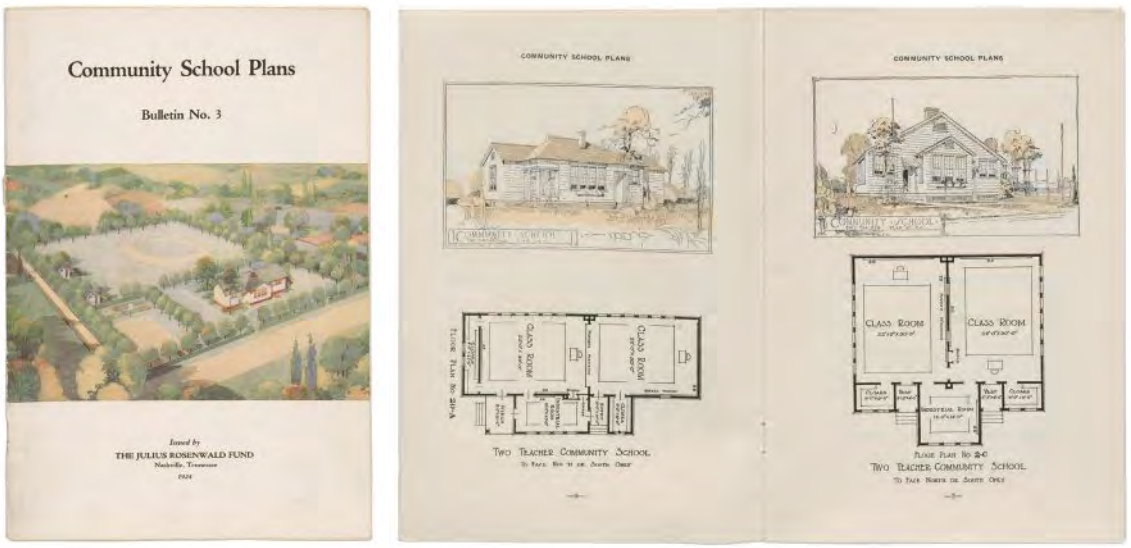
The meeting of Rosenwald and Washington is a pivotal moment in a new documentary, released this summer, by the Washington, D.C.–based filmmaker Aviva Kempner, whose work includes the *Partisans of Vilna* (1986) and the Emmy-nominated *The Life and Times of Hank Greenberg* (1998). *Rosenwald*, which premiered at New York City's Center for Jewish History and was screened at the NAACP's recent national convention in Philadelphia, is a Horatio Alger story of accomplishment, practical idealism, vile segregation, and self-help construction.

Rejecting Prefab

In 1912, in reaction to the substandard conditions of black rural schools in the Jim Crow South, Booker T. Washington enlisted his friend Rosenwald's support in building six new schools for black children in Alabama. Rosenwald was so impressed with the results that he proposed enlarging the program. He first suggested that Sears could manufacture schools as prefabricated kits—similar to the famous Sears catalog homes—but Washington insisted that design and construction of the buildings should be handled locally, to guarantee the active involvement of the community. To that end, Rosenwald donated part of the cost of each building, requiring matching funds to be raised by local school boards and the black community.

As Booker T. Washington intended, the design and construction of the Rosenwald Schools were left to the local community, but guidance was provided in the form of technical advice and practical handbooks. In 1915, Tuskegee published *The Negro Rural School and Its Relation to the Community*, which included building designs by Robert Robinson Taylor. An architect and the first black graduate of the Massachusetts Institute of Technology (in 1892), Taylor designed more than 20 buildings on the Tuskegee campus. Following Washington's strict self-help philosophy, these were built by the students themselves; student masons manufactured bricks, student carpenters felled trees and dressed lumber. Taylor was effectively the second-in-command at Tuskegee, but he was also responsible for a number of buildings at other southern black universities, as well as the impressive Renaissance Revival Colored Masonic Temple in Birmingham, Ala.

Washington died only two years after the first rural schools were built, but the newly created



A 1924 Rosenwald Fund bulletin with 19 different plans for schoolhouses and one for a privy

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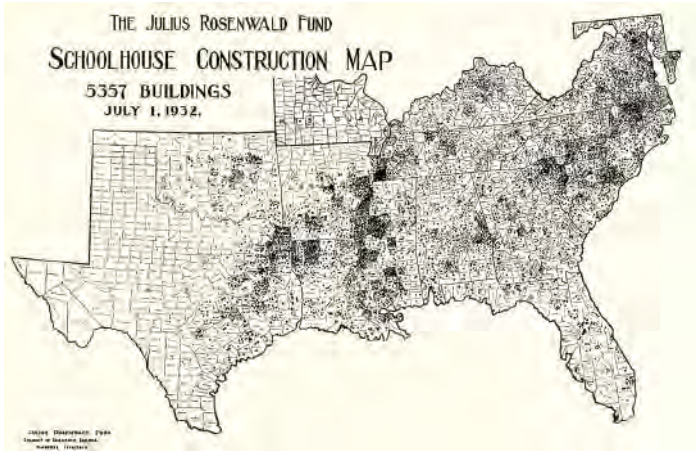
A Rosenwald school in Taylors, S.C., circa 1940

The renovated Ridgeley Rosenwald school in Capitol Heights, Md., now operating as a museum



A 1932 map illustrating how widespread the schools were across the South

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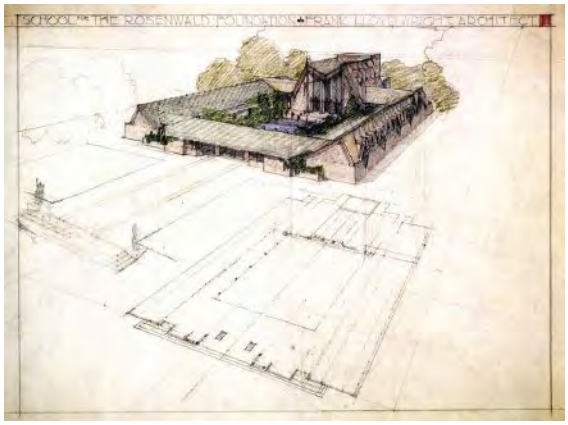
Rosenwald Fund enabled the program to continue. Rosenwald relied on the advice of Fletcher Bascom Dresslar, a Berlin-trained professor of health education at George Peabody College for Teachers in Nashville. Dresslar had definite ideas about architecture. He deplored "gingerbread stuff," and especially disliked belfries—a staple of the traditional country schoolhouse. "Thus far the architects of the large majority of our smaller schools have clung tenaciously to the 'schoolhouse type,' and have given us, in the main, buildings devoid of any attempt at niceties of proportion or unity of design," he wrote in his how-to guide, *American Schoolhouses* (1911).

"Never built. Not 'Colonial,'"
Frank Lloyd Wright scrawled
on his study drawing.
"Never built. Too expensive"
was probably closer to the truth.



Frank Lloyd Wright's 1928 design for a Rosenwald School

Dresslar, who emphasized "beauty of proportion and fitness for use," was a confirmed functionalist. But unlike the work of Rural Studio, which tends to be self-consciously avant-garde, the Rosenwald Schools were decidedly traditional in appearance: pitched roofs, deep overhangs, porches, and white-washed clapboard siding. The ordinariness was intentional. It made sense to follow well-understood building practices and to avoid needless complexity, because the schools were often built by unskilled volunteer labor. It also made sense to use an architectural language that was familiar to the users. Yet the completed buildings are not without art. Following Dresslar's teaching, decorative trim was kept to a

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minimum, which gives these unadorned buildings a satisfying, Shaker-like simplicity.

The Rosenwald Schools may have looked traditional, but they incorporated many design innovations. The classrooms were often separated by movable partitions so they could be combined into one large space. The most common arrangement was two classrooms, an adjacent "industrial room" for shop and cooking classes, as well as vestibules and cloakrooms. (So-called community schools had more classrooms, and included an auditorium as well as a library.) Classrooms had tall ceilings and exceptionally large double-hung windows, typically arranged in batteries for maximum daylighting, which was crucial since many of the sites lacked electricity. East and west light was favored and building orientation was emphasized. "It is better to have proper lighting within the schoolroom, however, than to yield to the temptation to make a good show by having the long side face the road," instructed the Tuskegee handbook. Cross-ventilation was facilitated by "breeze windows"—internal openings—and the buildings were raised off the ground on piers to facilitate cooling. This was green architecture by necessity.

Wright's Scheme

One should not imagine that Rosenwald was architecturally timid. He built the first Sears Tower, which was attached to a huge merchandise building that was known as "the world's largest store." When he conceived the Michigan Boulevard Garden Apartments in Chicago, intended for middle-class African Americans, he was inspired by a socialist housing project that he had seen in Vienna. His own home in Kenwood was a Prairie Style mansion designed by George C. Nimmons, who had apprenticed with Daniel Burnham.

One of Rosenwald's friends and a fellow supporter of Tuskegee who was particularly interested in architecture was Darwin D. Martin of Buffalo, N.Y. Martin was a long-time patron of Frank Lloyd Wright (the Larkin Building, the Martin House), and in 1928 he convinced Wright to submit a design for a Rosenwald School. The site was the campus of the Hampton Normal and Agricultural Institute in Virginia, a historically black college (and Booker T. Washington's alma

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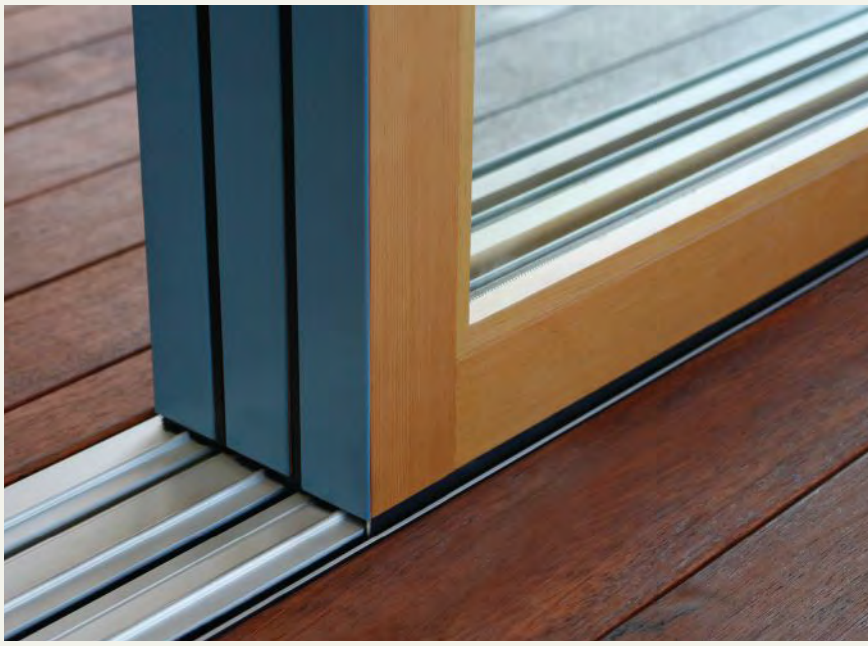
mater). Wright dismissed Shaker-like simplicity as the "extreme of timidity," and produced an unusual courtyard scheme. The courtyard, which included a swimming pool, was dominated by a tall children's theater with balconies, a proscenium stage, and a fly tower. The classrooms were lit by east- and west-facing dormer windows. The unconventional construction of heavy concrete and fieldstone, which Wright would later use at Taliesin West in Arizona, was an odd choice for a Southern campus. "Never built. Not 'Colonial,' " Wright scrawled on his study drawing. "Never built. Too expensive" was probably closer to the truth.

The Rosenwald Legacy

Rosenwald died in 1932, and soon after his fund wound down—as he intended—leaving a legacy of 5,357 schoolhouses, shop buildings, and teachers' homes across the South, from Florida to Maryland and Texas. The reaction of white communities to Rosenwald Schools was predictable: a few cases of arson, occasional vandalism, and general neglect. Nevertheless, most of the schools remained in active use until the 1960s, when the desegregation mandated by Brown v. Board of Education went into effect. Several illustrious Rosenwald alumni are interviewed in Kempner's film, including Maya Angelou, Rep. John Lewis (D-Ga.), and *Washington Post* columnist Eugene Robinson.

Although more than two score Rosenwald Schools have been listed on the National Register of Historic Places, many have been demolished or allowed to fall into disrepair. The National Trust for Historic Preservation is committed to preserving a hundred Rosenwald Schools and currently offers grants to assist in their rehabilitation. Restored, the buildings have found use as community centers, senior centers, town halls, and local museums.

The Rosenwald Schools recall the heroic efforts of exceptional individuals during a particularly dark period in the nation's history. They are also a graphic reminder of a time when great philanthropy and architecture went hand in hand: Andrew Carnegie and his libraries; Andrew Mellon and the National Gallery of Art; Edward Harkness at Harvard and Yale; and, not least, Julius Rosenwald and his rural schoolhouses.



The Evolving Office

In the new landscape of work the role of the designer is more critical than ever before. Four experts weigh in.

BY DREW HIMMELSTEIN

The office used to be where you went to do your job. Today, between smartphones, laptops, and high-speed wireless around every corner, employees have come to expect—and even thrive—with more autonomy. But too many employees spending too much time away from the office can come at a cost to important things like collaboration, innovation, speed, and creativity. Quite simply, people work better when they work together.

In this climate, what does it mean for workplace design to keep pace with the evolving needs of both businesses and employees? Offices should to be places that people want to be in, where they'll do their best work, and where they'll grow. In addition to being beneficial to workers, such environments help organizations attract top talent and inspire high-caliber performance.

In order to explore how the design world is adapting to this changing landscape of work, Herman Miller recently spoke with four experts to gain their perspective on where workplace design is headed. We asked Carlos Martinez of Gensler, Yves Béhar of fuseproject, Amanda Stanaway of Woods Bagot, and Greg Parsons of Herman Miller about how they respond to the changing nature of work and the crucial roles that design and designer play in its future.

HermanMiller

The Workplace as a Bustling Metropolis

CARLOS MARTINEZ
Gensler

Now that so many people can just work out of their living rooms, what draws them to an office? Carlos Martinez, consumer products practice area leader for global design firm Gensler, says it's the creative energy that comes from being around other people—vibrant spaces that buzz with energy in order to attract and foster talent.

"Why do you want to go to a restaurant, especially a really cool, good restaurant? It's not because you need food; it's because being in that space is exciting," Martinez says.

"People like to go to places that are crowded—bars that are very crowded versus bars that are empty—because it's exciting. It's about the fact that the place has to have a draw that is more than what you can get when you're doing it on your own."

In Martinez's view, successful workplaces hum with the energy of cities. In busy urban neighborhoods, people live and work in close quarters and move along the streets and in and out of businesses throughout the day. Creative people are drawn to the Brooklyns and San Franciscos of the world because they want to be in exciting environments. And they'll gladly pay $5 for a cup of artisanal coffee to set up their laptop in a busy cafe if it brings them closer to people who share their drive and interests.

"Workplace has become more of a place to be with other people," notes Martinez, who says that businesses that are competing for top talent should take note of this in their office designs.

To better understand the appeal and benefits of a more social workplace, Gensler studied co-working spaces, where freelancers and small start-ups rent desks in a shared office environment and get access to perks like Wi-Fi, conference rooms, and kitchen space. They also chat with their counterparts over the espresso machine, trading ideas and establishing valuable networking relationships, all while maintaining their autonomy outside of the traditional nine-to-five grind.

Martinez has noticed that the aesthetics of co-working spaces seem almost unimportant; you can walk into one and it can be ugly but as long as there's fast Wi-Fi and access to people and technology, it hums with energy. "I remember to this day one of the sites that I went to see," Martinez says. He was touring workplaces across the country, and the design of this one was rather generic—but what was happening inside was anything but. "I remember opening the door, and I was there for one minute and I said, 'Oh my, I want to work here.' It was this energy."

Even though this particular co-working space had compromised on aesthetics, it hadn't compromised on technology—fast internet connections and up-to-date office products. But technology works a lot better in places that are flexible and hackable enough for the people inside them to make the most of that technology. Indeed, this space seemed to be shaped by the people using it, and not the other way around, so that workers could seamlessly connect with one another, their clients, and their projects.

"We are really more of orchestrators, and we need to let [workplaces] become living organisms," Martinez says.

That's what's happened with 1871, a Gensler-designed Chicago co-working space and nonprofit business incubator for budding technology start-ups. 1871, which is set on the 12th floor of an historic Chicago building, is filled with natural light, colorful furniture, and eclectic wall murals. But the most important component of 1871 is the people who work inside it. As budding entrepreneurs, they are hungry to learn from each other, to network, to create, and to be inspired. The attractive office setting with top-notch technological capabilities gives them a jumping-off point to turn the space into an innovation hub.

For Martinez, the moment when employees move into a newly designed office is when the project really starts. It's important that designers are not overly attached to their own creations, because in a successful office, workers will continuously adapt the space for their evolving needs. Led by employee needs and ideas, the designer should accept and find ways to facilitate constant change within the office landscape.

Martinez recalls a time ten years ago, when he was asked to create, "the perfect space—a space that was composed in a way that acknowledged the expertise that

(TOP) Meeting areas and social space at the 1871 encourage impromptu collaborations and serendipitous encounters between the more than 400 tech entrepreneurs who share the space. (BOTTOM) The 600,000-square-foot workspace designed by Gensler for Motorola hums with energy thanks to open areas where employees can work, socialize, or simply relax.

PORTRAIT ILLUSTRATION MICHAEL GILLETTE

“Workplace has become more of a place to be with other people.” —Carlos Martinez

we brought to the table. Companies were very vigilant to make sure the vision of the designer was maintained, either through protocols like clean desk policies or maybe a facilities group that made sure there were standards that had to be maintained.”

But Martinez thinks it’s the other way around. “I think now we need to create places that actually are lived in. People in those spaces need to own them,” he says.

It’s so inevitable that employees will adapt their work environments that designers can often figure out design solutions simply by observing the ad hoc adaptations workers have already made.

“I always say many of the solutions that we’re asked to solve are already there, and it’s what I call ‘user work-arounds,’” Martinez says. “If you pay attention to how the user has totally made do with what the space doesn’t give them, that’s where the good stuff is.”

Of course, these user work-arounds may be quick and dirty—like uneven tables pushed together or chairs crammed into a conference room that’s too small. For Martinez, the designer’s opportunity is to integrate those necessary adaptations in the office design in a graceful, beautiful, or clever way. Looking at it this way, Martinez sees the relationship between office designer and worker as analogous to that of urban planner and urban resident.

“Why do people say, ‘I love Barcelona’ or ‘I love London?’ It’s because the framework [the urban planners developed] has been visionary,” Martinez says. “A city is very spontaneous. We’re not controlling every single thing that gets built in a city; what you do is create a system that allows that city to grow in a very healthy way, almost like an ecosystem.”

If urban spaces are planned but malleable, constantly changing shape based on the people who inhabit them, offices can be as well.

YVES BÉHAR
fuseproject

Collaborating Outside the Conference Room

When fuseproject cofounder Yves Béhar started looking into how people collaborate in workplaces, he realized it's been approached all wrong. Most collaboration, he found, doesn't happen in meeting rooms designed to fit a dozen people around a big table; it happens in informal meetings at people's desks.

"We need people to sit together and exchange quick ideas, brainstorm together, one-on-one or in a group, pretty much all the time, but without the formality of having to schedule meetings and to move people from one space to another," Béhar explains. "A big 'aha' moment for us was to realize that 70 percent of meetings happen at the desks, and no personal office desk has ever been designed for collaboration."

In 2011, Béhar and fuseproject were hired by Herman Miller to fix that. The resulting new office furniture line Public Office Landscape is specifically designed to facilitate this kind of casual collaboration. It includes innovations such as the "social chair," casual performance seating that works across a variety of applications to facilitate impromptu conversation or on-the-fly brainstorming as the need arises during the day. With Public, it's possible to create a wide variety of office settings that range from open to private, with a unified design vocabulary.

When fuseproject moved into a new, much larger workspace, it saw an opportunity to put the Public prototype to the test. One concern, Béhar recalls, was that the open space of a renovated 20,000-square-foot warehouse would slow the pace of quick brainstorming, collaboration, and iteration that had characterized the workplace in its smaller site. The trick was to move out of cramped quarters while maintaining the tight-knit mindset.

Fuseproject has studied offices in the U.S., Europe, and Asia, and managers and employees on every continent say they would like to see more conversation and interaction in

(BOTTOM) Casual seating adjacent to work areas make collaboration easy at fuseproject. (RIGHT) The visually consistent modular surfaces, storage, and seating of Public Landscape Office, designed by fuseproject for Herman Miller, can be configured into a broad range of settings that encourage fluid transitions between collaborative and focused work.

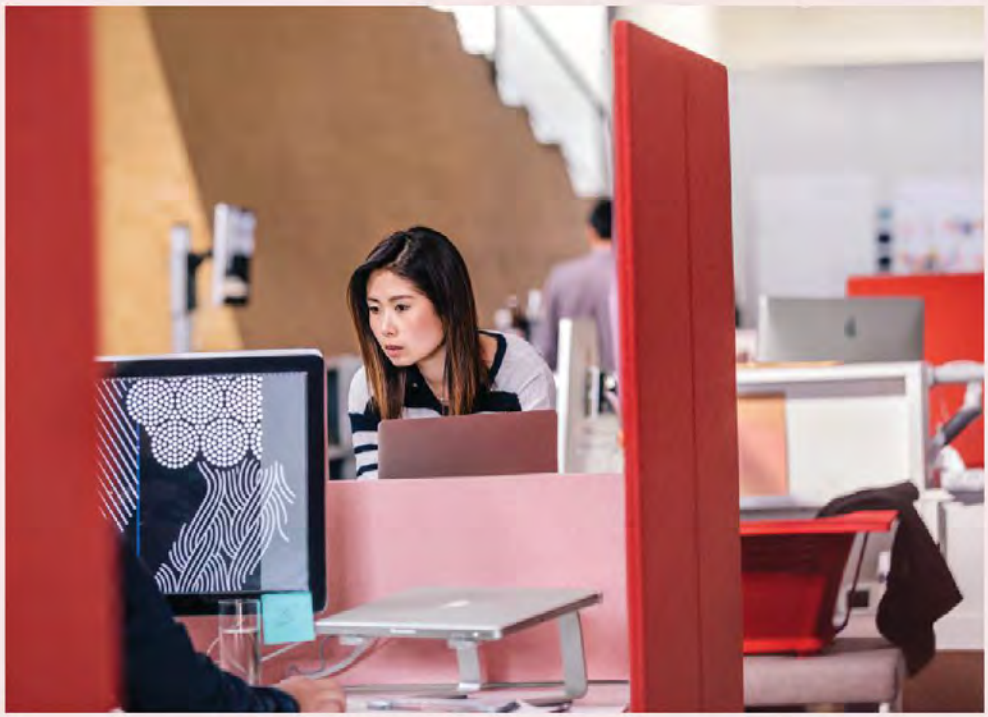
PORTRAIT ILLUSTRATION MICHAEL GILLETTE

HermanMiller

HermanMiller

(LEFT) The team at fuseproject, an industrial design firm, is at its most creative when surrounded by things that inspire them. (BELOW) Public transforms every part of the office—including individual desks—into places where collaboration can take place.

"If you're going to create collaborative space, it has to be everywhere; it can't just be restricted to a certain area." — Yves Béhar



the workplace, according to Béhar. Many offices, though, aren't conducive to that type of collaborative environment. To foster a collaborative workplace, Béhar says that maintaining the "flow" is crucial. If collaboration requires scheduling a meeting, reserving a conference room, and connecting a laptop to a projector (while troubleshooting the inevitable technical glitches), the flow of creative work is lost. Not only is collaboration slowed down, it's discouraged by the barriers that the office environment places in its way.

"If you're going to create collaborative space, it has to be everywhere; it can't just be restricted to a certain area," Béhar says. "It has to be something that you encourage throughout."

It's not that conference rooms aren't needed, but they should be just one option in an office landscape that invites collaboration in a variety of diverse settings. People can collaborate most wherever makes the most sense for them and their project: in open and enclosed meeting rooms, at their desks, as well as in shared spaces like hallways and break rooms. The designer's main responsibility is to make those places inviting and conducive to the sharing of ideas.

Béhar noticed a marked change in how collaboration happened when fuseproject moved into its new office with the new furniture. "The transition was so immediate from having to schedule every encounter for a meeting versus meeting with people in the flow of your day—the transition was so natural."

With less unnecessary friction in the workplace, the pace of innovation, iteration, and change increases. Perhaps that's why Béhar has noticed large companies taking their cues on office design from smaller companies that are sometimes more nimble and fast-paced.

"I think there's a renewed focus on quality human interaction," Béhar says of the companies that wonder, "How can I bring interaction and the same kind of efficiency and speed to my large enterprise?" He foresees a day when office workers track and measure their movements and work habits throughout the workday. With quantifiable data on how much time workers spend on various tasks and how they move about the office, office design could become even more sophisticated.

"You can see how we track our daily physical activity or sleep," Béhar explains. "If you consider that we spend at least eight to ten hours per day in an office, and we don't track any of that activity, I think it's quite surprising."

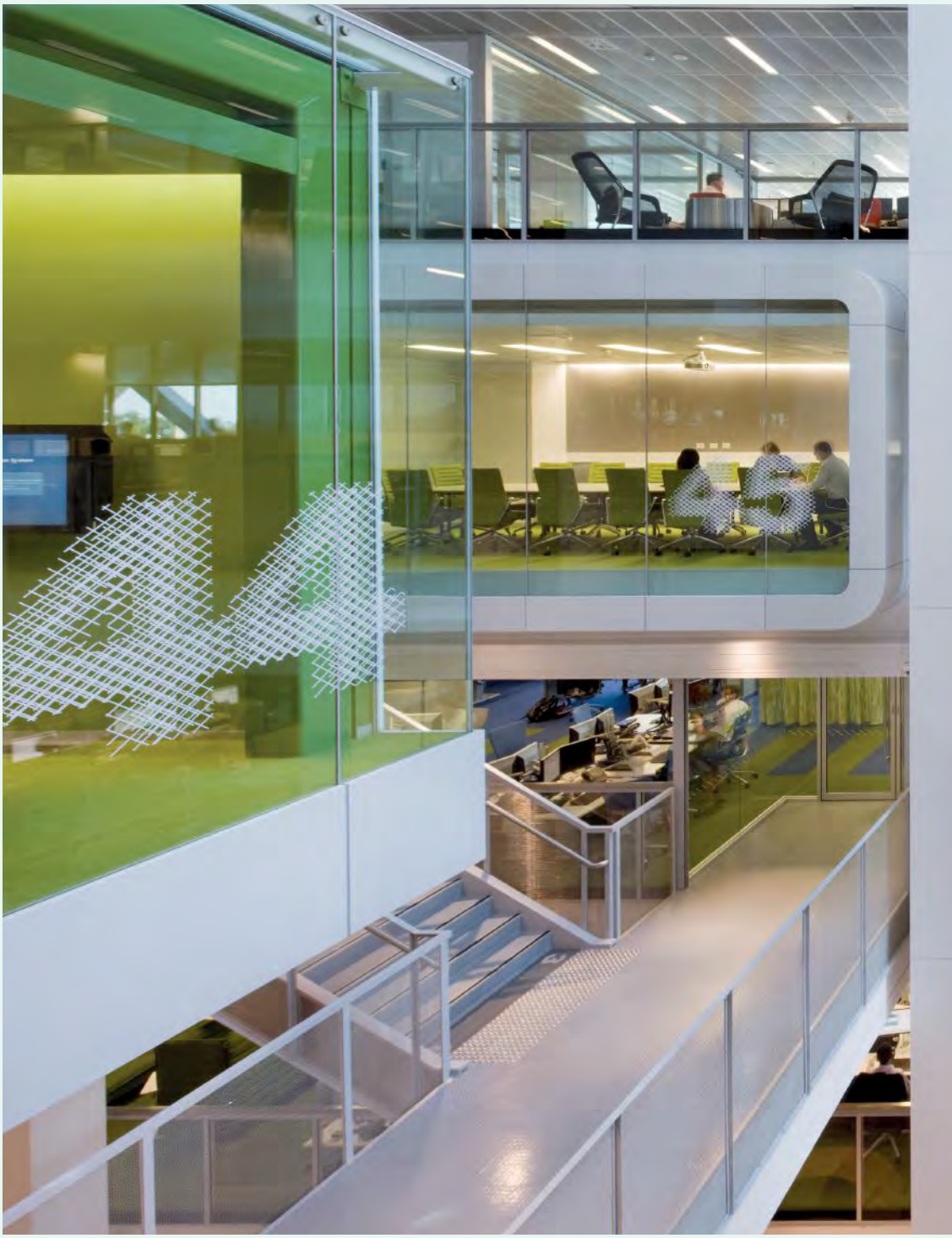
The information could inform everything from collaboration tools to furniture design and provide evidence that good design improves business outcomes.

"You can say you want people to collaborate more, but what does that mean effectively? What is the furniture's role in that? What is the educational role in that?" Béhar asks.

Until the day that big data takes over office design, however, designers can focus on creating frictionless offices where space and furniture facilitate, rather than hinder, creativity.

Chance Encounters by Design

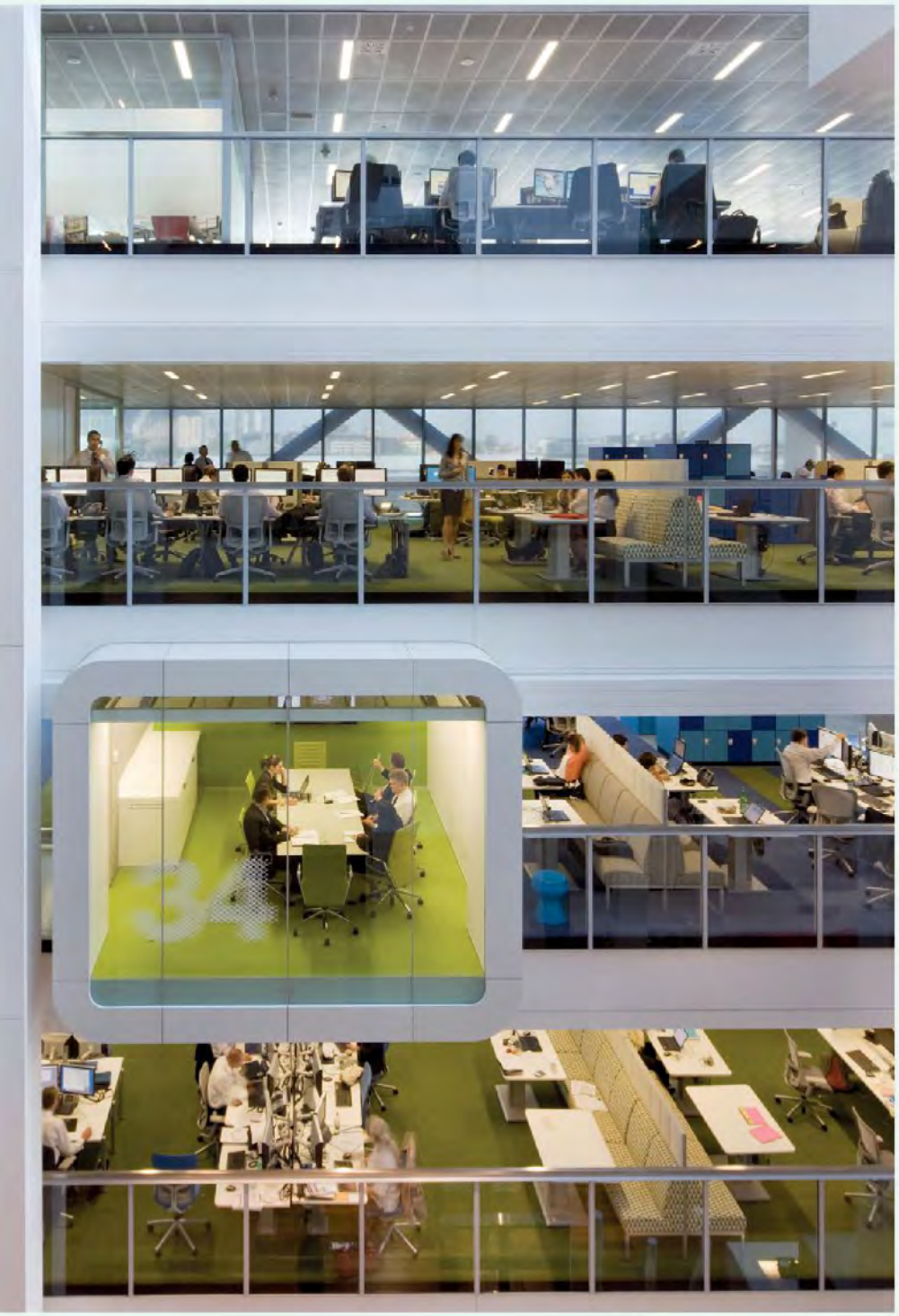
AMANDA STANAWAY
Woods Bagot



In the Woods Bagot-designed Macquarie Group's Sydney headquarters, done with Clive Wilkinson Architects, no one has assigned workstations. Executives are granted priority in a booking system for certain spaces.

HermanMiller

"The whole idea of activity-based working is that you use the right space for the right task, and by doing so you will perform at your best."—Amanda Stanaway



For Amanda Stanaway, a principal at architecture firm Woods Bagot, updating the modern workplace starts with updating how work gets done. She steers clients of her global practice toward activity-based working, an approach to office design that frees employees from assigned seating and allows them to choose different settings in the workplace that meet the needs of their work. It's appealing and empowering for employees, but requires a shift in thinking for managers who must learn how to manage through clearly articulated expectations rather than by tracking an employee's presence in the office.

"Instead of me saying 'You need to work from nine to five because I need to know that you are here,' [even though] you might work on Facebook all day long....The opposite of that is freedom and trust and managing by performance or output," Stanaway says.

Most of the offices that Woods Bagot has designed share a simple premise: instead of assigned desks where workers sit all day, employees have access to a variety of commonly shared workstations, and they can move freely throughout the office as their project requirements and workload dictate. Team members who are running up against a tight project deadline might group themselves at desks in one corner of the office or even create a "war room" by reserving a private conference room for a day. A colleague who needs to do heads-down work can choose a desk in a more private area of the office set up for quiet concentration. Where you work is determined by what you are doing, not by your title, department, or your manager's preferences.

"Activity-based working was developed with the idea that work is made up of a set of activities and actually no matter what type of a worker you are, you will have some collaborative work and you will have some work requiring quiet and concentration," Stanaway says. "The whole idea of activity-based working is that you use the right space for the right task, and by doing so you will perform at your best."

The style has caught on in Australia, where office space is at a premium. Flexible workspaces are more economical because they use space efficiently; for example, corner offices don't sit vacant when the CEO is out of town. Some of the biggest adopters have been the country's largest banks. Woods Bagot, along with Clive Wilkinson Architects, did a

major office redesign for the Macquarie Group, an investment bank, where employees had previously worked at desks grouped by department. In the new Sydney headquarters, there are no assigned workstations and employees stow their laptops in lockers. Large staircases cut diagonally through the airy office, encouraging employees to move and cross paths with people from different divisions. The flexible workspaces abolish what Stanaway describes as "command and control silos," where managers separated employees by department and oversaw them literally through sight lines.

"It is vital because you need to get people moving between places and connecting with others," Stanaway says. "I think ultimately connection is always an important part of any business and if you have a big business, connection is critical."

Strip away ingrained expectations and it becomes clear that sitting in one place for a certain number of hours each day isn't helping—and may actually be hindering—people from doing their jobs. On the other hand, when design encourages movement through the workspace people bump into each other serendipitously, make connections, decide to collaborate, and perhaps even come up with the next big thing. Bright hallways, coffee bars, and walkways that cut through the heart of the office are all spaces that can maximize this "bump."

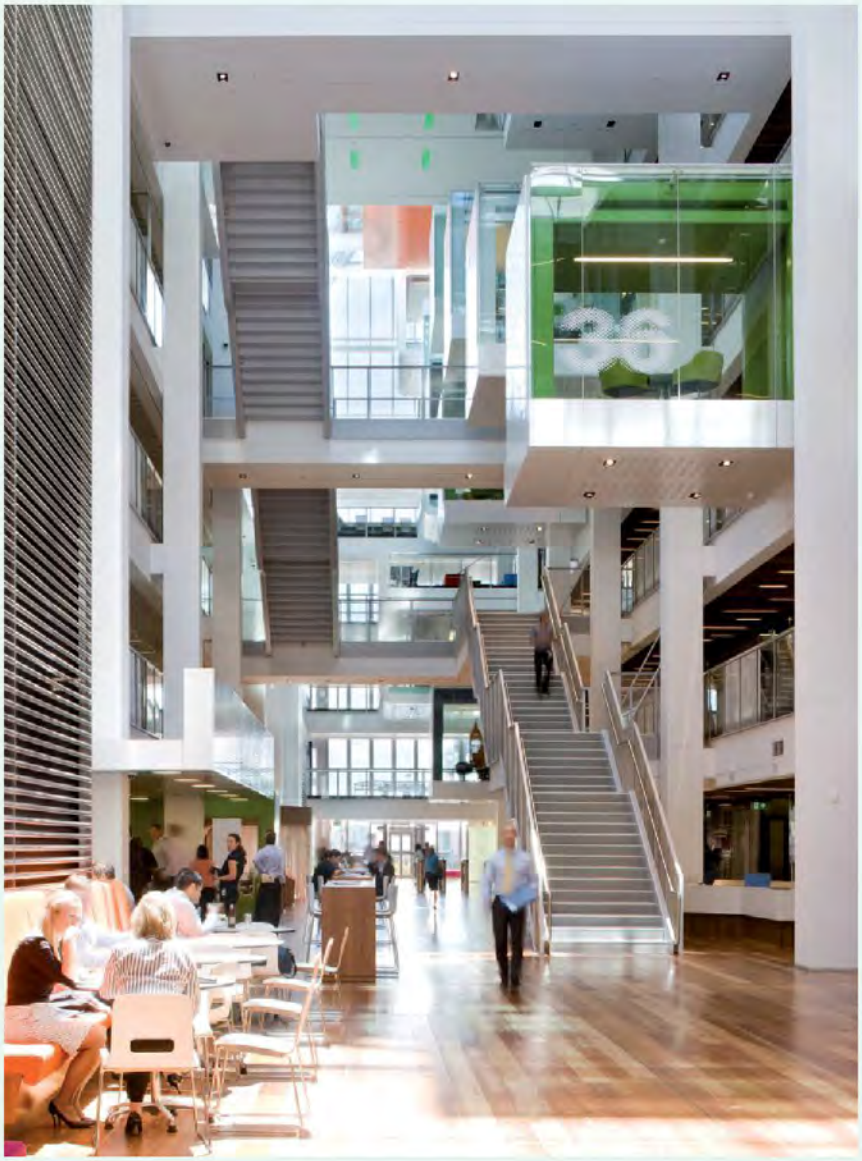
That said, empowering people to work anywhere, anytime can be a challenging shift for some managers. "You have to manage people by performance, because if you try to manage by presence or by visibility, you will fail," Stanaway explains. This can often be a positive transition, because it encourages managers to set clear expectations and monitor progress through structured team meetings.

Not all employees will accept change willingly, either. Stanaway likes to tell the story of an employee in a new office who didn't like the idea of stowing his things in a locker. For three months, he refused to cooperate and would instead overnight mail his belongings to himself at the end of each workday.

But ultimately, design can be an effective tool to change behavior and business culture. Stanaway worked on an office design for a company that was trying to become more people-focused, but the employees described themselves as "grumpy old men." The new office was structured such that nearly everyone had to walk through a common area where they would come into contact with at least ten other employees to get to their individual workspace. Lockers were also clustered around a community gathering point to encourage interaction.

"You would really struggle to go to that office and not talk to other people," Stanaway recalls. "It was about trying to use design to change the culture."

Stanaway firmly believes that in order to best motivate workers, offices must recognize that diverse people with diverse functions need diverse spaces in which to work. The challenge for her, she says, is "the belief that a homogenous workplace is going to create a great outcome."



(LEFT) Macquarie's offices had previously grouped its employees by department. The move to the new space was predicated by a desire to break down silos within the organization and promote a client-based culture.

PORTRAIT ILLUSTRATIONS MICHAEL GILLETTE

GREG PARSONS
Herman Miller

Succeeding by Meeting Fundamental Human Needs

(ABOVE) Approachable spaces such as this one in the Herman Miller San Francisco showroom can satisfy a range of human needs, from autonomy to belonging.

Technology and a changing business landscape may be transforming the workplace, but what remains constant are the core needs of the human beings that inhabit it. Greg Parsons, Herman Miller's senior vice president and creative director for Global Work, believes designers need to dig into the basic principles that motivate people—the so-called "human operating system."

"Whatever describes the character of the people and their work should describe the character of the workplace," Parsons says. "So if your people and their work are informal and open and rapidly changing, the space should be informal and open and rapidly changing. It's a pretty simple rule really."

When Herman Miller updated its approach to designing human-centered workplaces, a team within the company researched the psychological factors that motivate people at work. Their research led them to understand that though each person and each company is different, everyone is driven by the same fundamental human needs—security, belonging, autonomy, achievement, status, and purpose. For a company to succeed, it should provide the conditions that help satisfy these needs for its employees.

"We're creating a new idea that starts with people, so let's remember that's also what we need to base our designs on," Parsons says.

The methodology Herman Miller arrived at, Living Office, recognizes that all people and all companies have things in common (like those fundamental needs), and that they are also all unique. In response to this, it moves away from a one-size-fits-all standardized solution for office spaces, to a customizable landscape made up from ten different settings that are attuned to the specific purpose, character, and activities of the people working in them. In a single day, an employee might spend time in a "haven"—a private space ideal for concentrated work; a "cove"—an easily accessible area optimized for casual group collaboration; or a "plaza"—a large open setting in a well-trafficked area that offers a multitude of gathering points and attractions, like coffee or a library.

It's an office landscape designed for an era in which business success is increasingly driven by creative innovation. Today's workplace, shaped by the culture of Silicon Valley start-ups and co-working spaces, brings talented people together and nourishes their creativity.

"Work is less and less about repetitive, administrative tasks, and more about changing, creative paths," Parsons says. "What are the right ways to manage people doing that work? What are the right tools to give them? And what are the right kind of places to support them? The answer is they're all new and different."

Living Office balances the needs of the individual and the organization by supporting workers as individuals while letting the company customize its workplace landscape in a way that best suits its corporate culture and workday needs. By working together with architects and interior designers to apply its methodology, Herman Miller offers a way for companies to arrive at an ideal mix of settings, creating spaces suited to the character of the workers who use them and the activities they pursue. Within those settings, an ideal arrangement of surroundings, tools, and furnishings helps to deliver on the needs of people and offer an elevated experience of work. The resulting Living Office will be a place where people want to be—because it helps to facilitate better work.

"We think this is a moment for design to reestablish itself as a force that enables business leaders to create places that are powerful tools to help realize their goals," Parsons says.

The end result will be energetic, higher-performing offices that stimulate innovation through a more humane way of working. Parsons believes design will lead the way in creating vibrant workplaces that do as much good for the people who work in them as they do for the bottom line.

To see more Living Offices, learn about our approach, and find experts who can guide you through our process, head to hermanmiller.com/livingoffice.

"Whatever describes the character of the people and their work should describe the character of the workplace."—Greg Parsons

Herman Miller's Living Office in Mexico City offers a balance of formal and informal places where people can meet with clients or work together on projects.

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LEARNING OBJECTIVES

By the end of this educational unit you will be able to:

1. Recognize design challenges for which thermoformed ceilings are an attractive solution.
2. Utilize drop-out ceilings to reduce the cost and impact of installing fire sprinklers.
3. Integrate LED lighting with new approaches to luminous ceilings.
4. Improve indoor air quality by eliminating ceiling problems associated with mold, airborne fibers, and VOC-emissions.

CONTINUING EDUCATION

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Use the learning objectives above to focus your study as you read this article.

Visit http://go.hw.net/AR915Course1 to read more and complete the quiz for credit.

There is a thermoformed ceiling pattern for every architectural style or taste. When the Chintz Room in Columbus, OH was remodeled, M+A Architects envisioned a theme that was completely contemporary yet respectful of the restaurant's heritage as a lunch destination in the historic Lazarus department store. The traditional elegance of coffered panels is made fresh by combining deep and low relief panels and by creating a suspended cloud instead of a wall-to-wall expanse. *Design: M+A Architects / Photo: Danis Building Construction Company*

By Michael Chusid, RA FCSI CCS

It is time to revive a word that has fallen from favor. "Ceil" is a verb for the act of applying a finish to an overhead surface; "ceiling", a noun, is the gerund form. Some etymologists say ceil derives from the Latin *celare* which means "to hide or cover up"; others from the Old French *ciel* meaning sky, derived in turn from Latin's *caelum*—the sky or the vault of heaven (*cf.* celestial).

Adding a word to one's vocabulary can give a person a new means of expression. The same can be said for adding a building product to one's palette of material choices. A wider choice of products can satisfy a designer's quest for aesthetic exploration, help a project manager meet a budget, or the specifier to address challenging performance requirements.

Quality. Cost. Performance. Is it possible that restoring thermoformed ceilings (TFC) to the architectural vocabulary can meet all three of an architect's needs?

THE REAL MID-CENTURY MODERN CEILING

Contemporary thermoformed ceilings derive from building products developed in the late 1940s. Like many other Mid-Century Modern classics, the new ceiling elements were modular and made from polymeric materials that were just finding applications in construction. The ceiling panels and tiles were embossed with the decorative motifs of the era. Available in translucent materials, they were used in tandem with ascendent fluorescent lighting technology to create luminous ceilings. And, in an era that witnessed increased use of automatic fire sprinklers, the "drop-out" ceiling concept made it possible to install thermoformed panels beneath sprinklers.

Tastes changed, however, and thermoformed ceilings went underground—literally. For several decades, the most common use of thermoformed ceilings was for basement remodeling projects where ease of installation and resistance to humid conditions made them popular among the DIY set.

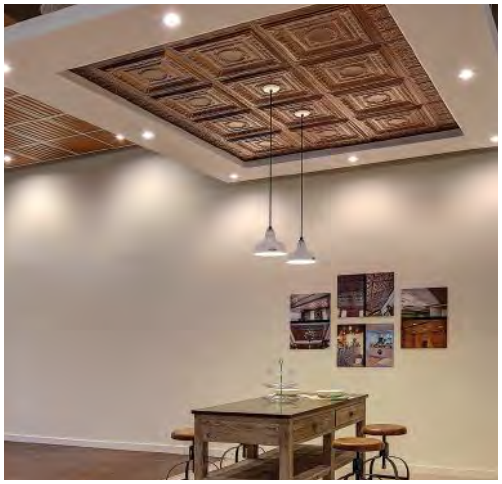
Yet tastes (and building requirements) continue to change and architects have found new reasons to ceil with thermoformed panels and tiles. For example:

The Manufacturers Trust Company Building is a striking example of a luminous, thermoformed ceiling. The New York City Landmarks Preservation Commission says, "Corrugated 'paper thin vinyl sheeting,' hung from T- shaped metal channels, gave the ceilings an uncluttered directional character. With none of the lighting fixtures visible, it could easily be seen from both streets and reads as a floating, illuminated grid." The building was designed by Skidmore, Owings & Merrill and completed in 1954. *Design: SOM / Photo: © Ezra Stoller/Esto*

- *Visual:* Designers are, again, embracing the decorative arts. And thermoformed ceilings are available in new styles and an expanded range of colors and faux finishes.
- *Confidence:* Some thermoformed ceilings are now approved by ICC-ES, IAPMO-UES, FM, UL, and other code and product evaluation agencies.
- *Acoustic:* The noise reduction performance of the products has nearly doubled due to new research and testing.
- *Green:* Reformulated materials have improved the environmental footprint of products that already offer exceptional life-cycle performance.
- *LED-Ready:* Several of levels of translucency and transparency provide new options for luminous ceilings. And,
- *Resilience:* Increased concern about floods and storms has focused attention on the impunity of thermoformed materials to water or moisture exposure.

To be sure, thermoformed ceilings do not offer any singularly unique characteristic. For example, there are other ceiling systems that are lightweight or light transmitting, cleanable or recyclable, decorative or sound absorptive. But there it is no other ceiling system that offers all the properties of thermoformed ceilings. This makes them a versatile alternative that can solve many architectural challenges that are problematic for other types of ceilings.

While thermoformed ceilings can be made with various types of plastic and in myriad configurations, this article discusses ceiling panels and tiles made from rigid vinyl or polyethylene terephthalate (PET) sheets 0.013 or 0.03 in. (0.33 or 0.76 mm) thick. Flat sheets are thermoformed under heat and pressure to create decorative surfaces. Tiles that can be installed with adhesives are typically made from the thicker material to avoid telegraphing irregularities in the substrate. Panels can be installed in conventional ceiling suspension grids and can be either material thickness due to the stiffening effect of thermoforming. (The definitions of ceiling "tile" and "panel" are based on ASTM E1264.)



Faux finishes have expanded the aesthetic range of thermoformed ceilings. The wood-look (top) is used in 2 x 4 foot panels with staggered joints to suit a casual workroom. The metal-look (bottom) is neatly framed within a ceiling tray (soffit). It is difficult to distinguish the facsimiles from the original materials when seen at normal viewing distances. Their relative economy, ease of handling, and light weight, however, will be immediately apparent to installers. *Design: Emma Davis Interior Design / Photo: Ceilume*

APPEARANCE

Another suspected source for "ceil" is Latin's *cælãre*, to carve, engrave in relief. This applies to thermoformed ceilings since they are available in dozens of styles, ranging from historic stamped tin patterns and classic coffers to contemporary geometric and multifaceted panels, and from shallow textures to profiles extending as much as 3 in. (76 mm) above or below the ceiling grid. Additionally, digital fabrication techniques have lowered the cost of making molds for custom patterns. Some styles can even be installed upside-down; inverted panels change the relationship of shadow and highlight to engage the viewer. This makes TFCs an antidote to the plain plane imposed by mineral fiber, gypsum board, and other ceiling products.

Decorative moldings around the ceiling perimeter add to the relief. When a style with high relief is used, it is customary to use low relief panels as a border. Alternatively, adventurous designers can achieve interesting effects by expressing the panel or tile profile at the ceiling perimeter.

Other design options include white, solid colors, faux metallic finishes, and faux wood grain finishes. While they can also be painted or given other decorative surface treatments, TFC manufacturers have not tested these applied finishes for surface burning characteristics or use in drop-out ceilings.

LIGHTING

Available in several levels of optical transmissivity, thermoformed ceiling panels facilitate creative approaches to lighting. In a hotel lobby, for example, opaque panels can be used with uplighting at seating areas, translucent panels to create a luminous ceiling above the registration desk, and transparent panels below spotlights creating visual excitement above the lounge dance floor.

Translucent panels (top left) create the most even light distribution. Frosted panels (top right) hint at what is above the ceiling. Transparent panels fully disclose what is above the ceiling whether above-ceiling lamps are on (bottom left) or off (bottom right). Each ceiling style will scatter light differently; some display patterns of highlights and shadows or sparkling refractions that become animated as one moves through a room. *Photo: Ceilume*

Daylighting, as an energy conservation strategy, also suggests applications for translucent and transparent panels beneath skylights and for opaque or translucent panels as light shelves to direct light more deeply into buildings.

Opaque: Opaque white panels have a bright light reflectance value (LRV) of approximately 83, per ASTM E1477. This takes on special significance with directional light sources that cast shadows on the molded relief of panels and tiles.

Colored light, emanating from the "Kill Bar," demonstrates how highlights and shadows can be used to dramatic effect in themed attractions such as the Times Scare haunted house in New York City. *Design: Egan Productions / Photo: Farouk Cherchali*

Translucent: Translucent plastic is used for backlit luminous ceilings. The amount of light transmitted varies depending on the thickness of the plastic and whether the plastic is a translucent white material or an unpigmented clear plastic with a 'frosted' surface. Translucent panels are often used with a clear or frosted acoustical backer panel that sits above the ceiling panel. The backer can reduce shadows caused by detritus that would otherwise accumulate directly atop ceiling panels. Frosted backers, moreover, help to diffuse above-ceiling light sources.

This cloudscape was created with two styles of billowing translucent panels. The relief projects downward on one style and upward on the other to enhance the interplay of shadows and highlights. LEDs above the ceiling can be dimmed to adjust from high noon to the warmer tones of late afternoon. The drop-out panels are installed beneath fire sprinklers. *Design: Emma Davis Interior Design / Photo: Ceilume*

Ceiling panels with classic detailing complement the theme of the moving screening room in a Noir Lounge in San Francisco. The thermoformed translucent material "creates a gentle glow and avoids glare on the screen," according to architect Gi Paoletti of G. Paoletti Design Lab. She adds that dimmable LED lamps above the luminous ceiling avoid the need for pendant light fixtures that would block patrons' view. *Design: G. Paoletti Design Lab / Photo: Stuart Locklear*

While translucent ceilings reduce light transmittance, the loss in efficiency may be recouped by cutting glare to improve lighting effectiveness. Costs can also be reduced by using simple, inexpensive fixtures such as strip fluorescent lamps above the ceiling. Increasingly, however, translucent ceilings are being paired with light-emitting diode (LED) lamps to create glowing illumination that can be programmed to change colors.

Transparent: Transparent panels allow light fixtures to be placed above a ceiling while maintaining the continuity of the surface's plane and pattern. For example, a light fixture with a directional beam can be placed above ceiling—and out of sight—yet still focused on a piece of artwork or other visual feature.

ACOUSTICS

Acoustics is now recognized as an important part of building sustainability—improving occupant satisfaction and productivity. TFCs can be used to quiet a room, meet HIPAA and speech privacy criteria, modulate reverberation, and reinforce sound.

Suspended TFC panels are diaphragms that transmit acoustical vibrations. In many instances, public address speakers and white noise generators can be effectively installed above panels to maintain an uncluttered ceiling.

Noise Reduction: This acoustical transparency also allows room noise to pass into the above-ceiling cavity where the noise is dampened. Depending on panel style and thickness, NRC = 0.25 can be obtained per ASTM C423.

Noise reduction can be increased in three ways:

1. Acoustical backer panels create an additional air cavity, typically 3 in. (76 mm) deep, that further dampens sound and produce 0.30 NRC. Some thermoformed backers are approved for use in drop-out ceiling systems.

2. Acoustical insulation can be placed above panels to produce 0.50 NRC. Instead of glass or mineral fiber insulation, consideration should be given to special polyester fiber batts, typically 1.5 in. (38 mm) thick, as their light weight and stiffness does not cause thermoformed panels to sag. Polyester fibers do not irritate skin and, because they are less brittle than glass or mineral fibers, are less likely to release fibers into a room environment. Fibrous insulation, regardless of type, is not approved with drop-out ceilings.

3. Recent testing has determined small perforations through the face of thermoformed panels in combination with polyester fiber batts can boost noise reduction to an outstanding

The brick walls and hard surface floors of this meeting hall required a ceiling with good sound absorbing properties. For remodeling projects, thermoformed ceilings are also light weight to minimize loads on existing structures and can be installed beneath existing sprinklers. *Photo: Ceilume*

Noise reduction as high as 0.85 NRC is available with perforated thermoformed ceiling panels in combination with a thermal-bonded, polyester fiber, non-woven batt. Panels and batts are Class A rated for surface burning characteristics and panels are Greenguard Gold certified for low VOC emissions. The faux wood finish shown here provides verisimilitude when viewed at normal ceiling heights. *Photo: Ceilume*

0.85 NRC, suitable for use in classrooms, offices, healthcare, and other occupancies with stringent noise control requirements. Sensitive placement of the perforations can enhance the dimensional appearance of panel styles.

Reflection: Thermoformed tiles can be adhered to a hard substrate such as gypsum board or concrete where acoustical reflection is necessary.

FIRE SAFETY

Surface Burning Characteristics: Thin plastic has such little mass it provides insignificant fuel load relative to the other combustible materials in a building. Surface burning characteristics, however, are more relevant to life safety; there are now thermoformed ceilings with Class A Surface Burning Characteristics with flame spread ≤ 25 and smoke developed ≤ 450 when tested according to ASTM E84; these products can be specified for all but the most critical occupancies.

The International Building Code definition of a Class A interior finish also states, "Any element thereof when so tested shall not continue to propagate fire." TFCs should, therefore, be made from plastic rated V0 under Underwriters Laboratories (UL) 94, Standard for Safety of Flammability of Plastic Materials for Parts in Devices and Appliances Testing. Such materials are self-extinguishing—flaming combustion stops within 10 seconds after removal of heat source, glowing combustion stops within 30 seconds, and materials do not drip flaming particles that could ignite cotton. This is an important distinction as there are similar-looking ceilings made, for example, from expanded polystyrene that melt and burn vigorously when exposed to flame.

TFCs can be used beneath fire-rated floor-ceiling assemblies, but do not contribute to fire separation between floors.

Drop-Out Ceilings: Unlike most types of ceilings, some thermoformed assemblies can be installed above or beneath fire sprinklers without interfering with sprinkler function when used in accordance with listings and approvals. When exposed to heat from a fire, panels soften, deform, and drop out of suspension grids at temperatures well below the activation point of commonly used sprinklers.

Visit http://go.hw.net/AR915Course1 to read more and complete the quiz for credit.

QUIZ

1. Compared to mineral fiber or gypsum board ceilings, thermoformed ceilings:
   - A. Require more personal protection equipment during installation.
   - B. Are heavier and more bulky to transport.
   - C. Are more prone to breakage.
   - D. Are competitively priced.

2. Perforations in thermoformed ceiling panels will:
   - A. Have no effect on acoustic performance.
   - B. Decrease noise reduction coefficient (NRC).
   - C. Increase noise reduction coefficient (NRC).
   - D. Improve sound transmission coefficient (STC).

3. Which *is not* a benefit of a drop-out ceiling?
   - A. Ceiling *is less* cluttered looking.
   - B. Panels open with a downward hinging action.
   - C. Fire sprinkler installation is simplified.
   - D. Products are listed with major building code evaluation services.

4. Which is true about thermoformed ceilings?
   - A. They require specially-trained installers.
   - B. They are only for residential occupancies.
   - C. They are available in many decorative styles.
   - D. They have only been in use for the past decade.

5. Which *is not* true about the environmental qualities of thermoformed ceilings?
   - A. Some products are Greenguard Gold certified for indoor air quality.
   - B. They can be made with up to 40% post-consumer recycled content.
   - C. Products can be made *without* phthalates, plasticizers, or heavy metals.
   - D. Scrap materials must be treated as hazardous waste.

6. Thermoformed ceilings contribute to building resilience because they:
   - A. Can be installed in standard metal suspension grids.
   - B. Are lightweight and easily transported.
   - C. Resist flood and storm water damage.
   - D. Can be used above food preparation areas.

7. Which light source(s) can be located above translucent or transparent panels?
   - A. Light emitting diodes (LED).
   - B. Skylights
   - C. Spotlights
   - D. All of the above

8. Thermoformed ceilings *should not* be used in:
   - A. Aircraft cabins.
   - B. Commercial kitchens.
   - C. Swimming pool areas.
   - D. Industrial washdown areas.

9. Because they are impervious to moisture, thermoformed ceilings can be:
   - A. Used as underlayment for roofing tile.
   - B. Used as basement waterproofing.
   - C. Washed when they get dirty.
   - D. Installed as shower surrounds.

10. The best way to install thermoformed ceiling tiles is with:
    - A. Finish nails.
    - B. Construction-grade adhesives.
    - C. Wallpaper paste.
    - D. Latex-cement mortar.

SPONSOR INFORMATION

Ceilume is the leading producer of thermoformed panels and tiles. In fact, we helped invent thermoformed ceilings over half a century ago. Our family-owned business is based in the little town of Graton in Northern California's wine country. Stop by when you are visiting the local wineries and enjoy a tour of the historic apple processing plant we salvaged for our operations. You can reach us at +1 (800) 557-0654 or ceu@ceilume.com. We look forward to working with you. www.ceilume.com/pro

UNDERSTANDING SPECIFICATIONS

FOR CLAD WOOD AND FIBERGLASS WINDOWS

Presented by:

MARVIN Windows and Doors
Built around you.

Photo courtesy of Hoachlander Davis Photography

LEARNING OBJECTIVES

At the end of this program, participants will be able to:

1. Review the need for clear specifications, as well as the different types and formats.
2. Explain how to fill out Division 08 CSI specifications in a careful and well-ordered way for both residential and commercial projects.
3. Describe the importance of referencing codes, industry standards and performance requirements in window specifications.
4. Understand how to write clear and concise specifications utilizing the resources of manufacturer's representatives to clearly convey the design and performance intent of the drawings.

CONTINUING EDUCATION

CREDIT: 1 LU

COURSE NUMBER: ARsept2015.2

Use the learning objectives above to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR915Course2 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

By Paige Lozier

WELL WRITTEN WINDOW SPECIFICATIONS

Windows represent quite a large component of a project's budget, ranging from five to ten percent or more. Therefore, window specifications that are not clear and concise could create wide price and performance variations, resulting in significant cost and time delays once the project commences. Specifications help to maintain both the material and labor budget for a project, avoid project delays, and set expectations regarding the aesthetics and performance of the finished building product.

Construction documents define the rights of, responsibilities of, and relationships among the parties. Standard contracts, drawings and specifications have been published by several professional organizations so that information can be placed in a predetermined location for each construction project, which provides familiarity through repeated use, resulting in clear and well-coordinated documents. Specifications are more easily coordinated with the drawings, specification sections can be coordinated with each other, and A/E consultants can correctly integrate their work with less effort and error.

Specifications complement, but should not repeat, information shown on the drawings. Nor should the drawings duplicate information contained in the specifications. Properly prepared drawings and specifications should dovetail like a jigsaw puzzle, without overlaps or gaps.

If a requirement on the drawings or in the specifications is duplicated in the other, an opportunity arises for a discrepancy between the two. An addendum covering a design change may correct the item in one location but overlook it in the other. Last-minute changes are most likely to create discrepancies of this sort. Such discrepancies may cause bidders to make different interpretations of what is required, often resulting in change orders and extra costs.

When specifying windows it is very important to take into consideration both rough and masonry openings. Photo courtesy of Chad Holder Photography

Rough/Masonry Openings

When specifying windows it is very important to take into consideration both rough and masonry openings. A rough opening (RO) is the opening left in a frame wall to receive a window unit. The studs on each side, which support the header across the top and the sill at the bottom, form the rough opening. The rough opening generally allows approximately 1/2" at each jamb and at the head of the window frame to allow for installation. Also, sill pans can affect the height of the rough opening.

That being said, the determination of rough opening dimensions is relative to the fenestration frame size and varies by manufacturer and product frame material. There is no industry standard for this clearance and even products within the same brand vary in perimeter clearance.

Openings in brick walls are known as masonry openings (MO). Masonry openings incorporate frame width on all four sides of the window frame in conjunction with an additional sealant joint (1/4" to 3/8" typically).

The specifier should provide enough information with details or a written description so the contractor can figure out what the rough opening or masonry opening should be. The addition of special casings and sills affect the masonry opening and should be articulated, as they will determine the actual frame/rough opening of the window.

Applied window elements such as casings and sills are available in a multitude of widths and profiles, which could greatly affect the rough or masonry opening size. If showing a window with casing on it, the dimensions of this casing should be specified.

Delineating sizing on drawings by manufacturer model or call numbers eliminates confusion. The size of each individual window element can have a significant cost impact on a large project. Be sure to indicate tolerances allowed for sizes specified for custom vs standard manufacturer sizes.

The frame description should include the window style and shape, both interior and exterior finishes, basic dimensions such as the thickness and depth of the frame, and the use of certified wood, if required. Photo courtesy of Blackstone Edge Studios

PART 2-PRODUCTS

The specifications will then move into descriptions of the specific elements of the windows, from frames and sashes to glazing, finish, hardware, insect screens and accessories. In general, call numbers and approximate sizes are best shown in the drawings, not in the specifications.

The frame description should include the window style and shape, both interior and exterior finishes, basic dimensions such as the thickness and depth of the frame, and the use of certified wood, if required. Specifications will articulate casing width and thickness, sill horn length, sill thickness and extensions, the use of elements such as aprons, back bands, drip caps and cove molding, as well as whether the casing should be field applied or factory applied.

Casing and sill accessories should be specified for material (i.e extruded aluminum) and finishes to match the window. However, profiles and dimensions are best illustrated on the drawings.

Sash

The sash description will include the operating type such as double-hung, casement, awning, radius or fixed, interior and exterior finishes, the thickness and type of mullions, mulling configurations and anchoring requirements. Divider options, profiles and spacers bars will also be covered.

Materials

Material choices, as well as exterior and interior finishes, have increased in offerings and complexity. Wood windows are available in differing species, and may come pre-finished, primed, stained or have field-applied finish options. Other options besides wood are aluminum clad wood, fiberglass composites and vinyl. There are also special hybrid options such as aluminum clad windows with PVC surrounds, or an aluminum clad sash with a wood frame. The materials section will specify the primary and cladding materials.

Glazing specifications may include the number of panes, the glazing method, type of glazing seal, the type of filler and glass type. Photo courtesy of Marvin Windows and Doors

Glazing

Glazing specifications may include the number of panes, the glazing method, type of glazing seal, the type of filler, and glass type including specialty glass such as low-E, insulating glass, safety glass, impact glass for coastal installations, or historic considerations. Performance requirements in this section should comply with code to promote energy savings, improved comfort, reduced fading, less condensation and increased light and views. Performance requirements specified here may

Window specifications that are not clear and concise could create wide price, performance and quality variations, resulting in significant cost and time delays once the project commences. Photo courtesy of Troy Thies Photography

CONSTRUCTION SPECIFICATIONS INSTITUTE

The Construction Specifications Institute (CSI) is an organization that keeps and changes the standardization of construction language as it pertains to building specifications. CSI provides structured guidelines for specification writing in their Project Resource Manual.

CSI-authored MasterFormat is an indexing system for organizing construction data, particularly construction specifications. MasterFormat is the most widely used standard for organizing specifications and other written information for commercial and institutional building projects in the U.S. and Canada. It provides a master list of divisions, and section numbers and titles within each division, to follow in organizing information about a facility's construction requirements and associated activities. Standardizing the presentation of this information improves communication among all parties involved in construction projects.

For many years MasterFormat consisted of 16 Divisions of construction, such as Masonry, Electrical, Finishes or Mechanical. In November 2004, MasterFormat was expanded to 50 Divisions, reflecting the growing complexity of the construction industry, as well as the need to incorporate facility life cycle and maintenance information into the building knowledge base. The Division we will be discussing today is Division 08—Windows and Doors.

CSI specifications use a 3-part 'SectionFormat' standard for organizing information in each section—Part 1-General, Part 2-Products and Part 3-Execution. Each Part is further organized into a system of Articles and Paragraphs.

Part 1 calls out reference standards that should be followed such as those of ASTM, AAMA and NFRC, as well as a description of the specific minimum window performance ratings that are required. Photo courtesy of Bob Coscarelli Photography

PART 1-GENERAL

Part 1 includes general information such as a summary of the specification sections and an overview of what should be covered at pre-installation meetings.

This section should also specify how action submittals such as product data, LEED submittals, shop drawings and samples or mock-ups should be delivered, as well as informational submittals such as warranties.

Part 1 also covers quality assurance of the manufacturer and installer, delivery, storage and handling considerations, as well as details about the manufacturer's warranty.

Reference Standards

Another very important section of Part 1 calls out reference standards that should be followed such as those of the American Society for Testing and Materials (ASTM), American Architectural Manufacturers Association (AAMA) and the National Fenestration Rating Council (NFRC), as well as a description of the specific minimum window performance ratings required for the project. These may include performance class and grade, thermal transmittance, solar heat gain coefficient, U-factor, visible transmittance, air infiltration, water infiltration and impact resistance among many others.

In addition, if the project is located within a very specific area such as a high velocity hurricane zone that requires attention to local building code product rating information, such criteria should be included here as well.

Manufacturers

A common mistake with specification writers is drafting a specification around a particular manufacturer only to list other 'acceptable or equal' manufacturers without careful research to identify their ability to perform or comply. The specification writer should identify the manufacturer as 'basis of design' and invite other manufacturers to submit prior to bid through the Substitution process outlined in Division One—General Conditions. Approvals of substitutions would then be issued by addendum.

Another consideration for the manufacturer section of the specifications is that the retailer pricing the windows could be unaware of the location or exposure of a project, requiring additional attention in the specifications to performance ratings or installation requirements such as wind borne debris protection, impact glazing, design pressure considerations or mull reinforcement.

Design Pressure Considerations

Note that for every project it is necessary for an engineer, certified in the state where the project is being constructed, to develop Design Pressure (DP) requirements. Design Pressure is the measurement of the amount of wind pressure that a window or door is designed to withstand when closed and locked expressed in lb/ft^2. DP ratings include both positive and negative numbers.

The positive number corresponds to pressure created by wind blowing at the exterior of a window, and the negative number represents vacuum pressure on the interior side of the product. DP rating requirements are site specific. They vary according to product location on the building, height of the building, density of buildings and wind speed. It is the architect's responsibility, if they don't have an engineer on staff, to hire one to develop DP requirements.

include impact resistance, UV transmission, sound transmission class (STC) and outdoor/indoor transmission class (OITC).

Finishes

Finish specifications will often note that the finish meet a certain AAMA standard. AAMA has a set of test criteria and specifications designed to determine the minimum level of performance for finishes available on extruded aluminum clad windows (for example). The three specifications range from good to better to best level of performance: 2603, 2604 and 2605. The finish section will also specify the desired color and interior finish options. A finish must be durable and low maintenance, providing resistance to scratching and marring as well as fading and chalking.

Interior / Exterior finishes not provided by the manufacturer should be specified in their own specification section 'Finishes'. Window specifications should 'Reference' other specification sections relative to the windows. Example: Window interior wood surface shall be factory primed ready for site finishing. See spec section _____.

Hardware

The hardware section of the specifications will specify the balance system (if hung windows), the jamb carrier material and color, as well as lock and latch material and finish. If referencing an awning or casement window, hinges and crank handles will be specified.

Hardware can range dramatically in price and standard options are not necessarily the same price. There is also big price difference between standard architectural hardware and performance hardware such as physical vapor disposition (PVD) or stainless steel, which are often used in coastal applications due to the corrosive nature of the environment. Any custom hardware will require modifications and additional cost.

Accessories

Windows have several accessories that must be specified such as insect screens and grilles. When insect screens are used, specifications should indicate operable vs. fixed units. Types of operable insect screens may include swinging or retractable screens. The specifications should indicate the screen mesh size and material, the frame material, and finish color.

Specify the quantity and type of grilles, which may include simulated divided lites (SDL), authentic or true divided lites (ADL or TDL), grilles between glass (GBG), snap-in grilles, lead caming or internal spacer bars. The widths, profiles, finish and color, interior and exterior material, and pattern will all need to be specified. Divider options should be specified and illustrated in section on the drawings.

Fabrication

Part 2 may also include a section on fabrication, generally specifying that the majority of components should be fabricated in the factory to the greatest extent possible, allowing for scribing, trimming and fitting at the project site.

This article continues on http://go.hw.net/AR915Course2. Go online to read the rest of the article and complete the corresponding quiz for credit.

QUIZ

1. Windows typically represent at least _____ percent of a project's budget.
   a. 1–2 b. 5–10
   c. 10–20 d. 20–40

2. True or False: Specifications complement, but should not repeat, information shown on the drawings.

3. How many CSI MasterFormat divisions are there?
   a. 15 b. 16
   c. 40 d. 50

4. In which Part should you specify how action submittals such as product data, LEED submittals, shop drawings and samples or mock-ups should be delivered?
   a. Part 1-General b. Part 2-Products
   c. Part 3-Execution

5. In which Part are the specific elements of windows specified?
   a. Part 1-General b. Part 2-Products
   c. Part 3-Execution

6. True or False: Openings in brick walls are known as rough openings (RO).

7. True or False: Include window schedules at the end of Part 3 when they are included in the specifications.

8. True or False: Integrated performance standards provide one document for comparing products of all material types.

9. Which of the following administers the only uniform, independent rating and labeling system for energy performance of windows, doors, skylights and attachment products?
   a. WDMA b. AAMA
   c. ASTM d. NFRC

10. Which of the following is a basic principle of construction law?
    a. The Spearin Doctrine b. RFI
    c. Or-Equal Clause

SPONSOR INFORMATION

NOISE CONTROL

IN STEEL FRAME COMMERCIAL BUILDINGS

Presented by:

PABCO Gypsum
what the job demands™

LEARNING OBJECTIVES

At the end of this program, participants will be able to:

1. Define terminology related to noise control.
2. Examine why noise control is essential in building design and construction.
3. Compare traditional and damped wall partition designs.
4. Describe how the use of constrained-layer damping panels allows building designers and specifiers the flexibility to achieve required noise ratings in steel assembly partitions.

CONTINUING EDUCATION

CREDIT: 1 LU/HSW

COURSE NUMBER: ARsept2015.3

Use the learning objectives to focus your study as you read this article. To earn credit and obtain a certificate of completion, visit http://go.hw.net/AR915Course3 and complete the quiz for free as you read this article. If you are new to Hanley Wood University, create a free learner account; returning users log in as usual.

By Paige Lozier

THE IMPORTANCE OF BUILDING NOISE CONTROL

Simply put, audible sound results from small changes in pressure that are propagated via waves that eventually reach the ear drum. The properties of these sound waves are important when dealing with noise control in buildings. Variations in acoustic wavelength cause changes in the frequency, or pitch, of the sound. The sound wave is also perceived at different loudness levels for each frequency. This affects the achievable sound transmission loss in building partitions. Sound transmission loss is a measurement of the amount of sound that is eliminated between rooms separated by a common partition. These characteristics and their effect on noise control can be illustrated with the following example. The sound from a home theater subwoofer has a long wavelength, which results in low-frequency noise. Because the wavelengths for these low frequencies are so long, it is more difficult to both attenuate (reduce) and perceive small changes in loudness for the subwoofer. The surround speakers around the home theater, however, operate at much higher frequencies and are far easier to attenuate. Differences in loudness for these higher frequencies are far easier for the human ear to perceive.

Noise is simply unwanted sound. Noise is created throughout a building from a wide variety of sources and in varying frequency ranges. Noise may originate from HVAC or mechanical equipment such as transformers and fluorescent ballasts, fans and pumps, appliances, elevators, and plumbing. Noise may be radiated into chutes, stairwells and elevator shafts, or from people, and loud speakers. Noise can transmit through solid materials as well, such as beams, floors, and even cabinets via structure-borne vibration. Many building materials such as doors, windows, and bathtubs are efficient sound radiators, worsening noise pollution within the building.

In addition, the advent of high quality audio systems and home theaters has drastically changed noise control in the built environment, as illustrated in the previous example. Previously, hospitality and multi-family facilities only needed to isolate a neighbor's voice, but they now must contend with loud movies or games exploding through partitions from behind entertainment centers or even simple television screens.

Today, most commercial and residential construction requires increased sound isolation between rooms. Since the 1950's, standard room-to-room noise reduction (sound transmission loss, as defined above) has steadily

achieved a sound transmission class (STC) of 34 to 40. Many tenants, owners, builders and specifiers have come to the painful and often costly realization that the amount of isolation provided by an STC 34 to 40 partition is simply unacceptable. At such a level of noise control, the sound radiated from loud conversations (85 dB), outside vehicle noise (90 dB) and music (100 dB) is so annoying that lawsuits are filed and an enormous amount of money is lost.

Noise litigation has become an increasing concern in the building industry. Poor designs based on inaccurate or misleading information, a lack of incorporating noise control into the design in the first place, and high-risk, high-failure designs all affect the comfort of tenants and may result in a settlement.

With adjacent room noise easily reaching peak sound pressure levels of 85 to 110 dB, walls today should be built to achieve STC ratings of 50 to 65. Intelligent design implemented by knowledgeable architects and contractors employs the use of innovative materials and techniques to achieve STC ratings of 60 or higher, as conditions warrant. The long term result of these designs, when implemented correctly, is that customers and occupants are happier with their investment. The "quiet" return on investment is high because such commercial and residential properties are easier to rent, generate fewer complaints, and produce higher resale values.

The advent of high quality audio systems and home theaters has drastically changed noise control in the built environment. Photo courtesy of QuietRock and PABCO Gypsum.

UNDERSTANDING NOISE CONTROL TERMINOLOGY

Before we continue further, let's discuss some terms you must understand in order to grasp the important issues surrounding noise control.

Hertz and Decibels

Human beings are capable of hearing a very wide range of frequencies, or pitches, from the low-frequency tones of a bass drum to the high pitch of a flute, for example. We perceive both of these sounds differently because the vibration in air that results from each of these sound sources is processed differently in the human ear. Frequency is measured in Hertz. Essentially faster sound waves or sound waves with smaller wavelengths result in higher frequencies. Conversely, the slower and longer sound waves are perceived as lower in frequency, or tone. The audible range of frequencies for the average human is 20 Hz to 20,000 Hz.

Sound is typically measured as a sound pressure level (SPL) in decibels (dB). The decibel is a non-linear (where 2 dB + 2 dB is NOT equal to 4 dB) unit and is generally related to the volume (or loudness) of a particular sound source. The general range of human hearing is from around 0 to 120 dB. A sound of a quiet library is roughly 30 dB, while 120 dB is the threshold where the ears begin to feel pain because the sound is so loud.

Sound Absorption vs. Sound Transmission

There are two general types of building noise control, sound absorption and sound transmission. Sound absorbing materials are used on room surfaces or in ceilings in an attempt to control noise within a room, improving speech communication or improving the quality of sound from an orchestra, for example. Absorptive or reflective materials can be tested for their sound absorption coefficients, or the percentage of noise that is absorbed when striking a material surface. Rooms with very little sound absorption (hard surfaces) may result in too many echoes, making speech difficult to understand. Rooms with too many sound absorptive materials are perceived as "dead" and may be poor environments for listening to music.

The Sound Transmission Class (STC) is a single-number rating that is calculated based on the amount of sound that is "attenuated" or reduced as it passes through an assembly partition. The higher the STC number, the more sound is attenuated. Walls, floors, ceilings, windows and doors will all have respective STC ratings depending on their design and the materials used in their construction. As this is a calculated result, it is not a uniform reduction across all sound frequencies.

The STC rating is calculated from the sound transmission loss measurement. STC ratings ignore frequencies below 125 Hz and above 4,000 Hz. Frequencies below 500 Hz are also de-emphasized during the calculation of STC. The STC rating was initially created for noise in the speech range of frequencies. It is no surprise then that, with the advent of the home theater and many other lower-frequency noise sources, the STC rating has become less and less relevant in building noise control design.

Sound Transmission Loss

As previously mentioned, the Sound Transmission loss (STL) is a measurement of the sound that penetrates through a partition (wall, floor/ceiling, etc.) from one room to another room. STL is measured in decibels over a broad range of frequencies. The ASTM standard E90 defines and describes methods for making laboratory STL measurements.

STL is measured in a two-room laboratory measurement suite with microphones over a frequency range that is divided into segments called 1/3rd octave bands. In one of the rooms a loudspeaker sound source is excited with random noise that is similarly loud at all frequencies. With the loudspeaker on, microphone SPL measurements are made within the source room. Then, with the loudspeaker still on, SPL measurements are made in the adjacent receiving room. The subtraction of the receiving room SPL from the source room SPL, after accounting for the amount of absorption in the room, is equal to the Sound Transmission Loss (STL).

Restaurants and other noisy areas will most likely exceed NC 40 ratings. Photo courtesy of QuietRock and PABCO Gypsum.

NOISE CRITERIA (NC) RATING AND NOISE REDUCTION COEFFICIENT (NRC)

The Noise Criteria, or NC rating, is a single number that represents the amount of background noise in a single room. It is an SPL measurement (in dB) and includes any steady-state noise sources such as HVAC and traffic noise. The SPL data is plotted and then fitted to a Noise Criteria curve.

Recording studios and concert halls are typically designed to achieve a maximum NC rating of 20 (very quiet). Residential homes and spaces such as conference rooms are normally designed to achieve NC ratings between 25 and 30. Churches and hotel rooms achieve NC ratings between 30 and 35, on average, while open-plan offices and classroom NC ratings lie between 35 and 40. Restaurants and other noisy areas will most likely exceed an NC 40.

The Noise Reduction Coefficient (NRC) is a single-number index determined from a laboratory test and used for rating how absorptive a particular material is. This industry standard ranges from zero (perfectly reflective) to 1* (perfectly absorptive). It is simply the arithmetic average of the mid-frequency sound absorption coefficients (250, 500, 1000 and 2000 Hertz) rounded to the nearest 5%.

Products designed specifically for absorption (NRC rating) are often assumed to provide some level of "soundproofing" due to the use of the term "sound absorption" when referencing the material. This can be a very costly misconception, as the sound absorption of such products refers to the ability of the material to reduce sound reflectance (sound bouncing or reflecting off of hard surfaces) and has little bearing on the STL. For instance, in commercial buildings you will often find acoustical ceiling tiles, the porous tiles that are placed within metal grids hanging from the ceiling. These tiles are designed to make the room less reflective (less echo and reverberation), however these tiles typically do very little to reduce sound transmission from room to room. Most products that are NRC-rated cannot be assumed to provide much in terms of STC improvement.

Other Sound Metrics

The reverberation time (T60), absorption area (S_α) and speech intelligibility index (SII) are some other metrics that can be useful in evaluating and applying the sound absorption within a room for various purposes. Reverberation time is calculated from the time that it takes for sound to decay (decrease in loudness) by 60 dB at each frequency.

Speech intelligibility Index (SII) is measured as a combination of T60 and the speech and background noise. An SII of 0 means that speech in the room is not audible (most likely due to high background noise or too much reverberation or a combination of these) and a value of 1 means that more or all speech within the room is intelligible. An SII value of 0.5 is considered to result in fair quality of speech and is standard for most areas.

Speech Privacy Class provides a means of measuring the isolation of speech noise between the interior of a closed room and locations outside the room. Photo courtesy of QuietRock and PABCO Gypsum.

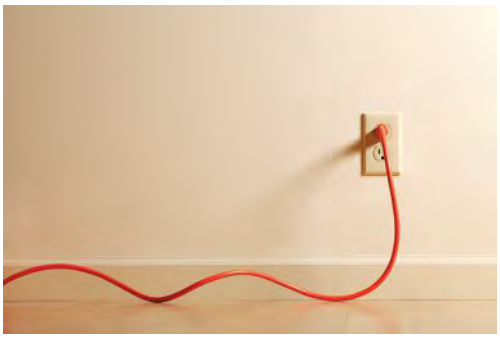
Speech Privacy Class

Currently the STC is used as the go-to metric for evaluating a partition's sound isolation performance related to speech privacy. However, a much better metric is the recently developed Speech Privacy Class (SPC). The SPC, also based on the transmission loss like the STC, is calculated in a different way.

SPC is based on a combination of the measurement of STL between the interior of a closed room and locations outside the room and the background noise levels at the same locations. The results can be used to rate the degree of speech privacy between enclosed spaces or to estimate the probability of speech intelligibility or audibility at a specific place outside of a room.

People speak at different levels and vary these levels into the presence of room noise and other room characteristics. Consequently it is not possible to say definitively whether a room is protected against eavesdropping. The probability of being overheard is the only reasonable way to determine speech privacy. The owners or managers of the "private" space that is under consideration must determine the criteria for this probability according to their specific goals and circumstances.

Evaluating speech privacy logically requires both a measurement of the background noise within a room as well as the transmitted speech because background noise can have a drastic effect on how we perceive human speech. According to the ASTM standard E2638, SPC 75 is considered to be Standard Speech Privacy, where the listener can understand one or two words occasionally and the speech is frequently audible. SPC 80 is considered to be Standard Speech Security, where the listener can rarely understand one or two words and the speech is only occasionally audible. High Speech Security is obtained at an SPC level of 85. At this point in the SPC range, the speech is, for the most part, unintelligible and is rarely noticed by a listener.



Since air offers less resistance to sound, much of the sound energy will exit a structure through air openings and penetrations in the barriers. Photo courtesy of QuietRock and PABCO Gypsum.

WHY ACOUSTIC SYSTEMS FAIL

Sound waves, like water, will find any leakage point to penetrate through a partition. Since air offers less resistance to sound than a piece of metal or wood, much of the sound energy will exit a structure through air openings in the barriers. Thus, a 5-foot square 1" thick lead wall might reduce the noise traveling from one room to another. However, if there are three 1/2" holes for wires in this lead wall, the majority of sound will penetrate through those holes, thereby reducing the effectiveness of the wall as a barrier to noise. Incidentally, the complete assembly or system must be considered when confronted with any building noise reduction problem.

This example of a system failure may be simple, but there are other reasons why an acoustical design might fail, including acoustic "short-circuiting" failures and layout failures. Failures related to short-circuiting are often a result of mis-designed ceilings, coupling by seismic traps or pipes, or incorrectly installed resilient isolation materials. Layout failures include mechanical equipment that is exposed to tenant space, incorrect duct design that results in sound transmission through the duct work from room to room, poor door layouts, and partial-height partitions that allow the transmission of sound through a lay-in ceiling plenum. Partitions designed for building noise isolation must be continuous from the floor all the way to the structural deck to be effective as sound barriers. Proper duct design and door layout involves creating a longer path for the sound between adjacent rooms and doors.

Failures in acoustic design are often repeated frequently due to cost cutting or lack of

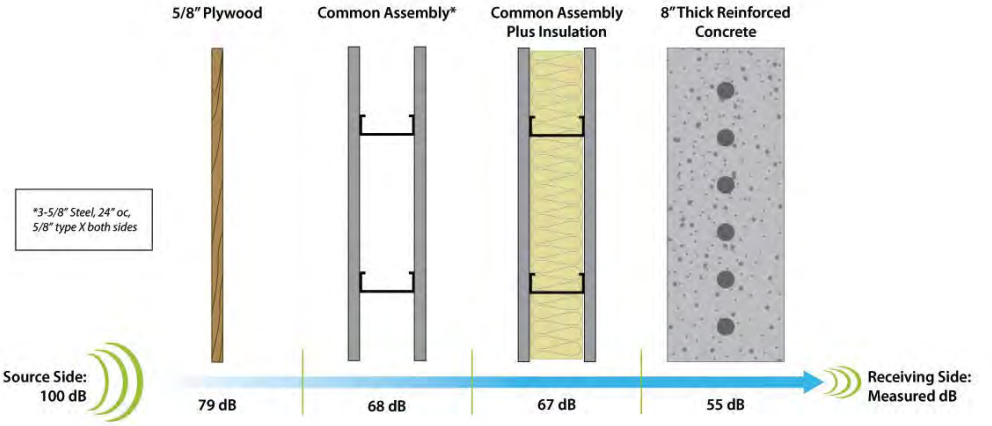
consideration for noise control when planning. Sometimes designers simply can't "see" these sound isolation problems on a floor plan so, problems only surface when they are experienced by the first occupants. Finally, poor follow-up during the construction process or failing to budget for the noise control retrofit costs can lead to acoustical failure.

MAKING WALLS QUIET—NOISE CONTROL TECHNIQUES

Mass Loading

When designing for noise reduction in any system, four primary tradeoffs need to be considered: weight, space, cost and aesthetics. Given adequate funding and unlimited weight and space requirements, a 10-foot thick lead barrier, welded on all sides, could be constructed and achieve the desired sound isolation. Given the mass of this type of barrier, it would require a considerable amount of sound energy to transmit any noise through the partition. This scenario, although extreme, is an example of a particular method of noise control called "mass loading." Mass, in the form of additional or thicker and heavier panels or slabs, can be added to the partitions between noise sources and occupants. However, few buildings have such extra square footage to spare, let alone the added cost (exceeding a few hundred thousand dollars) and weight (exceeding 20 tons) to support a sound isolation treatment like the lead barrier described previously. Mass-loading, tried and proven for over a century, is often not the most efficient method of reducing noise and vibration. Most building construction projects cannot afford the significant cost or weight that this method requires.

This article continues on http://go.hw.net/AR915Course3. Go online to read the rest of the article and complete the corresponding quiz for credit.



When considering reducing noise in any system, four major tradeoffs need to be considered: weight, space, cost and aesthetics. Image courtesy of QuietRock and PABCO Gypsum.

QUIZ

1. Which of the following is a measurement of the amount of sound that is eliminated between rooms separated by a common partition?
   a. Sound Transmission Loss
   b. Sound Transmission Class
   c. Noise Criteria Rating
   d. Noise Reduction Coefficient

2. Restaurants and other noisy areas will most likely exceed a Noise Criteria Rating of _____.
   a. 20
   b. 30
   c. 40

3. According to the ASTM standard E2638, _____ is considered to be High Speech Security; at this point in the SPC range, the speech is unintelligible and is rarely noticed by a listener.
   a. SPC 75
   b. SPC 80
   c. SPC 85

4. Which of the following failures includes mechanical equipment that is exposed to tenant space, incorrect duct design that results in sound transmission through the duct work from room to room, poor door layouts, and partial-height partitions that allow the transmission of sound through a lay-in ceiling plenum?
   a. Short-circuiting failures
   b. Layout failures

5. What are the primary tradeoffs that need to be considered when designing for noise reduction in any system?
   a. Weight
   b. Space
   c. Cost
   d. Aesthetics
   e. All of the above

6. True or False: Mass-loading, tried and proven for over a century, is often the most efficient method of reducing noise and vibration.

7. True or False: Designing and constructing staggered- or double-stud frames is an effective way of increasing sound isolation between enclosures.

8. The advantages of damping are that:
   a. CLD fits into spaces that cannot allow for other treatments.
   b. CLD is nearly equal in labor cost to a standard gypsum panel.
   c. CLD is the best treatment for speech noise (privacy) versus multiple layers of gypsum panels.
   d. All of the above.

9. True or False: A CLD panel on one side with 2 layers of 5/8" Type X gypsum wallboard on the other side can be used in a heavy-gauge framing application to achieve and exceed the minimum STC-rating code requirements.

10. True or False: CLD panels use decoupling in order to optimize sound isolation between partitions.

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Seashore Library
Beidaihe New District, China
Vector Architects

TEXT BY KATIE GERFEN

It's happened to us all: You arrive at your vacation destination, ready to relax in the sun, and find you've left your book at home. In most scenarios, you're stuck with gift shop fare, but if you're spending your days off in Beidaihe New District, China, you're in luck: The beach comes equipped with its own library.

Located roughly three hours from Beijing, this growing resort town on Bohai Bay was master planned by Sasaki Associates in 2010, and the developers want to make sure it comes complete with cultural amenities. For the library, they hired Vector Architects, a Beijing-based studio headed by Gong Dong, to design a sculptural community space with an unconventional approach: The library has no paved path to the entrance. It can be accessed from the beach or from a running trail that passes nearby. But even from the trail, Dong says, "People will have to take a 30-meter walk through the sand." Hardly a barrier-free entry, but the architects say that staff and facilities are available to help visitors with disabilities access the building. The library was placed away from the town's other structures "in order to achieve a more direct relationship with the ocean," Dong says.

The concrete structure was cast on site in board-lined formwork. "The use of wood forms was inspired by the marks in the sand of footprints, wind, and wheels," Dong says. Inside, the double-height reading room is a vaulted space that reaches its apex at the eastern edge, maximizing views of the water through a window wall with operable glass doors. Light also enters the space through a clerestory of hand-made glass blocks, clouded and textured by air bubbles introduced during the manufacturing process. Circular lightwells, each 30 centimeters in diameter, puncture the vault. These are operable vents, allowing for natural ventilation in nice weather, and admitting bright spots of western sunlight to the reading room.

Just to the north of the reading room's second-floor balcony, a meditation space with sloped ceilings and a single horizontal window out to the sea provides a compressive counterpoint to the light-filled reading room's release. Beyond it, and separated by a terrace, is an activity room with articulated ceilings and a west-facing clerestory that can be used for public events.

The curves of the ceiling planes throughout the 4,844-square-foot building were inspired by the waves crashing onto the beach. "The design is focused on exploring the relationship of the space, the movement of the human body, the shifting light ambiance, the air ventilating through, and the ocean view," Dong says.

And it all comes together in a sculptural and literary folly worth exploring. Visitors to Beidaihe New District should leave their books at home.

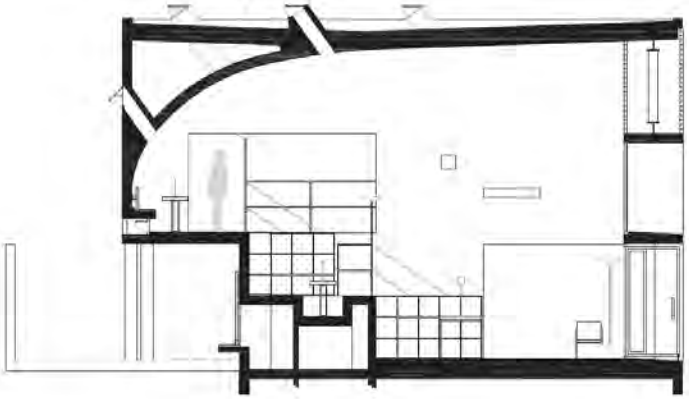
Previous Spread: Activity room interior

Opposite, Top: East façade from the water

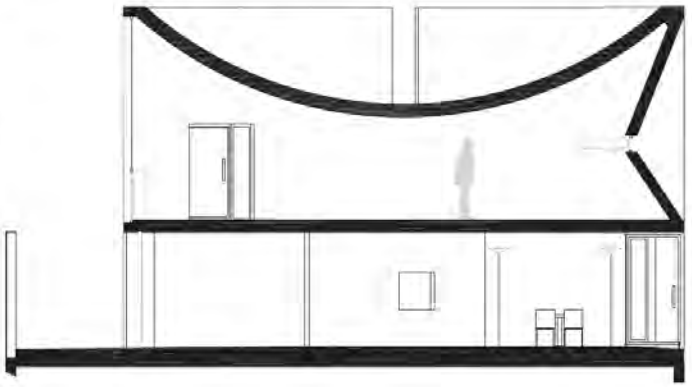
Opposite, Bottom: West façade at dusk

PREVIOUS SPREAD: XIA ZHI; THIS PAGE: SU SHENGLIANG

Section A–A₁



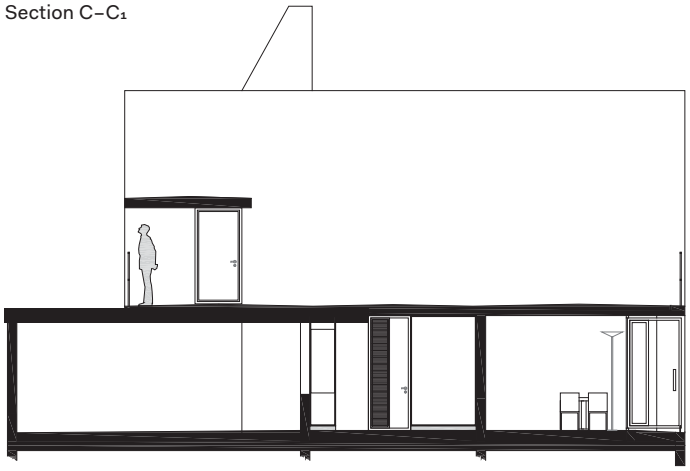
Section B–B₁



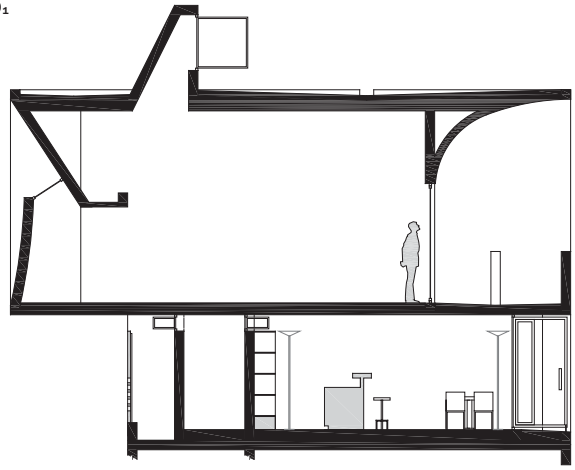
Site Plan

1. Entrance
2. Reading lounge
3. Resting area
4. Bar
5. Office
6. Storage
7. Terrace
8. Reading area
9. Meditation space
10. Outdoor platform
11. Activity room
12. Balcony

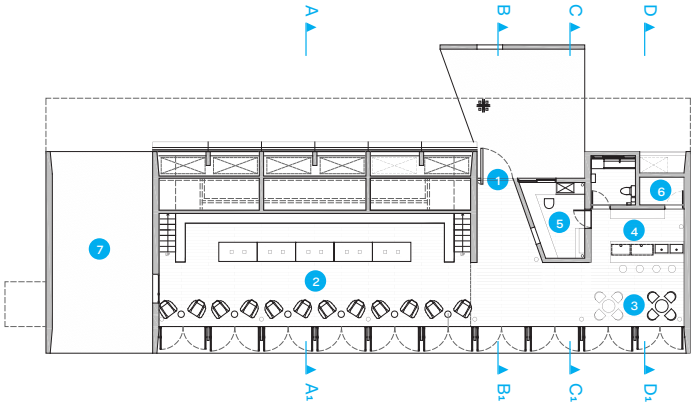
Section C–C₁



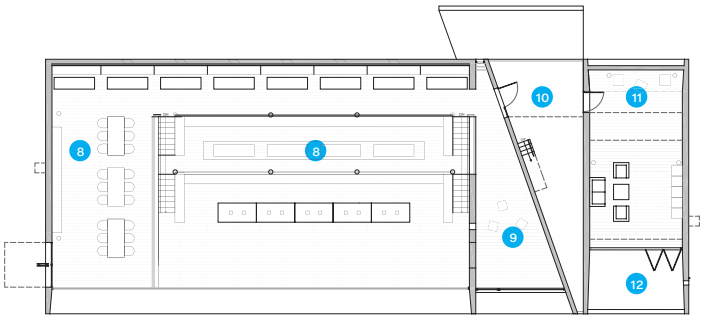
Section D–D₁

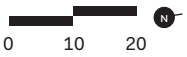


Ground-Floor Plan



Second-Floor Plan





Top: West façade, with freestanding concrete wall in foreground and second-floor terrace behind

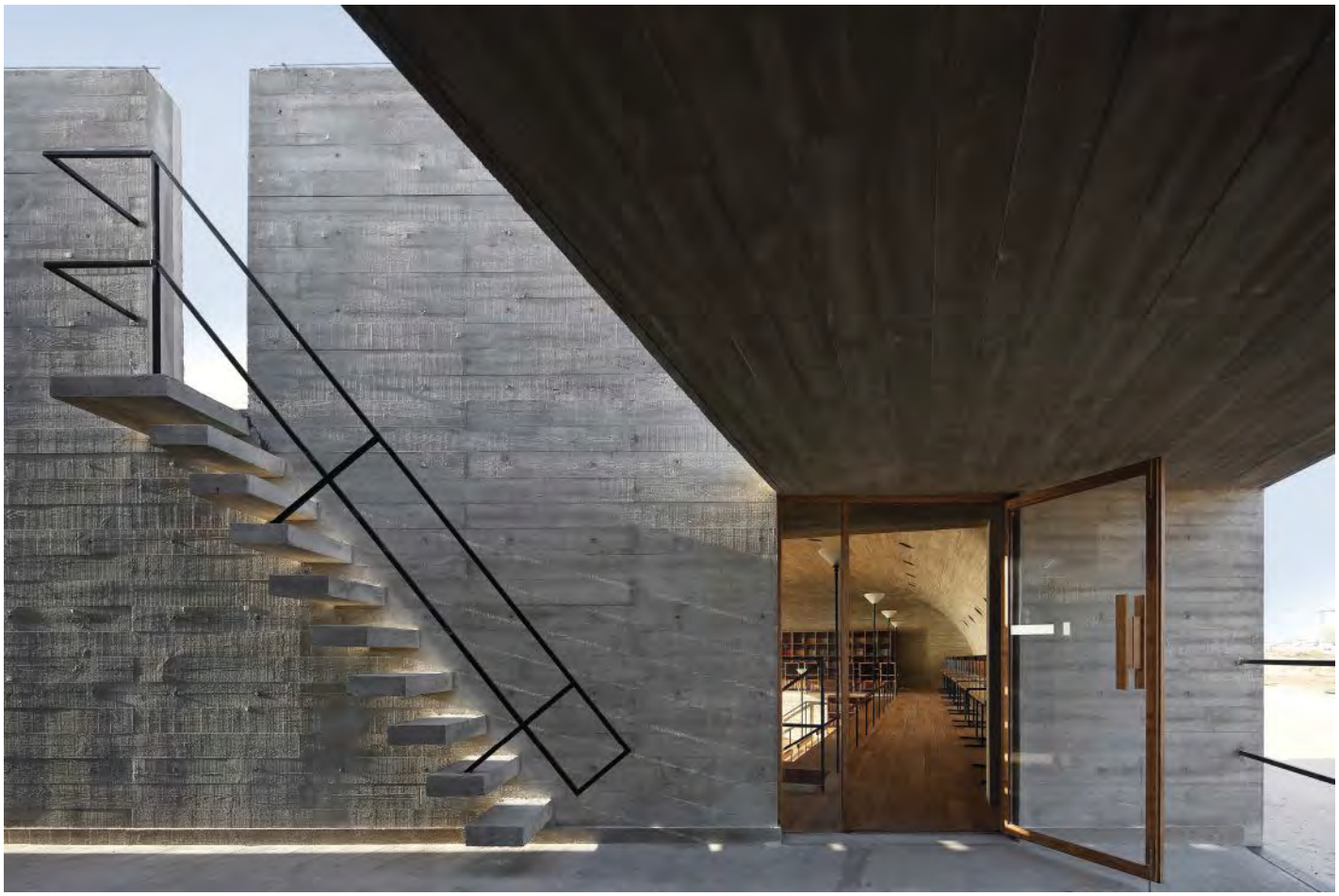
Opposite, Top: Passageway and door to reading room on south end of east façade

Opposite, Bottom: Passageway from west, with wood cladding of façade (at left) folding 90 degrees into bench

TOP: XIA ZHI; BOTTOM: SU SHENGLIANG

Reading room interior, view from north

HAL CHEN



Top: Second-floor terrace, looking south, with door to reading room and staircase to roof

Opposite: Rooftop view, looking east, with sloped roof of meditation room accessible by staircase from terrace

Project Credits
Project: Seashore Library, Beidaihe New District, China
Client: Beijing Rocfly Investment Group Co.
Architect: Vector Architects, Beijing · Gong Dong (principal architect); Chen Liang (project architect); Yifan Zhang, Dongping Sun (site architects); Zhiyong Liu, Hsi Chao Chen, Hsi Mei Hsieh (project team)
Structural and M/E/P Engineer: Beijing Yanhuang International Architecture & Engineering Co.
Structural Consultants: Lixin Ji, Zhongyu Liu
Size: 450 square meters (4,844 square feet)

1345 South Wabash
Chicago
Brininstool + Lynch

TEXT BY EDWARD KEEGAN, AIA
PHOTOS BY DARRIS LEE HARRIS

Chicago's skyline changed dramatically early this century, fueled not by the commercial buildings that crowned it as a center of architecture in the century prior, but by residential towers that answered a growing desire to live in or near the city's iconic Loop. This construction stalled as the economy tanked in 2007–09, but it's begun anew, with the first projects just now coming on line. Located in the fast-growing South Loop area, the 15-story 1345 South Wabash, by local firm Brininstool + Lynch (B+L), is the first such high-rise to be completed since the recovery set in.

Even within the consistently minimal Modernism of partners David Brininstool, AIA, and Brad Lynch, 1345 stands out for its starkly simple composition. The top 12 floors of the east, north, and west elevations are formed by bold horizontal strips of white-painted concrete that contrast with bands of windows, punctuated by a grid of 5½-foot-deep by 8-foot-wide cantilevered balconies on the north face. The architects riff on several Chicago predecessors: The horizontals are reminiscent of Frank Lloyd Wright while the simple articulation of the façade is more Ludwig Mies van der Rohe. But the mid-block, infill site is more typical of Manhattan than Chicago, a sign that this next generation of towers is less about freestanding structures and more about responding to specific urban conditions. Brininstool led the design, produced for longtime client CMK Cos., and this is B+L's fifth multifamily building in the South Loop.

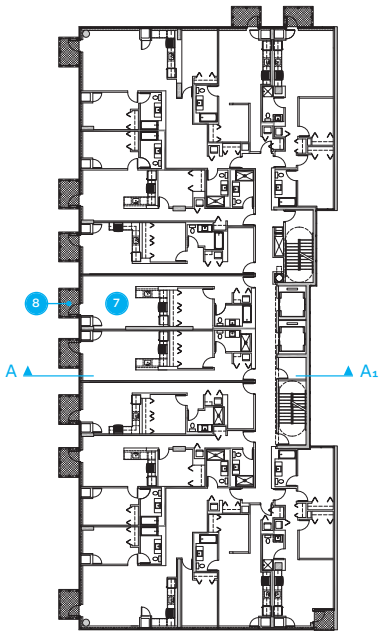
The 72-foot-wide site, fully occupied by the post-tensioned concrete structure, lent itself to a single-loaded corridor solution. Units face north, and while they now have incredible views of the Loop, the construction of a new B+L tower for the same client just 60 feet away will eventually leave units with a view of a shared garden between the structures instead.

Twelve floors of 12 units each sit atop three floors of parking. The most typical units (comprising a third of the total) are narrow—about 15 feet wide by 49 feet deep—but 10-foot ceilings lend spaciousness. "We need the 10-foot ceiling by code to allow borrowed light for interior spaces," Brininstool says.

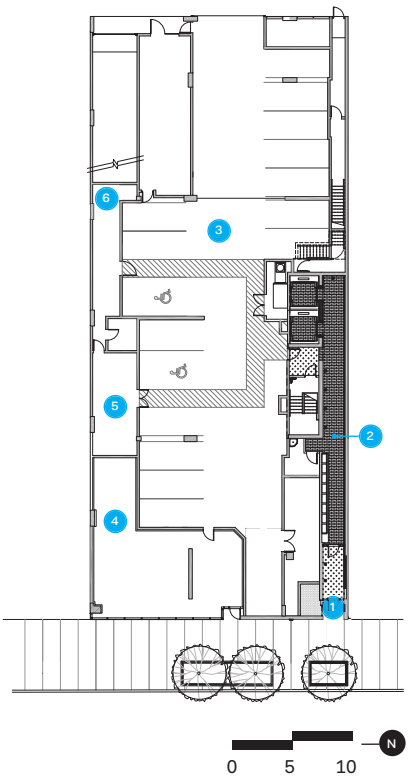
Interior materials were chosen for their taut lines, but are hardly lavish. In the long, narrow ground floor lobby, exposed striated concrete reprises the exterior's horizontal motif. And there is no pool or gym—it is walking distance from any amenity one could desire.

"The condominium market is difficult," Brininstool says, noting that developers need to make their profit quickly. But "CMK has been able to differentiate their buildings in the market through design." In Chicago, where design can be king-making, that says a lot about what B+L have done at 1345 South Wabash.

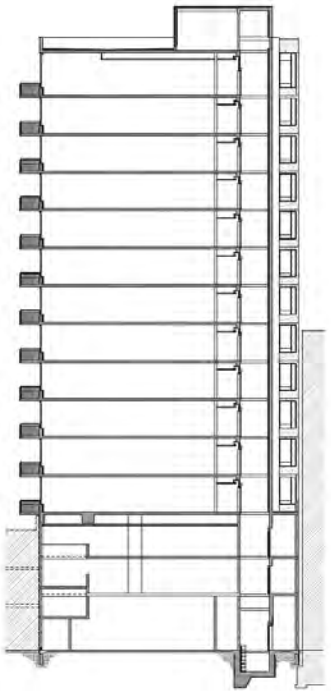
Fourth-Floor Plan



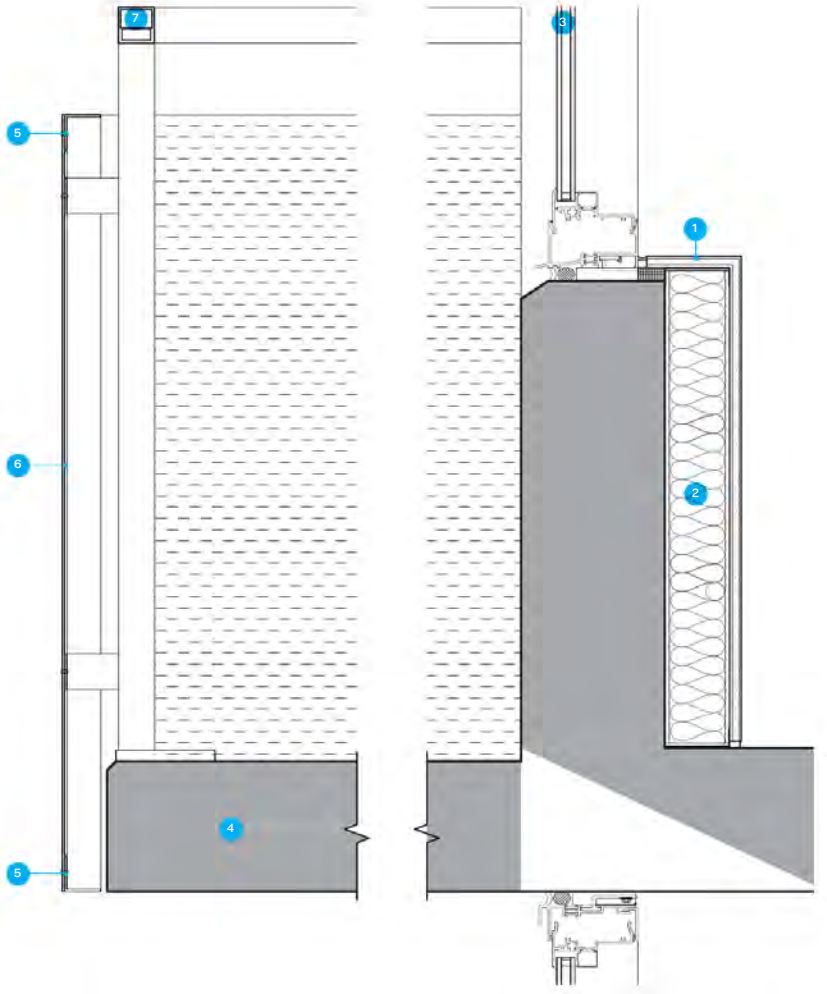
Ground-Floor Plan



Section A–A₁



Balcony Section Detail



1. Residential entrance
2. Residential lobby
3. Parking
4. Retail
5. Switchgear room
6. Recycling room
7. Residential unit
8. Balcony

1. Gypsum board window sill
2. Insulation
3. Glazing
4. Concrete
5. Aluminum angle
6. Metal mesh
7. 2" x 2" channel

Previous Spread: North façade with residence balconies

Opposite: Glass-and-concrete west façade, along South Wabash Avenue

This Image: Residential lobby, lined with striated concrete

Residential unit interior

Project Credits
Project: 1345 South Wabash, Chicago
Client: CMK Cos.
Architect: Brininstool + Lynch, Chicago · David Brininstool, AIA (principal); Dan Martus, AIA (project manager); Angelika Bukowska (project architect)
M/E Engineer: Cosentini Associates
Structural Engineer: C. E. Anderson & Associates
Civil Engineer: Eriksson Engineering
Geotechnical Engineer: Hayward Baker
Construction Manager: Daccord
General Contractor: Lend Lease
Size: 178,100 square feet
Construction Cost: $27.5 million

Len Lye Centre
New Plymouth, New Zealand
Patterson Associates

TEXT BY DEANE MADSEN

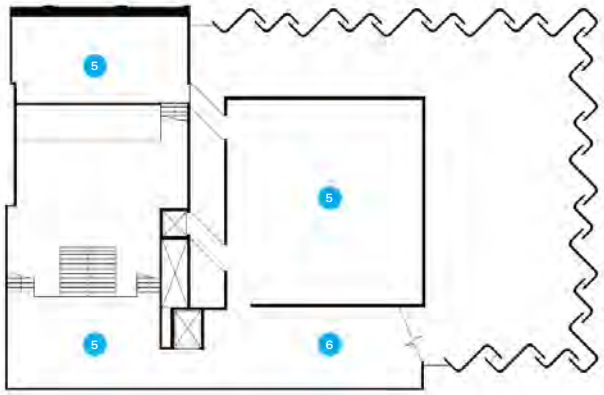
PREVIOUS SPREAD: SAM HARTNETT; THIS IMAGE: PATRICK REYNOLDS

Previous Spread: The Len Lye Centre, which opened in July in New Plymouth, is New Zealand's first museum dedicated to the work of a single artist. Len Lye, who was born in Christchurch, New Zealand, in 1901 as Leonard Charles Huia Lye, was perhaps best known for kinetic artworks rendered in stainless steel.

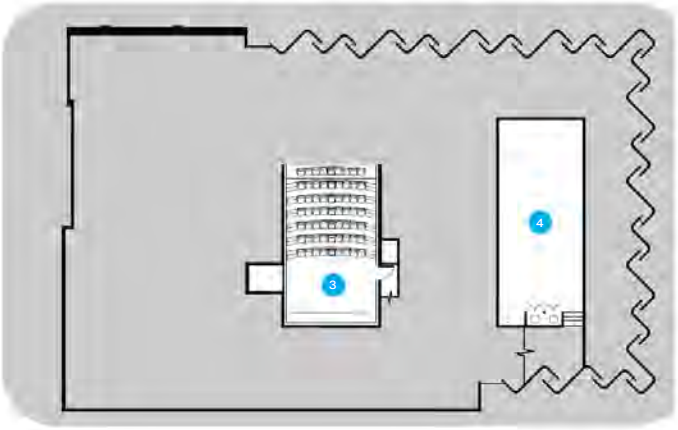
This Image: Parnell, New Zealand–based Patterson Associates designed the museum. The rippling stainless steel panels on the 14-meter-tall (46-foot-tall) exterior—540 panels in all—riff on Lye's work by reflecting the lights and movement of the surrounding city. Prior to Lye's death in 1980, he bequeathed his estate to the Len Lye Foundation, which he established to share his work with the people of New Zealand.

Second-Floor Plan

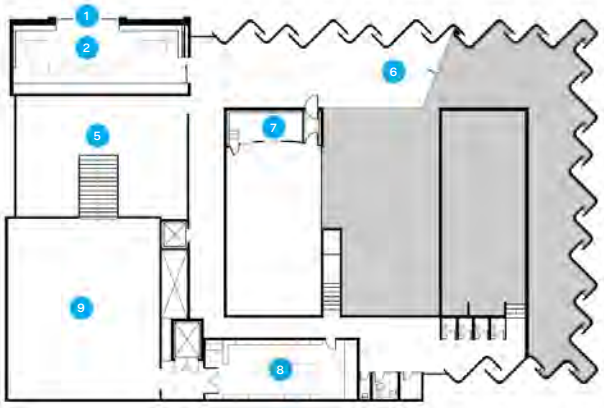
Third-Floor Plan



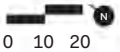
Basement-Level Plan



Ground-Floor Plan

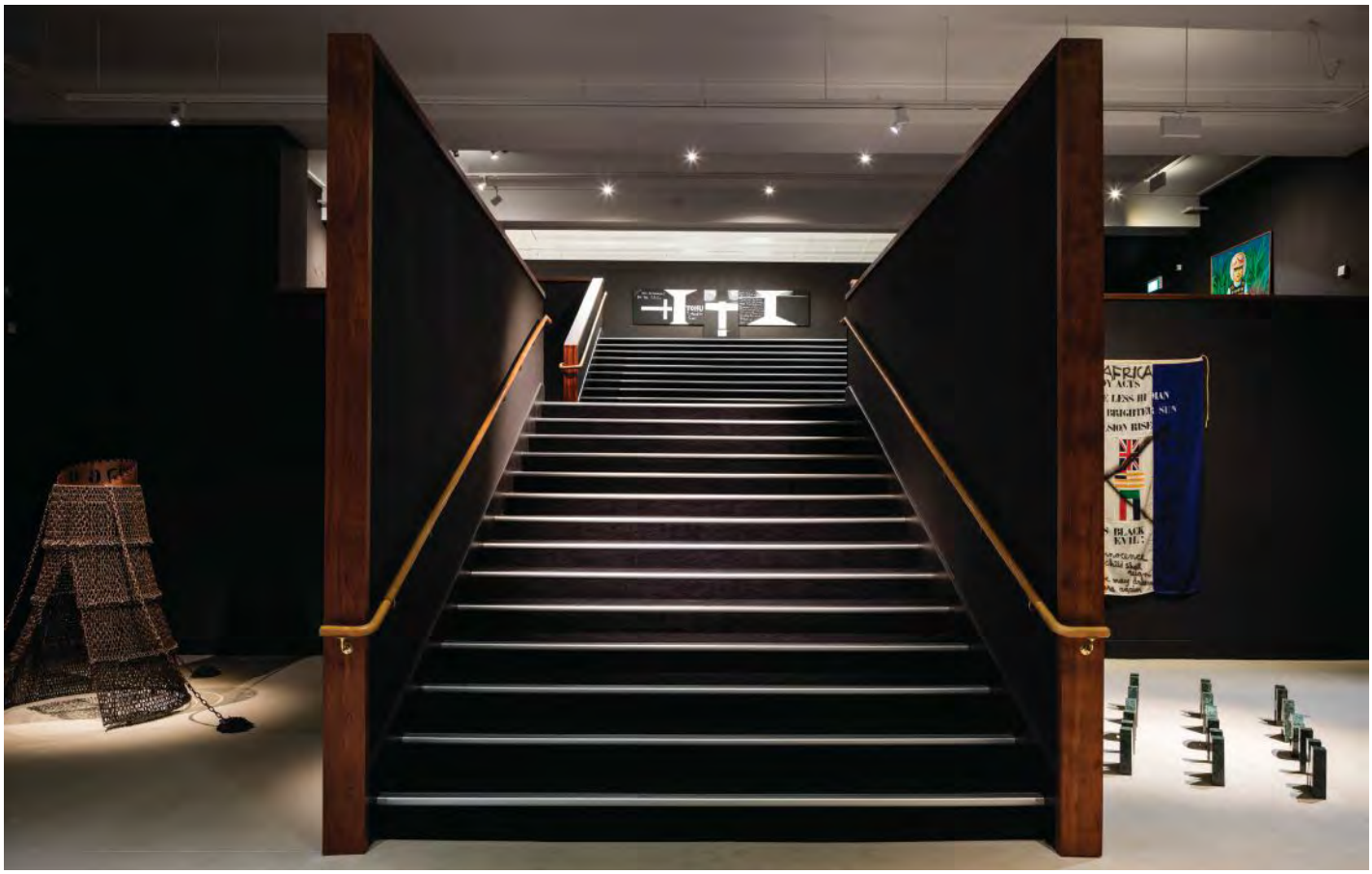


1. Entrance
2. Lobby
3. Theater
4. Motor room
5. Gallery
6. Circulation ramp
7. Projection room
8. Archive
9. Office
10. Education studio



Opposite: The Len Lye Centre adjoins at its northern edge the Govett-Brewster Art Gallery, itself a former theater renovated in the 1970s and converted into a contemporary museum for Pacific Rim artists. Lye exhibited his kinetic sculptures at the Govett-Brewster in 1977, making the center's connection to the gallery more than just physical.

PATRICK REYNOLDS



Above: Patterson Associates was also responsible for bringing the Govett-Brewster Art Gallery up to current standards, which involved consulting with artist Billy Apple, who installed the handrails and staircases (pictured) in 1979. The Govett-Brewster will continue to exhibit local artworks.

Opposite, Top: Visitors enter the Len Lye Center through a lobby shared with the Govett-Brewster. The intertwined spaces and programming throughout the conjoined facilities reflect cooperation between the gallery and the Len Lye Foundation, which will be jointly administrated but independently curated.

Opposite, Bottom: Lye referred to his motor-driven stainless steel kinetic sculptures as "tangible motion sculptures," in part to differentiate them from the "mobiles" of his contemporary, Alexander Calder. Nine-meter (29½-foot) ceilings in the main gallery allow ample room for Lye's large-scale *Fountain* series, and the wavy, precast concrete structure comes alive with overhead light bouncing off the works held within.

SAM HARTNETT

TOP: PATRICK REYNOLDS; BOTTOM: SAM HARTNETT

Above: A hallway just inside the lobby links the renovated Govett-Brewster building with the new addition; air bridges connect upper-level galleries while providing seismic separation.

Opposite: The architects envisioned the museum as a hybrid of classical temple and Māori *wharenui*, or meeting house, with a gently ascending ramp serving as *pronaos* to its inner sanctum galleries. The structural concrete perimeter is either a dense colonnade or a frequently interrupted wall; shuttered glazing in the gaps lets in sunlight and emits electric light at night.

PATRICK REYNOLDS

Project Credits
Project: Len Lye Centre, New Plymouth, New Zealand
Client: Len Lye Foundation, New Plymouth District Council
Architect: Patterson Associates, Parnell, New Zealand · Andrew Patterson (design director); Andrew Mitchell (project designer); Daniel Zhu, Caleb Green, Joanna Aitken (team)
Structural Engineer: Holmes Consulting Group
Contractor: Clelands Construction
Façade Engineer: Mott MacDonald
Size: 3,000 square meters (32,292 square feet)
Cost: NZD 11.5 million ($7.5 million)

ITALIAN MARBLE AND CERAMICS TILE inspiration

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CHICAGO ARCHITECTURE BIENNIAL

Residential:
Element House
Star Axis, New Mexico
MOS Architects

TEXT BY SARA JOHNSON
PHOTOS BY FLORIAN HOLZHERR

When the Museum of Outdoor Arts (MOA) commissioned New York–based MOS Architects to design a house, the museum didn't yet have a site. Cynthia Madden Leitner, president and executive director of the Englewood, Colo.–based organization, recalls her initial pitch to MOS principal Michael Meredith, AIA. "I said, 'We've been really reflecting and looking at what makes an outdoor museum today,' " she says. "One of the things we're interested in is building an off-the-grid home."

MOA wanted a house that was designed using the Fibonacci sequence, Madden Leitner says: "We thought, 'Why not set out like they used to in ancient times, when they built the cathedrals and put a geometric mandate on it, and see if we can do it?' Also, if our intent was to grow these modules—say you started out with two of them and you wanted to connect them—there is a feeling of recombinatory growth that happens in nature that also happens with the houses."

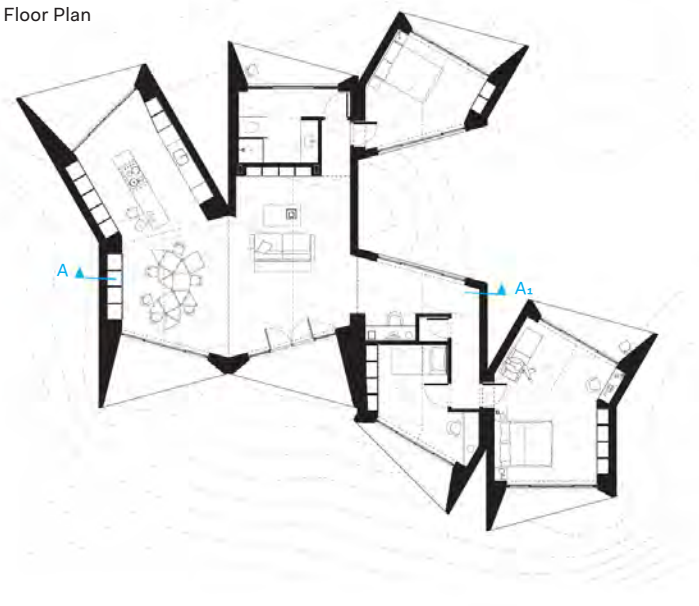
The team designed two Element House scale models for a 2010 MOA exhibition. "One was a long extruded house, and the other was the branching version we built," Meredith says. That same year, the latter concept began to take shape: MOA was a contributor to Star Axis, an 11-story sculpture by artist Charles Ross under construction in the New Mexico desert. The artwork, designed to be seen at night, is more than 80 miles from Albuquerque, N.M., so visitors would need a place to stay. Construction on the Element House prototype at Star Axis began in 2011.

Completed this year, the 1,543-square-foot house bears little relation to the art it serves. "It was very clear from the artist's perspective that they wanted an autonomous thing," Meredith says. "The worst thing in their mind was that we would try to make a mini Star Axis." The structure is a collection of modules that recall the iconic peaked-roof-and-chimney form universally recognized as "house," albeit clad in aluminum shingles. Aside from a few tweaks to the solar chimneys and the orientation, the initial design was not altered for the site.

The three-bedroom, one-bathroom house, which will open to the public when Star Axis is completed in 2017, is not visible from the artwork. "It's very much about being in that landscape and experiencing each of them independently, but knowing that they're nearby," says MOS principal Hilary Sample, AIA.

While there are no current plans to build more Element Houses, Madden Leitner says the initial plan was to create a high-end model (the prototype), a mid-range model, and an affordable model. "There are a lot of functions it could fulfill in the art world," she says, "but as a house to practically live in, that's certainly what we hope ultimately Element House is used for."

Floor Plan



Section A–A1

Previous Page: The house was designed to be completely off the grid, relying on solar panels for electricity and an on-site well for water.

OLLE LUNDBERG.

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Gates Hall, Cornell University | Architect: Morphosis Architects

Top: Element House has no dedicated front door. “You can enter in and out of the house from the bedrooms and from the kitchen, and basically from all around it,” says MOS Architects’ Michael Meredith.

Bottom: The chimneys that punctuate the roofline help ventilate the main living space (pictured) and other interiors, and they also bring natural light into the house through clerestory windows.

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One of the house's three bedrooms.

Project Credits

Project: Element House
Client: Museum of Outdoor Arts
Architect: MOS Architects, New York · Michael Meredith, AIA, Hilary Sample AIA, Ashley Bigham, Jason Bond, Ryan Culligan, AIA, Gideon Danilowitz, Michael Faciejaw, Steven Gertner, Jason Kim, Kera Lagios, ASSOC. AIA, Ryan Ludwig, Gabrielle Marcoux, Meredith McDaniel, Elijah Porter, Michael Smith, Mathew Staudt, Marikka Trotter
Structural Engineer: Edward Stanley Engineers
Climate Engineer: Atelier Ten · Paul Stoller
General Contractor: Sky Madden
Size: 1,543 square feet
Cost: Withheld

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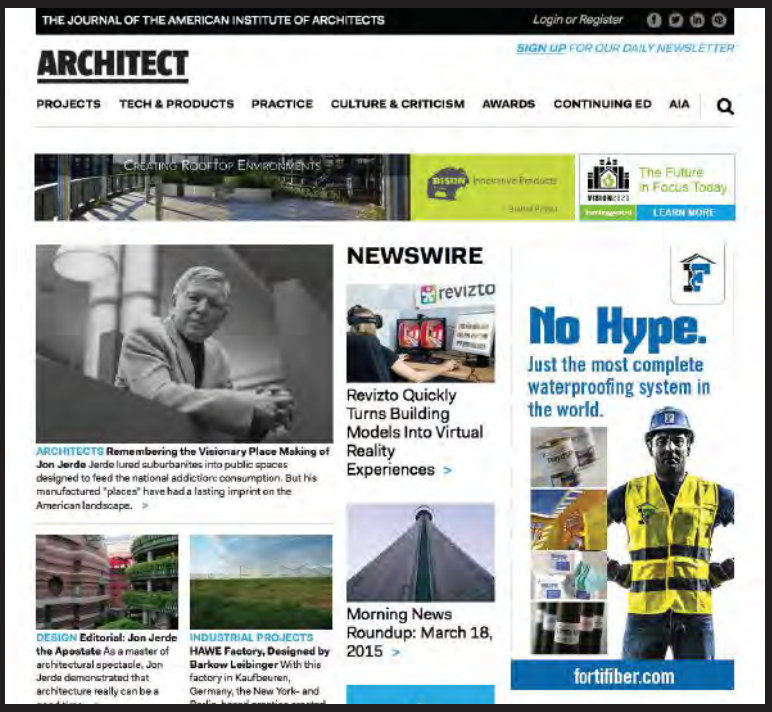

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Editorial: A Time for Peace

Of the five finalist designs for the National World War I Memorial in Washington, D.C., one is classical. This is a remarkable achievement. When was the last time a scheme from Vitruvius' playbook placed in a major competition? The 1990s? The fact that it's noteworthy at all—that it's unusual—is just sad.

It's no secret among architects that for decades, a civil war of fluctuating intensity has divided the profession into broad opposing camps: traditionalist vs. modernist (even the labels are points of contention). At this stage, after so many years of mutual antagonism, the conflict resembles one of those seemingly endless, utterly fruitless battles of the Great War—Verdun, or the Somme—with the two armies periodically lashing out at one another from behind fixed lines.

If it doesn't feel like the profession is at war with itself, maybe that's because it's so ingrained in the culture. The modernists, generally speaking, hold the academy, high art, big cities, and the commercial and institutional markets. The traditionalists' turf (again, I generalize) encompasses suburbia, the residential and light commercial markets, and the taste preferences of the British royal family and legions of consumers. Both sides have their proponents in the media. Both claim the high ground of sustainability and social interest. Neither can legitimately say they are winning.

The classical finalist in the memorial competition is the work of Devin Kimmel, AIA, of Kimmel Studio in Annapolis, Md. And by "classical," we're not talking about the postmodernized Rob Krier, HON. FAIA, or Michael Graves varieties. A triumphal arch with its openings walled up, rising from a heavily rusticated, grotto-like base, the design would be perfectly at home in C.N. Ledoux's Paris or Stanford White's New York.

There's no reason it can't be at home in 21st century Washington, D.C., either. Not that I'm advocating Kimmel's submission over the other entries: All five have their merits. (Nor am I advocating the outright demolition of the site's existing 1981 landscape by M. Paul Friedberg + Partners, with later plantings by Oehme, van Sweden & Associates.) But about this I am certain: It would be a shame—a mistake—to dismiss Kimmel's entry out of hand, to dismiss its inclusion on the shortlist as mere tokenism.

Traditionalist practitioners are sometimes subject to a quiet intra-professional prejudice, which serves no purpose. (Likewise, it doesn't help the classical cause when one of its outspoken champions employs scorched-earth P.R. tactics, as during the debate over the Eisenhower Memorial.) At ARCHITECT, we prefer to keep the conversation lively but civil, and whenever possible we publish traditional work of quality—as by Duncan G. Stroik, Hammond Beeby Rupert Ainge, and Robert A.M. Stern Architects.

I went to architecture school in the late '80s and early '90s. It was a fascinating time: a transitional moment, polemically speaking, when debate was rife. Neomodernists, postmodernists, deconstructivists, and high-church traditionalists all had a place at the table. Such a state of peaceful competition—*détente*, if you will—has always impressed me as optimal, the natural order of architectural discourse. Blindly enforcing orthodoxies benefits no one.

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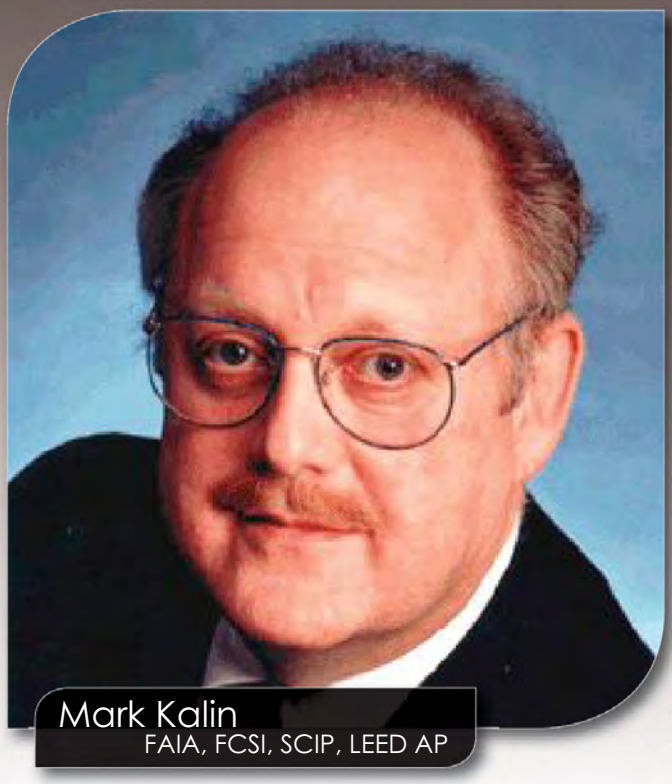

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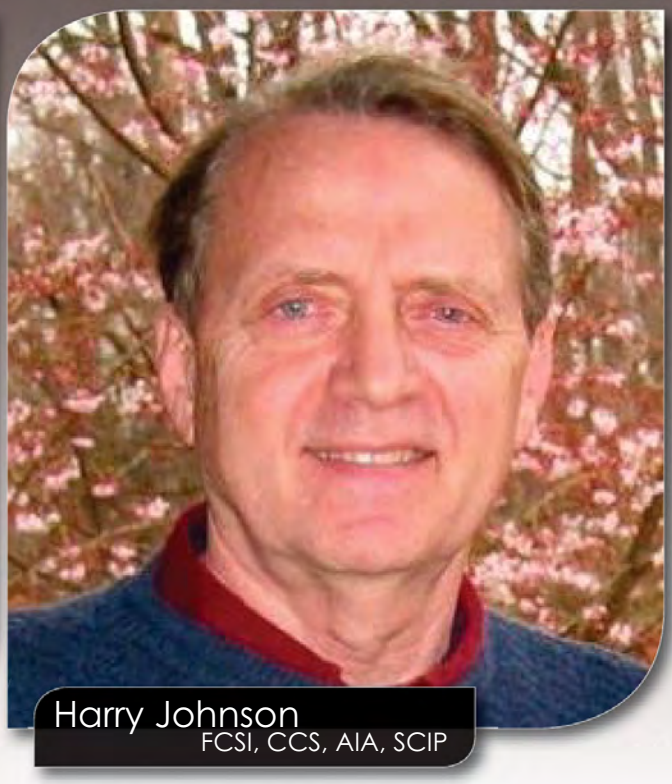

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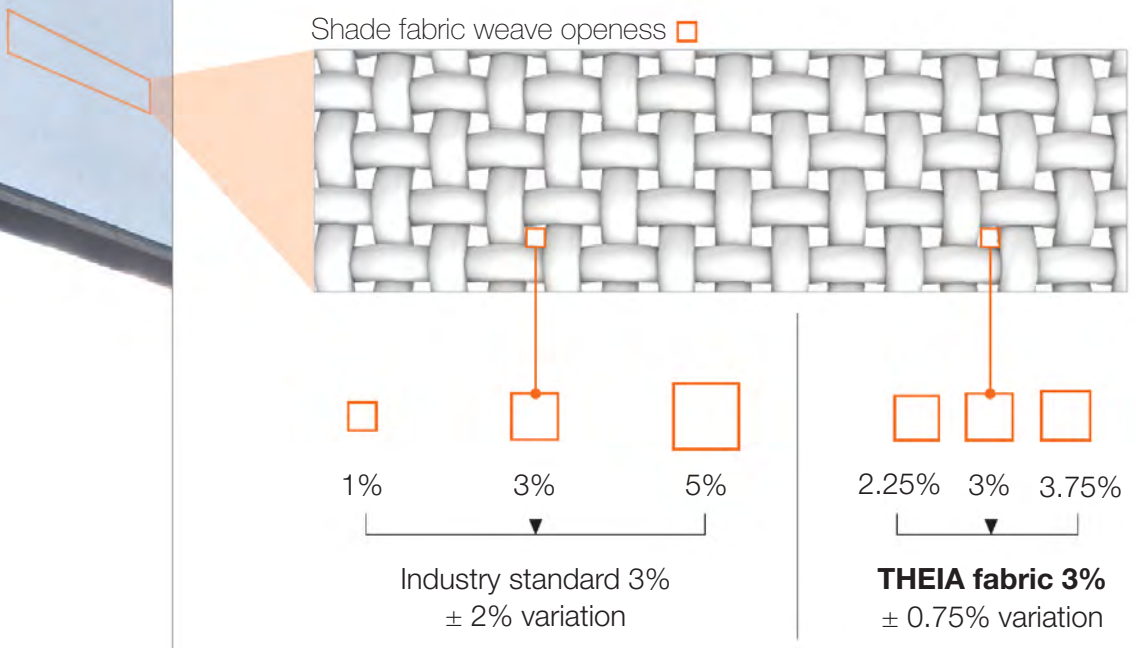

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