COMMERCIAL ISSUE

SPRING 2015

ASCENT®

DESIGNING WITH PRECAST

CONTINUING EDUCATION AIA

Designer's Notebook – Sustainability

- **Architect Profile: Rob Jernigan of Gensler**
- **Exceeding Nordstrom's Vision**
- **High Performance Office and Retail**
- **New Innovative Aggregates**

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EASTERN EDITION

NORTH AMERICAN Precast Concrete Sustainable Plant Program

PCI has joined other associations in the precast concrete industry to launch the NAPCSPP. The goal of the NAPCSPP is to reduce the environmental impact at the manufacturing level while advancing the culture of sustainability within the North American Precast Concrete Industry. This program allows plants to track environmental performance measures, monitor changes and improvements in performance, and enhance their environmental and economic performance.

Sustainability performance builds on the North American Precast Concrete LCA research already completed by PCI. As part of this program, facilities are required to submit confidential benchmark reports on a quarterly basis. The aggregated results of the program will be communicated to the public through the North American Precast Concrete Industry Sustainability Report.

For more information visit www.pci.org/napcspp.

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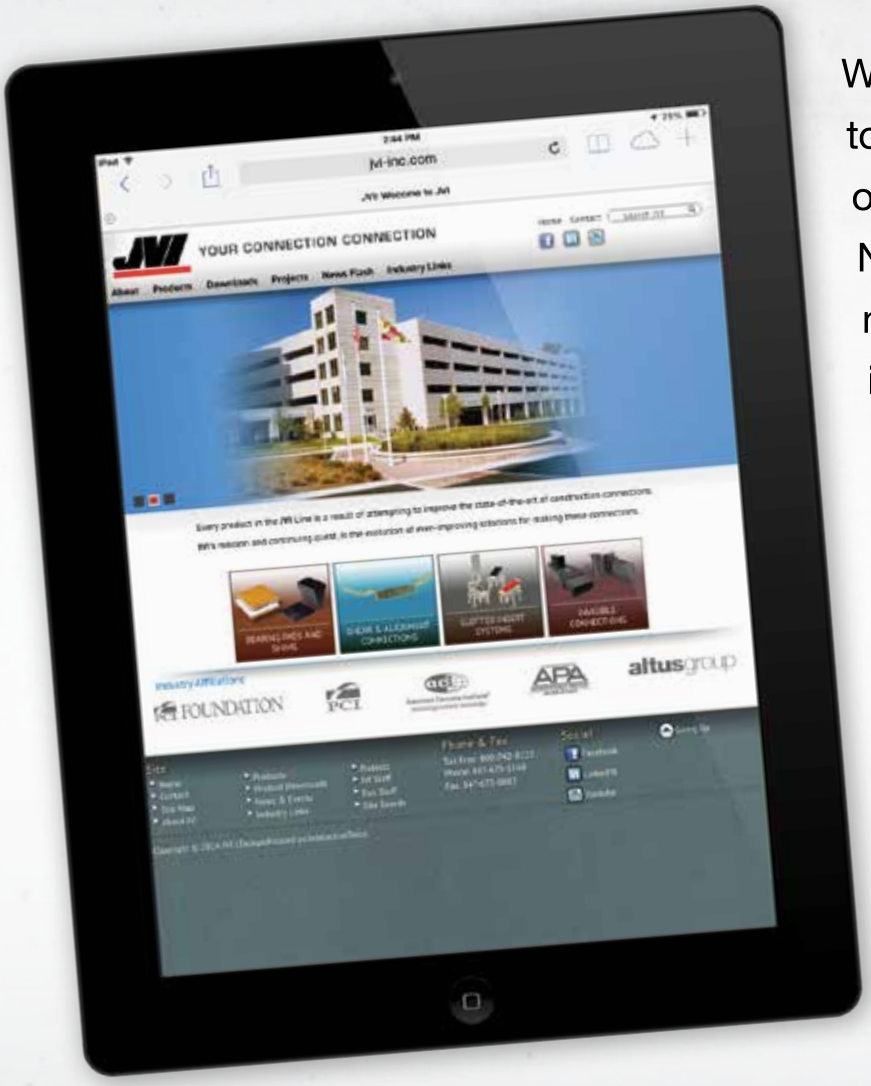

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Features

Office, Retail Rebound with High Performance Precast Concete

Designers exploit precast concrete's aesthetic versatility to respond to owners' needs as markets begin to grow again.

Teamwork Creates Recipe for Success

Owners, designers, and precasters work collaboratively to create a "total-precast" concrete office building that transforms a building into a carefully crafted business tool.


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Precast Surpasses Nordstrom's Vision

National retailer transforms its image with architectural precast concrete panels featuring multiple finishes, textures, and profiles, sometimes all within one architectural precast panel.


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Aggregate Innovation

New design mixes are expanding precast concrete's capabilities creating such innovative options as glow-in-the-dark designs, expanded colors, and translucent concrete.


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Ascent is a publication of PCI Precast/Prestressed Concrete Institute

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The Impact of Our Decisions

Have you ever thought about the true impact of your decisions? Often these are not fully understood until later in our lives. Some of these are seemingly small things at the time but can turn out to have a great influence on others and ourselves and may even define us.

I remember several years ago when I took a short business trip to Washington, DC. My son (age 14 at the time) begged to come along to visit museums, especially the Air and Space museum. It was a very busy time, but I decided to take the extra time to make a weekend of it. We had a really great time, visiting the Smithsonian, the Air and Space museum, and some of the monuments. He even asked me to show him some of the buildings I had built early in my career. Overall, the trip was more valuable to him and me than I could have imagined. We had great discussions, and I caught a glimpse of the man he would soon become. I didn't realize it then, but it would be one of the few trips he and I would get to take by ourselves. It helped define both of us and our relationship.

We often think about the *now*, and don't always realize the greater significance of our decisions, or their long-term impact. This applies to construction as well. What, and how we decide to build, will have a huge impact on others, society, and the environment for years to come.

When my son and I visited some of the projects I had built in the early '90s, I wondered: Who works inside these structures now? What do they do? How does the building affect them? Do they like the buildings? One project is an apartment building on Pennsylvania Avenue, which of course is constructed with precast concrete. It looked as beautiful today as it did back when we built it. I wondered if the people who lived in it felt as good about living there as I did about building it. A structure's aesthetic design is one of the things most people identify with. My son said, "This building looks really cool," and I realized one of the effects of what we had done.

A key part of that final impact comes from the materials we select. How will they withstand the test of time? How do they affect the indoor environmental quality? How do they affect the overall environment? As designers, these are some questions we must ask.

For example, when we select/approve combustible materials for a building's structural or enclosure system, we create additional future risk. From a fire-safety perspective, the industry has become more reliant on active fire-suppression systems. But structures made of combustible materials typically need extensive remedial work and often must be completely rebuilt after a fire event.

A similar result holds true for storm or high wind events. Most combustible construction is not resilient enough to withstand these types of storms. This lack of resiliency often requires additional materials to be harvested to rebuild structures, thereby increasing their impact on society and the environment.

The common practice of focusing on first costs, in the "now", can result in dramatic consequences later. High Performance design challenges us to truly optimize a structure based on its life-cycle costs. To be good environmental stewards, we should extend a structure's life cycle as far as possible. What will your structures look like in 20 years? Will they still make you proud? If there were a disastrous event, how will your structures fair?

Asking question like these can help bring to light how the decisions we make today will impact the future. With any luck, those decisions will ensure the next generation thinks the buildings you built were really cool.

ASCENT

On the cover: Nordstrom The Woodlands, Texas (see page 30). Photo: Connie Zhou/OTTO.

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- **POSTMASTER:** Send address changes to *Ascent*, 200 W. Adams St., Suite 2100, Chicago, IL 60606. Periodical postage paid at Chicago, IL and additional mailing offices.
- *Ascent* (Vol. 25, No. 2, ISSN 10796983) is published quarterly by the Precast/Prestressed Concrete Institute, 200 W. Adams St., Suite 2100, Chicago, IL 60606.

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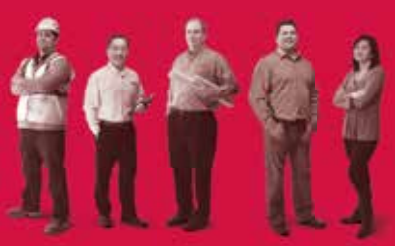

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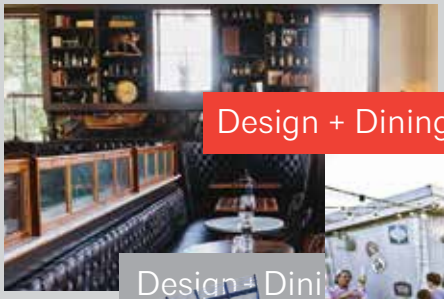

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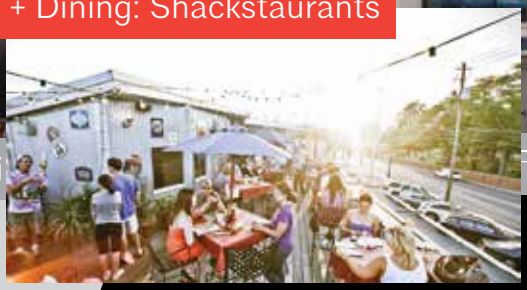

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Stresscon Project Earns NDRM&CPA Gold Star Award

DENVER, COLORADO

The CHI St. Joseph's Health Hospital & Medical Office Building has earned a Gold Star Award as the top project in the Commercial Building Category in the 2014 North Dakota Ready Mix & Concrete Products Association Gold Stars Awards Program (NDRM&CPA). The NDRM&CPA recognizes North Dakota projects for excellence in concrete and masonry design and construction.

The hospital project was submitted to highlight the use of architectural precast products, as well as high performance insulated wall panel systems accommodating high energy efficiency requirements. Located in Dickinson, ND, CHI St. Joseph Health's state-of-the-art facility includes a 25-bed critical access hospital with a level IV trauma center, and all clinic locations housed in one building. The project received the award based on the notable continuous insulation building envelope, complexity of architectural features, and the logistical challenges encompassed with shipping and erecting the precast pieces 670 miles from Stresscon's Colorado Springs, CO plant.

A collaborative design-build team including Davis Partners Architects, JE Dunn Construction, and Stresscon Corporation participated in creation of the 104,000 square foot facility. The precast components were erected over 26 days.

Stresscon provided 331 precast pieces, including the high performance thermally efficient precast wall panels for the project. The precast panels feature an acid etch surface, two colors, architectural banding, reveals, and protrusions. With edge to edge insulation, the wall panels achieve an R-value of 20, well in excess of the ASHRAE 90.1 requirements for all wall systems.

Capitol Towers – Charlotte, NC

CHARLOTTE, N.C.

Metromont Corporation is finishing up the new Capitol Towers in Charlotte, N.C.. The project was designed by the architect firm LS3P Associates, and is owned by Lincoln Harris Property.

The office building is a 10 level office tower erected with 430 pieces of precast concrete for a total of 85,000 square feet of precast. The project incorporated architectural cladding, an acid etched finish on the precast panels, and incorporated an additional 4,819 square feet of cast-in granite.

The parking deck that was included as a part of this build will include 1,600 parking spots. The structure is comprised of 1,411 pieces of precast for a total of 522,009 square feet of precast. This includes 114,637 square feet of field-topped double tees and 407,372 square feet of field-topped double tees.

Clark Pacific Selected to Build New Sacramento Kings Arena

SACRAMENTO, CALIFORNIA

West Sacramento-based Clark Pacific, has been awarded the contract by Turner Construction to deliver the precast scope of work for Sacramento Kings' Entertainment and Sports Center (ESC) in Downtown Sacramento. Clark Pacific's contract for the new arena includes stadia for the lower and upper bowls, suite-seating areas, entrance/exit walls, and cast-in-place steps on the stadia. The new ESC is projected to cost $477M, seat 17,500 guests and plans call for it to achieve LEED Gold Certification. The new arena is slated to open in September of 2016.

"We are excited and very proud to be part of this important Sacramento project that will be a great economic driver for the whole region," said Don Clark, president for business development of Clark Pacific. "We are especially proud to be working with Turner Construction on another iconic project that is a testament to the dedication of local leaders who have helped drive the vision for what is possible for this City."

In the stadium, there will be close to 700 pieces of precast. Typical panels are 30-38' long and weigh up to 23,000 lbs. There will be over 1000 concrete steps on the project as well.

When complete, the redevelopment project will cover four city blocks in the heart of downtown Sacramento and serve as a major catalyst to revitalize the area. In addition to the arena, which will be a multi-use facility containing a state-of-the-art practice facility and administrative offices, the project will have 1.5 million square feet of additional development: 475,000 square feet of office space; 350,000 square feet of retail; a 250-room hotel; and 550 residential units.

Major Expansion for Martin's Famous Pastry Shoppe Campus

CHAMBERSBURG, PENNSYLVANIA

Nitterhouse Concrete Products is completing erection on the 155,000 square foot bakery and warehouse facility for Martin's Famous Pastry Shoppe. This addition is being constructed entirely of precast concrete components produced by Nitterhouse Concrete Products. Structural components include: precast concrete columns, beams, slabs, stairs, and integrally insulated wall panels. While the insulated panels are manufactured in a light tan exterior; all interior components are white concrete with a unique, smooth finish; minimizing maintenance and never requiring painting. Erection required a total of 80 days, and utilized a 300 ton crane setting 947 total precast components.

The project was designed and engineered by the full service Chambersburg architectural firm, Newcomer Associates, Architecture + Engineering. This project is the eighth major addition to the Martin's facility and each addition has been constructed using precast concrete. Precast concrete was selected for the wall panels because of its durable concrete finish on both the inside and outside faces. All inside surfaces are white concrete, which was hand-rubbed to obtain a USDA food safe finish. The expected date of completion for the entire project is projected for August 2015.

Gate Precast Co. Adds to Hillsboro Staff as Southwest Business Grows

HILLSBORO, TEXAS

Michael Trosset

Trae Morton

Michael Campbell

Gate Precast Co.'s Hillsboro, Texas, office has added three new team members to support a period of steady growth in the company's Southwest Region. Michael Trosset is the new Southwest Division sales and marketing manager, while Trae Morton and Michael Campbell have joined the Estimating Department. The appointments continue a pattern of growth at the Hillsboro facility.

"These individuals provide us with a young, dynamic team that will give us the longevity we need as we grow our business in the Southwest region," said Jim Lewis, Gate's director of Architectural Systems. The new team members will operate in the vibrant markets of Texas and Oklahoma, where the Hillsboro office has provided design-assist collaboration on such high-profile projects as the Perot Museum of Nature and Science in Dallas, Nordstrom store in The Woodlands, Texas, and Cook Children's Medical Center South Expansion currently under construction in Fort Worth.

New AltusGroup tech brief outlines precast wall sustainability benefits

BETHLEHEM, PENNSYLVANIA

AltusGroup, a North American network of 19 precast concrete manufacturers, several International Affiliates and select Innovation Partners has published a technical brief outlining how insulated precast wall systems provide a sustainable exterior envelope solution by allowing buildings to reduce energy usage and costs.

The brief also discusses the resiliency benefits of the concrete enclosure systems. Precast concrete -- and specifically CarbonCast technology featuring carbon fiber grid wythe connectors -- is designed to withstand harsh weather and remain durable over time to extend the product's lifespan. This, along with sustainable manufacturing practices, can reduce a building's carbon footprint while enhancing long-term cost effectiveness.

The five-page PDF also highlights the evolution of building standards such as the U.S. Green Building Council's LEED (Leadership in Energy & Environmental Design) certification and Green Globes International (GGI) and how they influence product selection.

Six other AltusGroup technical briefs are available on topics including insulation, thermal performance and designing for educational applications.

Spancrete Opens Facility in Georgia to Serve Southeast

WAUKESHA, WISCONSIN

Spancrete®, expanded its Southeastern Operations by opening a new production facility in Newnan, Georgia, in January of 2015. This new facility provides service to the entire Southeast with industry-leading building solutions, including the Spancrete Wall Panel Building System.

In addition to offering premier precast structural and architectural concrete products, Spancrete also provides personalized, expert guidance throughout the entire construction process to ensure projects are completed on time, on budget and to high standards of quality. The new Spancrete facility offers Spancrete Hollowcore Floor and Roof Systems, Spancrete Insulated and Non-Insulated Wall Panel Building Systems and solid plank and stair components.

To celebrate this expansion, Spancrete celebrated the Grand Opening of their Newnan facility this week. The event included tours of the plant, education sessions, speeches from Spancrete and government officials, and an official ribbon-cutting ceremony. Attendees included several officials from Newnan and Coweta County, Spancrete Chairman and CEO John Nagy, and over 100 registered architects, engineers and general contractors.

Pictured from Left: Greg Wright/Coweta County Development Authority, Sarah Nagy/Spancrete, John Nagy/Spancrete, Al Antoniewicz/Spancrete, and Candace Boothby/Newnan-Coweta Chamber.

Owell Precast Becomes Olympus Precast

BLUFFDALE, UTAH

Following nearly a quarter century of success and measured growth the owners and management of Owell Precast have chosen Olympus Precast as the new name of their precast concrete manufacturing facility.

Owner Bill Ashton commented, "The change of the corporate name is an exciting and important milestone in the history of our company, and just part of the company's expanded corporate focus in response to market forces. I see the Olympus Precast name as a powerful catalyst for continued progress and growth."

Inspired by the immovable Mount Olympus, the name reflects Olympus Precast's bold commitment to quality, safety and integrity.

Submit your headline news for consideration in a future issue of *Ascent* to Stephanie Corrigan at scorrigan@pci.org.

Precast Contributes to Net Zero Goals on the National Renewable Energy Laboratory Campus – Past, Present, and Future Innovator of Sustainability

— Stephanie Corrigan

The Energy System Integration Facility in Golden, Colorado used high performance precast concrete to help meet their Net Zero goals. Photo: Dennis Schroeder, NREL.

Sustainability has been a hot topic issue for years. In the United States and around the world consumers are demanding sustainable products and "green" production processes. The US government has dedicated resources to developing improved processes and systems to create innovative solutions to today's sustainability needs and goals. Much of this work is done at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) campus.

The NREL is a 327,000-acre campus located in Golden, Colorado. According to their website, the NREL is dedicated to developing "clean energy and energy efficiency technologies and practices, advancing related science and engineering, and providing knowledge and innovations to integrate energy systems at all scales." The mission of the organization goes beyond the research performed in the laboratories. It actually begins with the design build process for the buildings that make up the campus.

– Stephanie Corrigan, MBA is Manager, Communications at the Precast/Prestressed Concrete Institute.

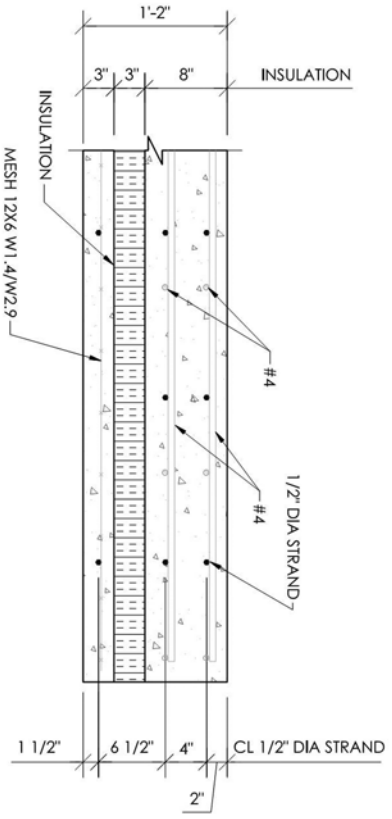
The NREL has experienced rapid growth in recent years resulting in the need to commit $400 million in new construction over the last five years. The building requirements for their expansion projects start with the Advanced Energy Design Guide from ASHRAE, and focus heavily on creating the most energy efficient buildings possible. As an organization dedicated to advancing clean energy and energy efficiency, it is important that their own buildings represent best-in-class examples. One building on the campus, the Research Support Facility (RSF), did achieve net-zero for the 2013 – 2014 year.

Energy efficient buildings require attention to many areas, one of the most important being a building's enclosure system. Thermally efficient enclosures require continuous insulation, along with the minimization of thermal bridging and management of air and moisture. Another key property that can be used to greatly improve energy efficiency is thermal mass. This is primarily available when using cementitious-based systems such as precast concrete. Concrete has a high heat capacity, which means it can store heat energy and then slowly release it as needed. This offsets large temperature fluctuations, and helps reduce the energy needed to maintain the interior temperature at a desired level, thereby also reducing the overall energy consumption of a building. According to Shanti Pless, Senior Energy Efficiency Research Engineer with NREL, the design-build team chose precast concrete as part of their high performance enclosure system for the recent RSF and Energy Systems Integration Facility (ESIF) projects, to meet energy efficiency goals.

Energy Systems Integration Facility

When a new structure is in the design phase, the team at NREL builds off experiences learned from past projects. The most recent facility built on the campus is the ESIF, in which precast concrete was used throughout.

The goal of the ESIF is to provide transformative capabilities to advance our nation's energy system into a cleaner, more intelligent infrastructure. It is the first facility in the nation to help public and private sector researchers with clean energy



Prestressed, insulated walls were provided on the perimeter of the structure to accommodate the high thermal performance requirements of the laboratory building. Material is 14" (8+3+3) and 16" (10+3+3) structural gray concrete, sandwiching 3" of insulation, providing an effective R-value of 28.4 for the building envelope.

technologies[1], and is the only national laboratory dedicated solely to energy efficiency and renewable energy[2].

The ESIF is used by commercial, governmental, and academic researchers to develop new technologies and to integrate these into the nation's energy system[5]. The facility supports more than $13 million in Department of Energy research performed in six departments: EERE Fuel Cell Technologies Office; EERE Solar Energy Technologies Office; Buildings Technologies Office; EERE Vehicle Technologies Office; EERE Wind and Water Power Office; and Office of Electricity[5].

Green Design Build Process

When developing specifications and designing the ESIF, it was important for the team to consider energy efficiency throughout the design build process and the resulting structure. Building a high performance building is important to the overall ESIF brand. According to Brian Larsen, Principal Project Leader with the Alliance for Sustainable Energy, LLC, the campus needs to be a "living model of sustainable energy." With that in mind the project was designed to be a net-zero building.

The high performance precast concrete enclosure had an effective R-value of R-28.4. Photo: Dennis Schroeder, NREL.

The design build team, which consisted of Martin/Martin, Inc., JE Dunn Construction, and Smith Group JJR , incorporated sustainable design practices throughout the build process including recycled materials, skylights, windows for cooling and ventilation, and solar powered fans[1]. They also utilized Building Information Modeling (BIM) throughout the design build process.

The 182,500 square feet structure was completed in 2013 and consists of 34-feet tall high-bay laboratories; 204 office spaces; 1,190 teraflops of high performance computational capability; and cost a total of $134.96 million.

The structure is certified LEED Platinum and achieved all of the 56 LEED points that it applied for. The building is rated at 46.2% more energy efficient than the baseline and projects an estimated $1 million in annual operating cost savings, including $200,000 in thermal energy savings from reusing the waste heat from the high performance computer data center to heat the ESIF building.

High Performance Precast Concrete

According to Larsen, precast concrete best met the performance specifications. The aesthetic versatility of precast helped create a look that integrated well with the campus style and the environment. It also met cost, schedule, and performance needs, especially from an energy reduction perspective.

Larsen went on to say that precast was a great option because it results in fewer issues compared to other building material options. He described precast as "highly reliable." Due to its reliability, it was used for a number of elements on the structure including insulated wall panels, floors, and ceilings. In total, 876 pieces of precast were used throughout the structure.

A portion of the enclosure system consisted of high performance precast concrete wall panels that contained three-inches of integral, edge-to-edge insulation. This provided a material R-value of 20.5 and an even higher effective R-value 28.4 which helped ESIF achieves an energy performance 40 percent greater than the ASHRAE 90.1 building standards baseline building. Stresscon, the precast manufacturer, won an Award of Excellence for Precast Concrete from the American Concrete Institute for this project[1].

The continued growing relevance of sustainability for consumers, professionals, and policy makers enforces how critical it is for the design community to consider all aspects of green building when developing projects. The achievements of the ESIF design build process and the research it continues to develop, is paramount in continued progress for energy efficiency in our nation and the world.

Sources:

1. Stresscon press release: http://www.enconunited.com/pdf/Stresscon%20Project%20Wins%20ACI%20Award.pdf
2. Brian Larsen's Power Point
3. http://www.nrel.gov/news/press/2014/10330.html
4. http://www.nrel.gov/
5. ESIF Annual Report

For more information on these or other projects, visit www.pci.org/ascent.

"High Concrete Group's involvement during design was key to the success of the precast work on this project."—Eric Marin, Ross Barney Architects

HOUSE FOR ENERGY

The Ohio State University's new ten-story chiller plant uses precast concrete panels with a series of openings that allow a view inside, while keeping the interior temperature consistent and the energy use regulated. The plant building is more than just a concrete box with openings however. Conceived of as a "House for Energy," the envelope showcases the energy-efficient chiller equipment inside and records the sun's energy on the exterior. The building features high-polish finished precast concrete panels and "fins" of glass, which cast colored light rays across the concrete surface. The result is a dynamic facade that changes with the time of day, season and the location of the observer.

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Maximizing Benefits of Precast Concrete

Gensler's Rob Jernigan has studied precast concrete throughout his career, with the goal of maximizing its functionality and pushing its limits to achieve creative designs

— Craig A. Shutt

Rob Jernigan, FAIA

The 22-story tower on the Elihu M. Harris State Office Building in Oakland features inset windows framed by precast concrete pilasters to blend with the architectural character of the neighborhood. Upper stories are clad in textured precast concrete panels. Photo: Nick Merrick, Hedrich Blessing

Rob Jernigan built his 36-year architectural career by fusing great design with technical excellence, including many designs utilizing precast concrete. He has worked with the material since his earliest days, exploiting its capabilities in many ways, on many building types in many cities. Through that experience, he has developed an appreciation for what it can achieve. That appreciation leads him to continue to push its limits and look to maximize the benefits it can provide.

"I'm an architect who has developed professionally with a very strong belief that buildings have to have great design, which means they have to be highly functional as well as aesthetically pleasing," he explains. "When we pick materials, we want them to meet our aesthetic-design requirements but do more than that, especially if they can provide some structural qualities. I look at precast concrete not just as a finish material but as a material that should be able to provide some structural functions to the building."

In his role as regional managing principal for the Southwest region at Gensler, Jernigan evaluates projects from a larger perspective. He reviews systems, independencies, and interconnectedness, considering budget needs, building performance, the environment, and other factors. He oversees an 812-person staff designing buildings across a wide range of environments, with offices in San Diego, Newport Beach, Los Angeles, Phoenix, Las Vegas, and Denver.

Throughout every project, he keeps in mind four key points: "I'm concerned with how the building looks, if its design maximizes its material use, how well it functions for the clients' needs, and how it will look over the long term," he says. "We have to use materials in creative ways so they hold their value while maximizing their aesthetic and functional capabilities. I'm always striving to find fully integrated solutions."

Started in Houston

Jernigan began his career in Skidmore, Owings & Merrill's Houston office in 1979 after graduating with

Precast concrete components used on the East Campus Office Building on the campus of the University of California-San Diego helped reduce the budget by serving as both the cladding and the structure. Photo: Ryan Gobuty / Gensler.

a five-year professional degree in architecture from the University of Tennessee. He'd hoped to land a job in his hometown of Atlanta, "but firms there weren't beating down our doors to get graduates at that time." Whereas Texas markets were so hot he received several offers in Houston and Dallas and selected SOM.

"Texas is concrete country, both cast-in-place and precast concrete," he says. "My introduction came via office buildings with parking structures galore. We did a lot of them at SOM using precast concrete." Finishes ranged from inset stone to exposed, sandblasted styles. "One benefit of precast concrete panels is that they can span column to column, so we were only load the columns and not the floor structure," he explains. "And it's such a plastic material that we can design any shape, texture, shade and shadow we wanted, creating many finishes from the same material."

In 1988, he moved to Los Angeles, along with 50 employees, when SOM closed its Houston office. Two years later, he opened his own firm, Keating Mann Jernigan Rottet (KMJR) in L.A. Ironically, its first two major commissions came from Houston: the British Petroleum Plaza and the BMC Software Software Headquarters. Both 20- to 25-story buildings were designed with architectural precast concrete panels on cast-in-place concrete frames with precast concrete parking structures. "Those were designed in similar ways, but they had very different looks," he explains. "They're an indication of the range of options available while using the same materials."

One of his first major projects to showcase the benefits of precast concrete was the British Petroleum Plaza, in which Jernigan designed 13'6" precast concrete panels with punched openings. "We popped aluminum-framed windows into those and they were done," he explains. "That made me realize the potential for using precast concrete, and I began looking at facades and how they could work for clients."

A key reason he favors precast concrete, he notes, is the level of quality control. "It's a great material because you can control the aesthetics and be sure you'll get the quality you want," he explains. "If you cast a panel that doesn't turn out for some reason, you cast another. If you pour cast-in-place concrete on a day when something isn't right, you're stuck."

Seismic Challenges

In Los Angeles, he found new design challenges. "The high seismic zone creates issues that caused us to use steel versus concrete for the primary structure frame. We try to design precast panels so they can be utilized in the lateral frame of the primary structure."

The Broad contemporary art museum in Los Angeles features a complex GFRC latticework designed by Jernigan and Gensler. The material allowed for great variation in pieces without the weight that other options would have required. Photo: Iwan Baan

He continues to evaluate ways to maximize precast concrete's use in seismic situations, he notes. "I desire to get double duty out of any material. By using precast concrete, we are able to get both, an exterior skin and a lateral frame that is required in higher seismic zones."

In 1994, KMJR was acquired by DMJM/AECOM, and Jernigan ran the architectural division at its Los Angeles office. During that time, he was involved in the design of the 22-story Elihu M. Harris State Office building in Oakland, which features precast concrete architectural panels. "It's a very prominent use of the material that worked effectively for a state government building because it is very durable and requires minimal maintenance."

Jernigan joined Gensler four years later, where he created and led the Buildings & Campuses design studio. He later became the leader of the L.A. office before being named regional managing principal. Throughout this time, he says, one of his goals has been to find new opportunities to utilize precast concrete in innovative ways: "I keep exploring how to gain more function from precast concrete than just dead load."

One recent example was the University of California at San Diego East Campus Office building, where the precast concrete panels helped to reduce the budget by serving as both the cladding and the structure. "We were able to reduce the amount of glass or skin on the building because the precast structure is exposed and is 40% of the exterior."

Geography Impacts Design

In his regional position, Jernigan sees the diverse styles that geography, environment, architectural history, and other factors play in a project's design. Phoenix's desert climate, for instance, plays well to precast concrete's strengths. "Precast concrete's thermal mass can absorb the heat in Phoenix during the day and radiate it at night, cutting energy needs." The same goes for Denver, except it has wider mid-range temperatures, including freeze-thaw cycles that must be handled. "Regardless of how harsh the climate is, we find that precast concrete stands up well over time."

In California, Jernigan's attention has turned to the benefits offered by glass-fiber reinforced concrete (GFRC), due to the capabilities for dimensional depth and plasticity with less weight. "By providing a shaped back rather than filling it with concrete, the pieces provide the versatility of precast concrete's aesthetics and can provide dimensional relief and shape while also being substantially lighter. It gives us more flexibility in creating forms, geometry and shape."

His studies led to the design of the complex GFRC latticework on The Broad in L.A. "We originally looked at using reinforced concrete on the façade that would also support the roof," he notes. "But the amount of penetration that could be structurally allowed onto the frame proved to be much too small. Then we looked at traditional precast concrete panels, but they would have been limited in size, which would have boosted the number of forms required due to the volume of pieces we needed to cast. GFRC allowed us to create more variation in pieces without the weight from the precast concrete."

The use of GFRC will grow especially in high seismic zones, he predicts. "Due to the increased use of 3D modeling in our design process we're seeing the ability to complete complex structures, as a result that's reflected in the designs. For that reason GFRC is a great material – it's lightweight, plastic and can form to any shape."

Owners are an easy sell on the use of precast concrete, he adds. "Owners love precast concrete. They understand its versatility and how it can create a design is durable and relatively maintenance free when compared to other building cladding materials.

Precast concrete's flexibility means Jernigan expects to be designing with it throughout his career. "The beauty of precast concrete is its versatility. And the best thing about it is, if you're clever with how you design, you can achieve two things with it. You can get a very strong, time-tested material as well as a material that has some structural qualities."

For more information on these or other projects, visit www.pci.org/ascent.

Gensler's gServe Aids Community

Among Jernigan's favorite duties is leadership of the firm's gServe program, short for Gensler Service. It encourages employees to volunteer for community-service efforts ranging from pro bono project design to volunteering at local organizations and litter clearing.

"We as architects have to be an important part of our community, and that goes beyond design," he says. "We believe we improve the world through design, but being in the community just as a designer isn't enough."

Fortunately, the program receives a great response at Gensler. "The new generation coming up is very service-minded, and they're committed to giving back."

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Office, Retail Rebound with High Performance Precast Concrete

Designers exploit precast concrete's aesthetic versatility to respond to owners' needs as markets begin to grow again

— Craig A. Shutt

The office and retail markets are on the rebound from the recession that curtailed activity beginning in 2008. Both segments—and the mixed-use projects that combine both—are growing, with clients needing new spaces quickly. As more projects get underway, designers are discovering how high-performance precast concrete components help them meet an array of functional and aesthetic challenges on tight deadlines and budgets.

High Performance precast concrete provides an array of benefits to these projects, including the capability to span long distances that provides flexibility for layouts and inherent fire resistance that saves time and material, leading to lower costs. The fast speed of erection ensures deadlines will be met for moving into new spaces or opening stores to generate revenue. Precast concrete's aesthetic versatility ensures any design style can be achieved, from a contemporary look that stands out to more traditional appearances or aesthetics that match the surrounding office or retail environment.

The following examples of offices, retail spaces, and mixed-use buildings show some of the creative ways precast concrete systems are being used to meet the challenges of building cost-effective, aesthetically pleasing, highly functional, high performance buildings.

Park Place

Park Place in Leawood, Kan., features upscale retail, restaurant, residential, and office spaces. The most recent phase of construction added upscale mixed-use office and retail tenants in two buildings. Both had to blend with the existing buildings' appearances while creating a distinctive look of their own that would attract tenants and shoppers.

'Schedule was a key reason we chose precast concrete for the façade cladding.'

"Schedule was a key reason we chose precast concrete for the façade cladding," says Gary Schuberth, principal with Opus AE Group LLC, the architect on the project. "We had a tight timetable, and precast concrete, with its capabilities for incorporating thin brick and decorative reveals, gave us the desired exterior design to meet our demanding schedule. A built-up system of metal sheathing and field-laid-up brick would take more time, and installation could be affected by weather and temperature. Because the precast system ensured we could get the buildings enclosed faster, this speed of construction allowed the interior finishes to also be expedited over a more traditional wall system."

Aesthetics also were a major factor, as the designers wanted to project a "New Urbanism" architectural style that was rich in detailing. "Earlier buildings in the complex had this styling, and we wanted to complement it," he explains. "It was a fairly traditional but ornate look, and our goal was to replicate that in an economical way."

The predominance of masonry and decorative elements in those buildings led to the use of embedded thin brick as well as textures cast with formliners, acid-etched finishes, medallions, projections, and cornice work. "There was a time crunch to meet the tight schedule," says Dirk McClure, regional director of sales and business development for Enterprise Precast Concrete Inc., which fabricated the panels. "The Opus design team knew the look they wanted going in, so we began talking about specific textures immediately."

The goal for the first structure to be built, the office building, was to create a strong focal point for the center. The building was sited at the terminus of one of the main pedestrian retail streets and became the only free-standing building linked to the shopping district. "This building was envisioned to capture and continue the high level of detailing and ornamentation established with the buildings already constructed in the development," explains Schuberth.

Thin brick in four colors cast in different brick patterns replicates the masonry look on other buildings and provide textural detail. A combination of sandblasted and acid-washed textures work with a variety of dimensional reveals to vary the appearance of the building from one portion to another. Decorative precast concrete medallions in a chevron pattern were applied to each column, providing a higher level of detailing and visual texture at the pedestrian retail level.

Blending In

Constructed immediately after the office building, the nearby mixed-use building was sited to continue a group of mixed-use buildings along one of the main pedestrian retail streets. That created the need to

relate to existing building architecture, Schuberth explains. "This building was envisioned to capture and continue the high level of detailing and ornamentation established with the buildings already constructed within the Park Place development."

The building needed to be articulated to create strong visual interest and texture. This goal was achieved by breaking the façade into three differentiated parts to continue the scale of the "zero lot-line" construction in the development, says Schuberth. "Each portion of the façade has a distinct style created through the selection of different brick, precast finishes, and applied and integrated detailing."

Exposed areas also received a combination of sandblasted and acid-washed textures along with dimensional reveals to provide depth and variations. Bold cornices provide strong shadow lines and dimension to what is essentially a fairly simple, flat façade. Ornamental metalwork was added for awnings, infill railings, and for medallions attached to the precast panels.

'The mockup-review process was very efficient to reach approval on the final look.'

The brick colors were chosen for contrast and style, not to match exactly with other brick used in the complex, notes Schuberth. "The use of brick was important, but matching specific colors wasn't critical. The mockup-review process was very efficient to reach approval on the final look." The architect visited the plant during fabrication of the panels to ensure quality control but no adjustments were needed. Four, 4- by 4-foot panels were produced for final approvals, adds McClure. "Reviews were handled both in the plant and at the job site to ensure the required quality was being achieved."

The panels with inset brick were cast with a white backing mix rather than a traditional gray one, McClure notes. "They invested a premium for the white concrete mix, which allowed the appearance of pure white

Park Place in Leawood, Kan., used architectural precast concrete panels in different design styles to complement yet differentiate two new buildings in a large upscale mixed-use complex consisting of retail, restaurant, residential, and office spaces. Schedule and aesthetics were key drivers for selecting precast concrete panels. All photos: Dirk McClure of Enterprise Precast Concrete, Inc.

PROJECT SPOTLIGHT

Park Place
Location: Leawood,Kan.
Project Type: Office and mixed-use buildings
Size: Building J: 65,000 square feet; Building F: 61,000 square feet
Designer/Engineer: Opus AE Group LLC, Kansas City, Mo.
Owner: Park Place Developers LLC, Leawood, Kan.
Contractor: Opus Design Build LLC, Kansas City, Mo.
PCI-Certified Precaster: Enterprise Precast Concrete Inc., Omaha, Neb.
Precast Specialty Engineer: Enterprise Properties, Omaha, Neb.
Precast Components: 526 architectural precast concrete panels (316 for Building J, 210 for Building F).

joints that caused the red bricks to really pop." Corner detailing also received added focus, creating return pieces to replicate the look of inlaid brick without a notable joint line. "Enterprise did a good job of detailing these pieces in an economical way to create the appropriate look," says Schuberth.

The site was restrictive, with other retail and office activity around the construction. The west façade of the office building was sited on a zero lot line, and the use of precast concrete panels allowed the façade to be constructed more efficiently with little lay-down area required and in a minimum amount of time relative to a more traditional scaffolded approach that would've been required with metal studs and laid-up masonry, Schuberth says. The precast concrete design also allowed for wider ground-floor openings in the façade, which created more flexibility for storefront design, creating versatility for future retail tenants.

The schedule was tight and unyielding, notes Schuberth. "Both buildings were fully leased as of a specific due date, and we had to meet that deadline," he explains. "The tenants were leaving the buildings they were in and had to be able to move into their new spaces by that day." Fabricating all the various elements into the precast concrete panels and erecting them quickly so interior trades could begin work ensured the tight schedule could be met.

The result of this attention to detail and leverage of precast concrete's attributes was two buildings with distinctive looks that opened on time and on budget. "These were challenging jobs," says McClure. "The appearance had to be highly articulated, the schedule was aggressive and the budget was relatively tight considering the level of detail required. Enterprise likes challenging jobs, and the entire project team really rose to the occasion. To construct the building in a more traditional manner would have made meeting these goals an even more complicated and expensive undertaking."

Adds Schuberth, "Precast concrete allowed the building team to work creatively with the precaster to integrate masonry, detailed metalwork, and dimensional exposed

concrete. This integration of materials into precast concrete panels created a savings in schedule, labor, and cost while providing a high level of quality. It also provides a highly durable building with much less maintenance."

La Maison Simons

While precast concrete frequently is specified to replicate the look of traditional masonry and fit into existing campuses, it also can strike out in bold new directions, creating contemporary designs that offer visual excitement and attract attention. Such was the case at La Maison Simons, a long-established department store in Quebec that was looking to update its image and project an upscale, futuristic look.

To achieve this goal with its new 110,000-square-foot store in Ville d'Anjou, Quebec, designers use architectural precast concrete panels cast with a regular pattern of recessed dots fit with fiber optics across the façade that illuminate colored disks inside the recesses, changing the look of the building during the day and night.

Founded in 1840 in Quebec City, Simons opened its first store in Ville d'Anjou in 1870, where its headquarters remain. With eight stores across Quebec and one in Alberta, the chain is embraced by the area as a family-run success with a trademark green color announcing its brand. "Simon stores have always distinguished themselves with unique and exclusive architecture," says Philippe Blais, architect at Lemay Michaud Architecture Design.

For this store, he says, "We wanted to create a minimalist building with a unique texture. We achieved just that with the sleek, white concrete surfaces and the impact of the fiber optics." The fiber optics were embedded in approximately 2,350 of the circular recesses cast into the architectural precast concrete panels. The recesses, ranging in depth to 1 ½ inches and evenly spaced over the panels' facing, vary in diameter, with each change in depth, size, or alignment requiring a new mold.

"The challenge was to keep the project both economical and interesting for the client in the pursuit of his original design," explains Guy Tremblay, technical director with Bétons Préfabriqués du Lac Inc. (BPDL), the precaster who fabricated

La Maison Simons in Ville d'Anjou,Quebec features architectural precast concrete panels cast with a regular pattern of varying-depth recessed dots fit with fiber optics that illuminate colored disks inside the recesses, changing the look of the building during the day and night. All photos: ©Marc Cramer.

PROJECT SPOTLIGHT

La Maison Simons
Location: Ville d'Anjou, Quebec
Project Type: Retail
Size: 110,000 square feet
Cost: $28 million
Designer: LeMayMichaud architectural design, Quebec, Quebec
Owner: Cadillac Fairview, Ville d'Anjou, Quebec
Structural Engineer: WSP, Quebec, Quebec
Contractor: Construction Albert-Jeand, Montreal, Quebec
PCI-Certified Precaster: Bétons Préfabriqués du Lac Inc., Alma, Quebec
Precast Components: Architectural precast concrete panels in a variety of heights with integrated fiber optics.

the 138 insulated panels, each with about 600 recessed circular block-outs.

"The concept of the store offers an immersion into the world of Simons, its clothing, fashion, glamour, and elegance," explains Blais. "In contrast to its context, the building's architecture is intended to be dazzling and refined while being evocative of the brand's image and vocation. The perception of the store's design is meant to be simple and obvious. The building emerges from the site in the form of a white and green volume, two contrasting colors which serve one another to reveal themselves."

The bright white of the panels symbolizes "purity and elegance," he notes, while the green replicates Simon's brand color. "The use of insulated precast concrete panels allowed the exploration of a texture consisting of points distributed uniformly over the entire façade." The goal was to reflect the patterns found in fabrics or leather clothing and haute couture.

Recessed Disks Sparkle

Approximately 27,000 square feet of the façade were clad with the recessed, decorative panels, which were cast 9'-9" wide in varying heights. A white concrete mix with a light sandblast was used, creating a stark contrast with the fiber optic illumination. Each recess had a painted aluminum disk, featuring a color gradient moving from dark green to white, affixed to its base. The disks are illuminated by the fiber-optic lighting in various computerized combinations of intensity. The recesses are slightly angled on the perimeters to allow draft in the formliner to eliminate suction that would have created difficulty in releasing the panels from the mold as well as to create water outflow when installed.

The panels emphasize the placement of two asymmetric entrances as well as a cantilevered display window that attracts the attention of passersby. At these locations, the dots' diameter is enlarged and the depth gradually decreases. The color gradients continue onto green silkscreened glass, going from opaque to transparent, revealing the interior of the store. The white and green appearance during the day gives way to the illuminated, dotted pattern at night. "The building changes to wear its evening garments," Blais explains.

'The precast concrete patterns not only met the elaborate decorative needs but provided energy efficiency and cost effectiveness, as well as improved durability'

The precast concrete patterns not only met the elaborate decorative needs but provided energy efficiency and cost effectiveness, as well as improved durability. "We wanted to cut down the budget and the schedule for the exterior wall construction, which is why we chose precast concrete insulated panels," Blais says. "The sandwich wall panels resulted in a very economical and easy-to-implement building envelope. It allowed the start of construction on interior systems earlier in the construction schedule."

The designers worked closely with the precasters to maximize the use of each formliner, he notes. New molds were needed for each change in depth or alignment, with the fiber optics woven into the panels during casting. "The design of a simple and repetitive motif limited the number of formliners required," he says.

The erection process took four weeks with the high performance precast concrete panels combing insulation, air and vapor barriers into one efficient system. Other exterior wall systems typically require building multiple components on site. "That is normally done on-site prior to the exterior-cladding installation, which is more expensive and takes more time than work done at a plant," Blais notes. "By using precast cladding, the only work that was done on-site was the precast panel installation."

The close teamwork on the project created a dramatic, innovative design that attracts attention to the retail location both day and night while retaining the elegant, contemporary appearance that the owners wanted to project. "The plasticity and the smooth white finish of the material enabled the design of a unique and exclusive image for the Simons brand," Blais says. "Everybody is talking about the glittering façade."

Summit Executive Center

Precast concrete helped transform a 40-year-old rundown, vacant building in Summit, N.J., into the Summit Executive Center, a Class A office building. To achieve that, the construction team stripped the existing 47,000-square-foot structure to its original concrete core, built a 30,000-square-foot, steel-framed addition, and clad the entire building with architectural precast concrete panels in several finishes. The result was an attractive facility with two floors of offices and two floors of parking for 200 vehicles. The facility has received LEED Silver certification.

"A new façade was needed to transform this tired building, built in 1966, into a Class A office space," explains Mark von Bradsky, principal at Structure Studio, the project's structural engineer. The existing structure couldn't directly support the weight of the new façade, he notes, so several façade systems were investigated and developed that would rely on the building only for its lateral support. All gravity loads would have to be transferred to the building's basement walls and foundations.

'The most viable option from both a cost and constructability point of view was architectural precast concrete'

"The most viable option from both a cost and constructability point of view was architectural precast concrete," he says. "Although there were many challenges imposed by the existing concrete structure, the precast concrete façade system proved to be the best solution."

Time was a key consideration. The project schedule required the enclosure construction to occur during potentially harsh winter weather. "The use of prefabricated elements such as precast concrete was clearly beneficial to achieve a timely completion when faced with weather constraints versus stick-built, field-assembled materials involving wet trade work," he says. "In addition, work performed in a factory-controlled environment with skilled craftsmen ensured tighter tolerances and fewer errors than alternative means of construction."

Precast concrete also offered benefits due to site logistics. Because the structure was located in Summit's busy Central Business District, field-installed masonry would have created greater traffic disruptions around the site. General contractor Gale Construction Co. planned the worksite so the precaster, U.S. Concrete Precast Group, could stage its panel deliveries in an area where a parking structure was to be erected later. This alleviated long-term congestion at the site while keeping panels nearby and ready to be erected as needed.

An integral phase of the construction process was stripping down the existing building to its concrete structure and constructing the new high performance precast concrete, aluminum, and glass façade that seamlessly carried over to the new addition. The precast panels feature modular thin brick and a sandblasted finish, along with multiple shades of smooth banded material and articulated cornice work. The design was approved by the City of Summit, which was a requirement.

The aesthetic qualities that could be achieved with high performance architectural precast concrete played a role in its specification, notes Robert Sandy, project manager for Gale. "The number of finishes and shapes in the cross section of the façade provided an impetus to reduce the number of trades and subcontractors required. That, in turn, led to a reduction in coordination efforts and cost."

Seamless Transition

The design also called for a seamless transition of elements in the façade between the original, gutted reinforced-concrete structure and the new addition. Because the existing structure had limited capacity to carry the superimposed loads of a façade, the precast concrete enclosure was designed to transmit the majority of its weight directly to a new cast-in-place concrete-grade beam with very little load transmitted to the superstructure.

'The initial thought processes and decisions to use precast really proved to be of great benefit.'

A 40-year-old rundown, vacant building in Summit, N.J., was transformed into a Class A office building by demolishing the structure to its original concrete core, adding a 30,000-square-foot addition and cladding the entire new frame with architectural precast concrete panels. All photos: US Concrete Precast Group.

PROJECT SPOTLIGHT

Summit Executive Center
Location: Summit, N.J.
Project Type: Office building
Size: 77,000 square feet
Cost: $11.4 million
Designer: Rotwein & Blake, Livingston, N.J.
Owner: MRY Associates, Summit, N.J.
Structural Engineer: Structure Studio, Morristown, N.J.
Contractor: The Gale Construction Co., Roseland, N.J.
PCI-Certified Precaster: U.S. Concrete Precast, Middleburg, Pa.
Precast Specialty Engineer: Civilsmith Engineering, State College, Pa.
Precast Components: 251 pieces, comprising wall panels, spandrels with architectural cornices, column covers and site planters.

"The initial thought processes and decisions to use precast really proved to be of great benefit as the project moved from the design stage through implementation," says Sanders. The precaster likewise was proud of what had been achieved, says Steve Kenepp, sales director at U.S. Concrete Precast. "The precast concrete design helped the building become LEED Silver certified, provided the aesthetic appeal the owners were seeking, allowed construction to be finished quickly and efficiently with little traffic disturbance, and was a cost-efficient approach."

Iroko Building

Aesthetics, speed of construction, logistical flexibility, and energy efficiency were key reasons why high performance insulated precast concrete was specified for the cladding on the Iroko Building, a 56,000-square-foot, four-story office in Philadelphia. The building was constructed for a relatively young pharmaceutical company that faced an enviable challenge: It was expanding quickly and needed more space to hire more workers as quickly as possible.

In deciding how to create their first office building, the owners laid out specific goals. The foremost challenge was that it needed to be completed as soon as possible so they could begin expanding their work staff. But they also wanted to locate their facility in the Navy Shipyard, as it would emphasize their focus on research and the life sciences while providing them with state and city tax incentives. To project an image of state-of-the-art research, they wanted to design a building that was thermally efficient and architecturally unique. It also had to incorporate local materials as much as possible to tie the building to the city while ensuring LEED certification.

Precast concrete panels helped to meet each of the requirements. The panels were cast 11 inches thick and feature 3 inches of insulation sandwiched between 4-inch wythes of concrete, providing a material R-value of 19. The panels were cast with a light white exterior color to help maximize its Solar Reflective Index, which helps reduce solar heat gain, as well as aids LEED points.

Architecturally, the owners were looking for a unique finish but were unsure of exactly what to choose, says Dave Thomas, project manager for J&R Slaw Precast Inc., the precaster who fabricated the components. "They wanted a unique structure, but they didn't have a set finish or texture in mind," he says. "We presented a variety of options to them."

Designers at Digsau, the architectural firm on the project, initially were leaning toward a board-form finish of some type, but they didn't think it was "spectacular" enough, Thomas notes. Slaw prepared samples of 19 finishes, which led the team to a stacked-board look that creates a dimensional appearance of long, narrow boards jutting out at random spots in the stack. The panels were erected on two full adjacent façades of the building, with glass curtain wall used on the other two. The result is a building that has a strikingly different appearance from every corner.

To further enhance the contrast between the concrete and glass façades, the panels feature random window arrangements of three sizes of windows, with the stacked-board texture used in sections of random patterns across the face. Only a few formliners were required to achieve all of the textured portions, although the combinations of panels create different patterns across the sides. The formliners were created with a slight draft to the jutting ridges to avoid creating suction on the liners so the panels could be removed easily.

Windows Pose Challenges

While the formliners worked smoothly, the odd arrangement and sizes of the window penetrations created challenges, Thomas says. "The window positions didn't always fit into the ends of the panels smoothly. Some ended up in the center of the panels, requiring a panel shape almost like a 'W' to be cast." The panels were cast with a multitude of strongbacks to support the gaps in the panels.

"Transporting the panels to the site was an issue, as we couldn't put them on a 45-degree angle to ship them due to the fragility of the design," Thomas explains. They

The Iroko Building in Philadelphia was built on a tight time frame so a growing pharmaceutical company could expand its operations. The precast concrete panels used to clad the building helped speed up construction, meet the aesthetic challenges, and help attain LEED certification. All photos:Dave Thomas.

PROJECT SPOTLIGHT

Iroko Building
Location: Philadelphia, Pa.
Project Type: Office building
Size: 56,412 square feet
Cost: $15.4 million
Designer: Digsau, Philadelphia, Pa.
Owner: Liberty Property Trust, Malvern, Pa.
Structural Engineer: Environetics, Philadelphia, Pa.
Contractor: Penn Construction Co., West Chester, Pa.
PCI-Certified Precaster: J&R Slaw Inc., Lehighton, Pa.
Precast Specialty Engineer: Civilsmith Engineering Inc., State College, Pa.
Precast Components: 32 insulated architectural panels, 11 inches thick including 3 inches of insulation.

were secured on trucks individually and arrived at the site undamaged. An asphalt parking lot adjacent to the site provided plenty of room for staging the panels for erection as needed. "There was lots of room for staging, so we were able to move them quickly into position," he says. The precaster's plant was located two hours away, so only a few panels had to be stored at the site as new deliveries were made quickly.

The strongbacks were carefully removed from the panels as they were erected to ensure no cracking or positioning issues arose. The precast concrete panels overhang the curtain wall at the corners, so a butt joint was used on the panels to butt the curtain wall against the panel backs.

The curtain wall features multiple glass types, as well as vertical mullions that create "fins" projecting from the facing. The mullion design weaves into a rich and textured pattern that offers visual interest while mitigating solar heat gain and glare. The verticality of the textures contrasts with the horizontal depth provided by the precast concrete facings of the building.

Erection of the 32 precast concrete panels, typically measuring 45 feet wide and 13'5 ½" tall, took only five days. That ensured interior trades could begin their work quickly, leading to the building being completed just one year from when the contract was awarded.

"The process we used to find an aesthetic design that pleased the owners while providing a cost-effective design shows how precast concrete can be used to satisfy unique customer needs," says Thomas. "Its façade treatment sets this building apart from what others could have achieved with other materials."

These examples show some of the range in textures, colors, and state-of-the-art technical design that is being achieved with precast concrete systems. Office and retail projects both can leverage the material's benefits to create buildings that are attractive to tenants and visitors, providing designs that are cost-effective, aesthetically pleasing, thermally efficient, and quick to complete.

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Teamwork Creates Recipe for Success

Owners, designers, and precasters work collaboratively to create a "total-precast" concrete office building that transforms a building into a carefully crafted business tool

— Craig A. Shutt

The new headquarters for Gordon Foods Service in Wyoming, Mich., was designed to reflect a traditional style using local materials to reflect the company's long-standing culture and history. A precast concrete structural system from one precaster and architectural precast concrete panels from another provided the personalized look the owners wanted. Photo: Craig Van Wieren.

Early collaboration between the precasters and the design team was a key to creating a functional and efficient high performance precast concrete structure for the Gordon Food Service Home Office in Wyoming, Mich. "It is rare to sit side by side with all members of the design/construction team and make all the decisions needed to create a 100-plus-year building," says Kevin Diekevers, facilities manager for Gordon Food Service. "The entire process was a collaborative, energizing event."

The new building reflects the culture and history of a business that opened its doors in the 19th century. The building used precast concrete for the structural system and as part of the building's enclosure system. This combination is sometimes referred to as total-precast. The structure uses local materials to create a blend of traditional appearance and high-tech systems with an emphasis on employee interaction and the environment. Achieving these goals took close communication among the team, which included two precast concrete manufacturers.

The 384,000-square-foot facility features two rectilinear wings, two and three stories tall, that meet at an angle at a central three-story lobby. The 50,000-square-foot 'Connector' atrium features a lounge and other amenities to encourage employees to interact and collaborate. The first floor of the west building and Connector provide the majority of the customer-related venues, including a test kitchen with three fully equipped commercial kitchens. The remaining spaces feature offices that are laid out in an open-plan system.

The design derived from an extensive discovery process that began with the design team from the architectural firm, Integrated Architecture, meeting with a variety of company leaders and employees. It also included input, review, and critique from corporate-construction experts, who manage the construction of corporate warehouses, stores, and distribution centers.

Those meetings were distilled into key metrics that informed and shaped the building's design and

PROJECT SPOTLIGHT

Gordon Food Service Home Office
Location: Wyoming, Mich.
Project Type: Corporate office building
Size: 384,000 square feet
Cost: Contact contractor for cost
Architect: Integrated Architecture, Grand Rapids, Mich.
Owner: Gordon Food Service, Wyoming, Mich.
Structural Engineer: JDH Engineering, Grandville, Mich.
Contractor: Dan Vos Construction Company, Inc., Ada, Mich.
PCI-Certified Precaster (structural): Kerkstra Precast, Grandville, Mich.
PCI-Certified Precaster (architectural): Gate Precast Co., Winchester, Ky.
Precast Specialty Engineer: Ericksen Roed & Associates, Saint Paul, Minn.
Precast Components: Columns, inverted tee beams, rectangular beams, hollowcore planks, solid planks, and solid panels.

sustainability goals and set the tone from the beginning. "When we were invited to be a part of this project, the customer wanted an open space that was inviting to collaboration" explains John DeBlaay, vice president/project executive for Dan Vos Construction Co.

Involving the precasters early in the design process maximized the potential of the precast concrete construction.

Involving the precasters early in the design process maximized the potential of the precast concrete construction. "It was exciting for us to work as a team holistically to look at the building as a living environment not only for our employees but for our guests," says Diekevers. "This collaborative approach allowed us to save both time and money."

'This collaborative approach allowed us to save both time and money.'

The team blended materials and emphasized natural lighting, says Scott Vyn, director of design for Integrated Architecture. "Precast concrete, metal panels, and glass combine to create a modern, understated facility that embodies the unassuming corporate culture of one of the largest family-held corporations in the nation," he notes. "Utilizing a thin building footprint and orienting the structure east-west on the site allowed natural light to flow deep into the core and ensured all work zones have a visual connection to the out-of-doors."

The layout of the two wings and atrium also helped reduce the building's scale, he explains. The two main building masses are linked by the light-filled Connector, which serves as a transitional space housing a lunch room, living room and one of several collaboration zones.

"Functional and efficient, GFS's new headquarters is more than a building; it is a carefully crafted business tool," Vyn says. "Reflecting and embodying the GFS culture, it offers a friendly, energetic, business-focused environment illustrating the value GFS places on each employee while continually reinforcing cornerstone ideals that are etched in glass, painted on walls, and shared across the organization."

Total Precast Structure

The facility's total precast concrete structural system, which includes columns, inverted tee beams, hollowcore planks, and solid architectural panels, provided 40-foot open bays that added flexibility to office layouts and more interaction among employees. The openness was enhanced by the installation of a raised-floor HVAC system, which was aided by the precast concrete structural framing. "Using precast concrete hollowcore rather than steel was 20% less expensive and saved months of construction time," says DeBlaay.

The structural system was cast with self-consolidating concrete, which provided an exceptionally smooth finish, says Greg Kerkstra, CEO for Kerkstra Precast. "The finish allowed for exposed structural elements, which did not require covering with ceiling tile or drywall."

A key benefit was precast concrete's inherent fire resistance, DeBlaay notes. The designers wanted to leave the interior structure exposed as much as possible, and a steel frame would have required adding fire proofing to the structure to achieve a one-hour fire rating. The natural fire rating provided by the precast concrete structure supported the creation

The 384,000-square-foot facility features two rectilinear wings, two and three stories tall, that meet at an angle at a central three-story lobby. The 50,000-square-foot 'Connector' atrium includes a rooftop plantings. Photo: Craig Van Wieren.

of simple, clean ceiling lines while saving time and material costs. The precast concrete also provided a required fire wall between the wings at the connector, which consists primarily of steel with some glass curtain wall.

The precast concrete elevator core and stair towers provide lateral stability for the building, allowing the precast concrete column and beam spacings to be stretched throughout the building. "With the elevator core and the stair towers providing key lateral support, the anchorage at the base was critical to building stability," explains Don Akhurst, project engineer with JDH Engineering, the structural engineer on the project.

Another significant benefit came from the precast concrete's mass, which helped dampen vibrations that the design team was concerned might arise. "With a very open floor plan with very few interior walls, we wanted to avoid what happens in lightly framed buildings, where the effects of floor vibration can be noticed in water ripples in coffee cups and wiggling computer monitors and can be felt by office workers as people walk by in the nearby aisles," says Akhurst. "Those systems have some 'bounce' to them, and the design team didn't want to have that happen in this building."

To ensure the precast concrete framing provided sufficient stiffness to avoid that issue, JDH worked with Kerkstra to adjust the precast concrete beams to increase the floor stiffness. "Once we agreed on where the damping numbers should be, we experienced no issues," Akhurst says. "That was important with the long spans that we were using."

Raised Flooring Installed

The framing stiffness was critical, as the designers wanted to install a raised floor HVAC and utility system that offered flexibility for moving offices and left the ceiling areas high and exposed. The precast concrete planks were set into place with no topping, and the flooring was installed using that as a base.

The precast structural solution fit well with the raised access-floor design. "Utilizing the hollowcore, we were able to achieve a clean, high-interior ceiling, which brings natural light deep into the building," Vyn says. "The precast structural system also provided a cost-effective platform for support of the raised access floor system."

The main HVAC ducts run in vertical chases at the perimeter and then branch off into smaller "highways" of air-distribution that run beneath the floor, he explains. That allowed 12-foot ceilings that remained exposed, showing the precast concrete finish. "It creates a better ambiance in the offices to put the mechanical systems in the floor and leave the ceiling open."

"Eliminating the need for a topping on the planks was a key cost savings," DeBlaay says. "It saved a lot of time and material, which also helped speed up the project."

Speed was essential, as the new building was bringing together 1,200 employees from several locations who couldn't miss their move-in date. "We had a deadline we knew we had to meet," DeBlaay says.

Two Precasters Team Up

Having the structural and architectural precast concrete systems cast in climate-controlled manufacturing environments as site work was conducted ensured the building's enclosure was completed quickly. "Speed was a big plus for using the precast concrete system," DeBlaay says. Splitting the precast concrete components between the structural system, from Kerkstra, and the architectural cladding panels, fabricated by Gate Precast Company, provided no difficulty, he notes.

Important to the design process was the precasters' joint decision to contract one precast specialty engi-

The total-precast concrete structural system provided open 40-foot bays that allowed flexibility in laying out offices. Photo: Kerkstra Precast.

The precast concrete design proved to be 20% less expensive and saved months of construction time compared to a steel frame. Photo: Kerkstra Precast.

neer on the project. Ericksen Roed & Associates of Saint Paul, Minn., served as the precast specialty engineer for both the structural and architectural precast components. "Through enhanced coordination between both precasters, and one design engineer, we were able to design the entire total precast system effortlessly," says Jim Lewis, director of architectural precast systems for Gate Precast.

The erection of the pieces from the two precasters went smoothly, with no issues arising thanks to close communication among the construction team. Site disturbance was minimized by casting the precast concrete components off site and delivering them as needed. "Kerkstra's plant is only 10 miles from the site, so there were no issues with transportation," says Akhurst.

The finish for the architectural panels was worked out with corporate officials through lengthy discussions about their culture, history, and future. "Precast panels employed on the building's exterior provide a consistent, low maintenance, clean aesthetic that is in keeping with the overall design intent, a welcoming, cost-effective, long-lasting, people-friendly facility," Vyn says

Aesthetically, precast provided the flexibility for varying the color and textures to replicate the desired appearance. A buff finish was created using an acid-wash with complementary aggregates. It allowed for a richer color and smooth texture, which was used on the majority of the panels. To complement but contrast with this design, the lower panels feature a deep gray concrete mix that was acid washed to give the appearance of a dark granite.

Durability and long-term performance were critical elements in the factors that company executives outlined, Vyn notes. The building was designed, using precast concrete and other long-life materials, to exceed a 100-year service life.

Sustainability

Some of the initial site work involved drilling 400-foot-deep wells on the campus to maximize use of renewable energy. The 300 wells, which took four months to install, make the site one of the largest geo-thermal fields in Michigan. Mechanical and utility systems added to the sustainable features, including the underfloor HVAC. The system delivers 152,000 CFMs that provide static pressure for the 238,000 square feet of raise flooring. All employees have individual controls for air flow and temperature at their stations.

The building has been planned for future expansion, with space to the south designated for a future addition, as well as needed revisions as the company grows. Phone and data cabling are centralized in two designated rooms on each floor with independently controlled cooling systems, allowing them to connect to revamped systems as needed. Two large generators were installed at the east end of the property to keep the building and its systems operational even during a complete power failure. The LED lighting is controlled via motion and building-management systems to reduce energy use. Rainwater also is collected and reused.

The building has been submitted for LEED certification. "Numerous sustainable strategies, including building envelope commissioning, under-floor air delivery achieved through a raised access floor, and with geothermal heating and cooling, combine to achieve efficiencies that are designed to exceed ASHRAE by 46%," Vyn says.

The precast concrete will aid in achieving that goal through its use of local materials and local manufacturing, reductions of waste and site congestion, the use of recycled materials, and the thermal mass of the 8- to 10-inch panels, which will aid with energy efficiency.

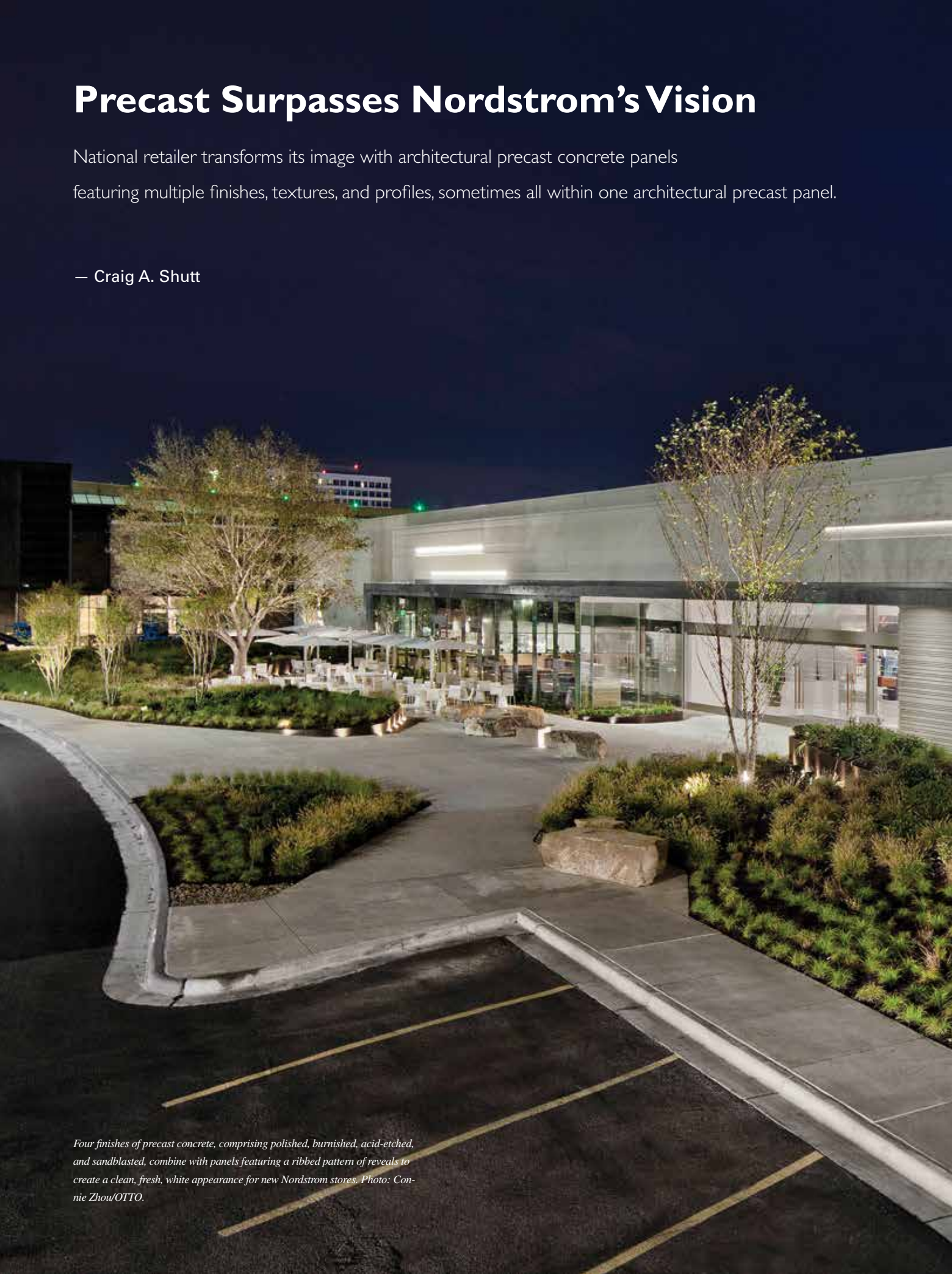
"I absolutely love the open and exposed precast structure and consistent look of the exterior," says GFS's Diekevers. "On behalf of the Gordon Food Service team, we thank the design and construction team for an incredible structure and job well done!"

For more information on these or other projects, visit www.pci.org/ascent.

Precast Surpasses Nordstrom's Vision

National retailer transforms its image with architectural precast concrete panels featuring multiple finishes, textures, and profiles, sometimes all within one architectural precast panel.

— Craig A. Shutt



Four finishes of precast concrete, comprising polished, burnished, acid-etched, and sandblasted, combine with panels featuring a ribbed pattern of reveals to create a clean, fresh, white appearance for new Nordstrom stores. Photo: Connie Zhou/OTTO.


NORDSTROM

Designers for Nordstrom retail stores have long used insulated architectural precast concrete panels to clad their buildings. The upscale retailer has strategically projected an upscale image that blends with the traditional malls they occupy, and precast concrete has met those needs. Now, new stores are being constructed with a more contemporary look that uses four distinct finishes.

The store design circa 2000 used a precast concrete facade featuring 9-inch-thick sandwich panels with 2 inches of integral insulation. "The layer of rigid insulation created a thermal envelope that enhanced the energy performance of the store long before it was mandated," says Brad Nesset of Thermomass. The traditional look provided a two-tone appearance using a rusticated brick formliner to create a red-brick appearance on a "frame" that surrounded a projecting upper façade in a buff, limestone-like finish.

'The layer of rigid insulation created a thermal envelope that enhanced the energy performance of the store long before it was mandated,'

The new façade incorporates a dimensional projection that features a clean, fresh, white appearance. The entry areas feature 1-inch-thick reveals, producing a ribbed pattern that provides color contrast and dimension while polishing the outer projections to simulate natural stones. The projecting feature wall façade incorporates horizontal bands with four finishes: polished, burnished, acid-etched, and sandblasted. These bands create subtle distinctions in the white concrete panels that project an image of sophistication and elegance while retaining the traditional durability offered by precast concrete.

The look was devised by a team at Callison Architecture, the design firm for Nordstrom, led by Min Cho, director. "The combination of horizontal reveals, layers of multiple finishes, and building proportions combined to form a natural warmth from a modern mass," he says.

The concept developed through a design-assist collaboration with Gate Precast Company, which by Summer 2015 will have cast panels for five stores. The panels (typically 32 feet by 12 feet, either oriented vertically or horizontally depending on the location on the envelope) feature 2 or 3 inches of rigid continuous insulation (depending on the climatic zone) sandwiched between 5,000- to 7,000-psi concrete. Welded-wire and thermally efficient e-glass resin connectors ensure zero thermal bridges across the wall plane, as the steel precast connections are behind the rigid insulation, ensuring Nordstrom loses less than 1% of energy through their walls.

Regardless of where a Nordstrom store is located, the wall panels will exceed the most stringent ASHRAE 90.1, International Energy Conservation Code (IECC), or local model energy code requirement with the same design criteria

A special white mix design features Texas limestone with a small amount of Georgia sand that provides a "sparkle" effect, according to Conrad Filo, quality control manager at Gate Precast.

"Min Cho wanted a superwhite panel, but our first try created a color so intensely white that it was difficult to distinguish the different finishes," he explains. "We found a balance that produced the white, shiny, color he sought, while also allowing the various finishes to stand out." Gate also consults with other precasters around the country as stores are built in ar-

eas outside of their fabrication areas. To date, that includes stores in Minnesota, California, and Hawaii.

Matching Original Finishes and Textures

"We understood that we couldn't vary color and finish from the original concept set by the design team and Gate," says Thomas Ketron, director of marketing at Clark Pacific in California. "They required a specific color and the capability to do four finishes, and they had very high expectations for the finished product. There was not a lot of flexibility in the look we could achieve."

The Wauwatosa, Wis., store panels, as with the other stores, were designed to be erected in a vertical position, although they were taller, measuring 50 feet tall and 10 feet wide, according to Bill Henderson, vice president and operations manager in Gate Precast's Ashland City, Tenn., plant. "They prefer vertical panels in some of their three-story stores, as it limits the additional structure to support the panels. This way the panels are self-supporting."

The Hawaii Nordstrom project faced a unique set of challenges, with its elevated steel structure above existing parking and limited capacity tower cranes. The precast elements were limited in weight to 75 psf due to seismic considerations and had to span horizontally 30 feet unbraced.

"Even with all these challenging parameters, we were able to brainstorm creative solutions due to the Nordstrom team's foresight to work with us early in the process," says Les Kempers, vice president for GPRM Prestress. "I was even more impressed with Nordstrom's ability to create an open synergy between the PCI producers to share their knowledge and thus ensure consistency in their new store signature. It's a pleasure to work with an owner and design team that thoroughly understand the product and the process."

Consistency across all stores and the specific finishes initially specified were critical to the brand. "The exceptional quality of the reveal patterning and finishes adds another design dimension of horizontal movement to animate the overall façade," explains Robert Filary, an associate at Callison who worked on the project. "The strategically placed finishes break down the building mass to create an inviting scale for the customer."

Polishing Vs. Burnishing

Acid-etching and sandblasting are traditional finishes, while polishing is a longstanding finish not provided by all precasters. Polishing and burnishing both are created with diamond-tipped pads used either by a handheld or machined polisher.

The amount of grinding determines the finished look and which term applies. A dull matte finish ("honed") is achieved with a small amount of grinding. A high luster ("polished') grinds off the most paste. A mid-range level creates an intermediate finish ("burnished"). (For more on these techniques, see the Spring 2014 issue of Ascent online at www.pci.org.)

The burnished finish was envisioned by Dawn Clark, vice president of store design, architecture and construction for Nordstrom, and Min Cho to create a signature finish for Nordstrom. "A 'burnished' finish was extremely rare, because it's the toughest finish to provide," says Gate's Jim Lewis, director of architectural systems.

Gate created the burnished finish for Nordstrom, but it has been polishing for much longer. The challenge comes in polishing without removing too much. "You have to pour the mix just right, because it's a polished as-cast finish, so any imperfections in the mix or form are permanently vis-

Strategic placement of each of the four finishes used on the feature wall helps to break down the mass of the building and create an inviting scale. Consistency across all stores was critical. Photo: Connie Zhou/ OTTO.

Providing a polished finish on the panels requires grinding off most of the top layer of paste to produce a shiny appearance. Photo: Gate Precast Co.

The panels feature 2 or 3 inches of rigid continuous insulation sandwiched between two wythes of precast concrete. Photo: Gage Brothers Concrete Products.

ible. Polishing exposes more of the aggregate, which is an easier level to achieve."

Gage Brothers hadn't produced burnished finishes, but it has offered polishing for more than 30 years, says Joel Bass, a project manager at Gage. "We visited Gate to see how they approached burnishing and learned their procedures. Our people got the opportunity to produce a few panels in their plant. Polishing is something we've done for a long time, so that level of grinding wasn't a concern." Adds Tom Kelley, president of Gage in Sioux Falls, SD, "Gate was very helpful in sharing their technique to ensure we all created the same finish without any problems."

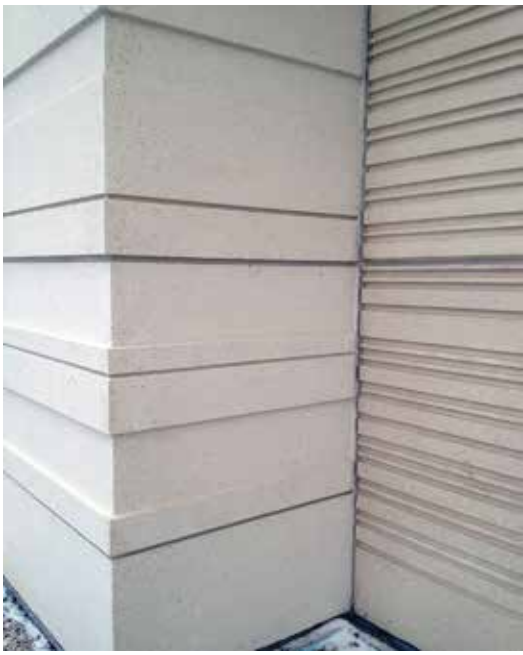
Providing these two finishes was an important part of the final look and achieving the design intent, says Filary. "Precast concrete's polished and burnished finishes elevate the design approach by blending high-end sophistication with a new modern expression for the Nordstrom brand."

Installation Move Smoothly

The installation of the panels at most of the stores has gone smoothly. Since most are anchor stores in larger shopping malls, the work must progress around existing retail centers and active shopping congestion. In Wisconsin, for instance, the store was built into an existing mall. "We have to minimize disruptions and get in and out quickly," says Henderson.

At the Wisconsin store, 122 pieces were delivered in 92 loads. Tri-axle trucks were used to transport the panels due to their weight and length, he says. Somewhat similar totals were required for other stores. A store completed in The Woodlands, Texas, by Gate's Hillsboro, Texas, plant, used 151 panels with each covering 212 square feet. Gage's 43-foot-tall project in Minnetonka, Minn., features 180 panels in two sizes (30 by 10 feet and 44 by 10 feet), along with some smaller tuck-under panels, Bass reports.

Nordstrom has opened three of these new stores: The Woodlands, Texas; St John's Town Center in Jacksonville, Fla., and The Mall of San Juan, Puerto Rico. New stores on the way include Ridgedale Center in Minnetonka, Minn. (opening Fall 2015 with precaster Gage Brothers); Del Amo Fashion Center in California (Fall 2015, Clark Pacific); Ala Moana Center in Hawaii (Spring 2016, Grace Pacific Rocky Mountain); and The Domain in Austin, Tex. (Fall 2016, Gate Precast).

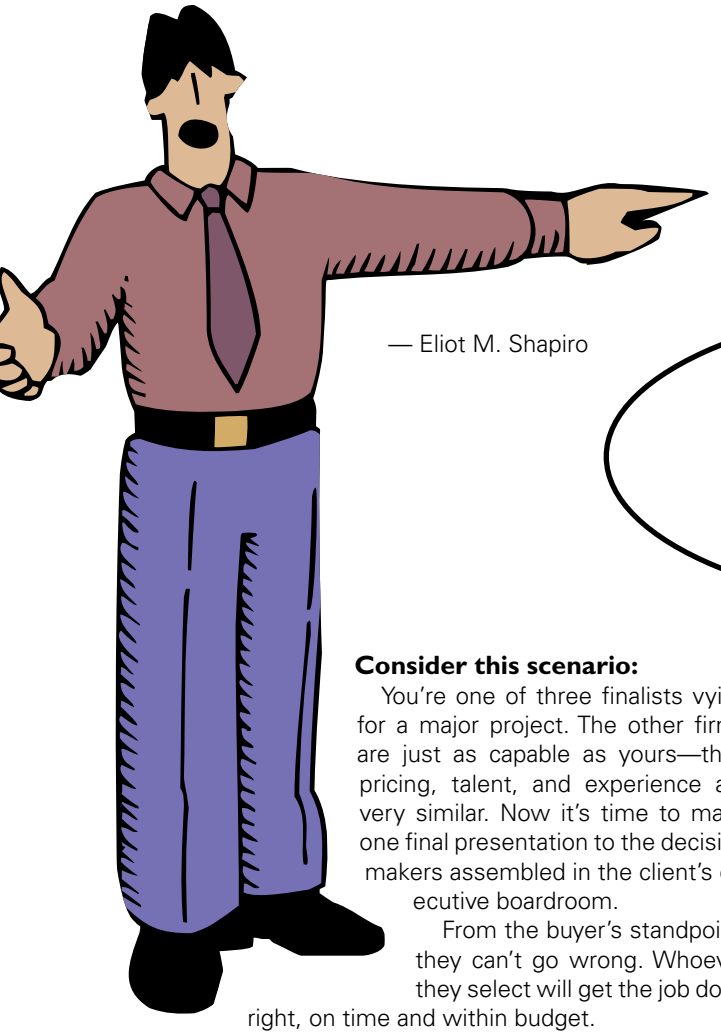


Entries feature 1-inch-thick reveals, producing a ribbed pattern that provides color and dimensional contrast to the other finishes. Photo: Gage Brothers Concrete Products.

'It is one thing to have a vision but something else far greater when the reality exceeds all expectations.'

Cho has been pleased with the consistency the precasters can provide. "It is one thing to have a vision but something else far greater when the reality exceeds all expectations," he says. "Only through great partnership were we able to create unique mixes, finishes, and designs that surpassed all preconceived notions of concrete and supported the Nordstrom brand elements. The combination of horizontal reveals, layers of multiple finishes, and the building's proportions formed a natural warmth from a modern mass. Artistry truly blended with execution."

For more information on these or other projects, visit www.pci.org/ascent.



Communication—

— Eliot M. Shapiro

How to Present with Confidence

Consider this scenario:

You're one of three finalists vying for a major project. The other firms are just as capable as yours—their pricing, talent, and experience are very similar. Now it's time to make one final presentation to the decision makers assembled in the client's executive boardroom.

From the buyer's standpoint, they can't go wrong. Whoever they select will get the job done right, on time and within budget.

If this is the case, how do they decide? It's easy to respond with "the cheapest", "the most experienced" or "the one with the best looking team!" But when everything is equal (at least in the client's mind), who is most likely to win the business? The answer, in many cases, is the firm whose presenters display the most confidence, the one that inspires the highest level of trust, and the group that makes them think, "I like these folks."

Trustworthiness, confidence and likeability—all are key success factors when delivering your information during presentations, meetings, and interviews. But what does it LOOK like to be confident? What does it SOUND like to be trustworthy? Most speakers know how they'd like to be perceived, yet they don't come across that way under pressure.

Unfortunately, tendencies happen—we've all got 'em, and people are watching. If you're unaware of your own physical and verbal tendencies, they may hold you back in these tough situations. It's time to expose these tendencies, and share some time-tested ways to minimize or eliminate them altogether.

First, a warning—these tips may sound easy, but putting them into practice feels very different than you'd think. During our workshops and coaching sessions, we videotape our clients as they experiment with these skills so they can see the difference for themselves. We'll even tell them, "We don't care how you feel!" As harsh as that sounds, it's liberating. The video allows one to see how these skills actually look compared to how they feel.

Read on to explore tendencies—both physical and verbal—that create the wrong perception, and discover how to overcome them with effort and practice.

Physical Tendencies:

- Eye Contact: Most speakers know this is important, but the phrase itself is problematic. Instead, think about "eye CONNECT". You want to connect with listeners, making each person feel as if this speaker is talking to ME. Instead of glancing at someone and moving away, look at each person for a complete thought. Thinking through your mental script, the thought is over when you come to a punctuation mark, usually a comma or period. Using this method, you'll never deliver more than one sentence per person before moving on (and you'll avoid the "creepy factor"—making people uncomfortable with too much eye contact.)
- Gestures: Even when you feel comfortable in front of a group, your hands may convey a different message. Fidgeting with your fingers and clasping your hands are both potential signs of nervousness. Most of us gesture when we're not thinking about it, but we hold back when we're the center of attention.

– Eliot M. Shapiro, Co-founder and Principal of EMS Communications, is an experienced training facilitator and presentation coach with a passion for public speaking and teaching. For 20+ years, he has helped individuals and teams realize their own potential, sharing his enthusiasm with thousands of people. He lives by the same philosophy he encourages in his clients: you don't always have to act serious to be taken seriously.

Since 1998, EMS Communications has been on a mission to "rid the world of boring presentations, one speaker at a time!" We accomplish this by helping individuals and teams improve their leadership, presentation and communication skills. Our services include private executive coaching, customized corporate workshops and open-to-the-public presentation skills seminars.

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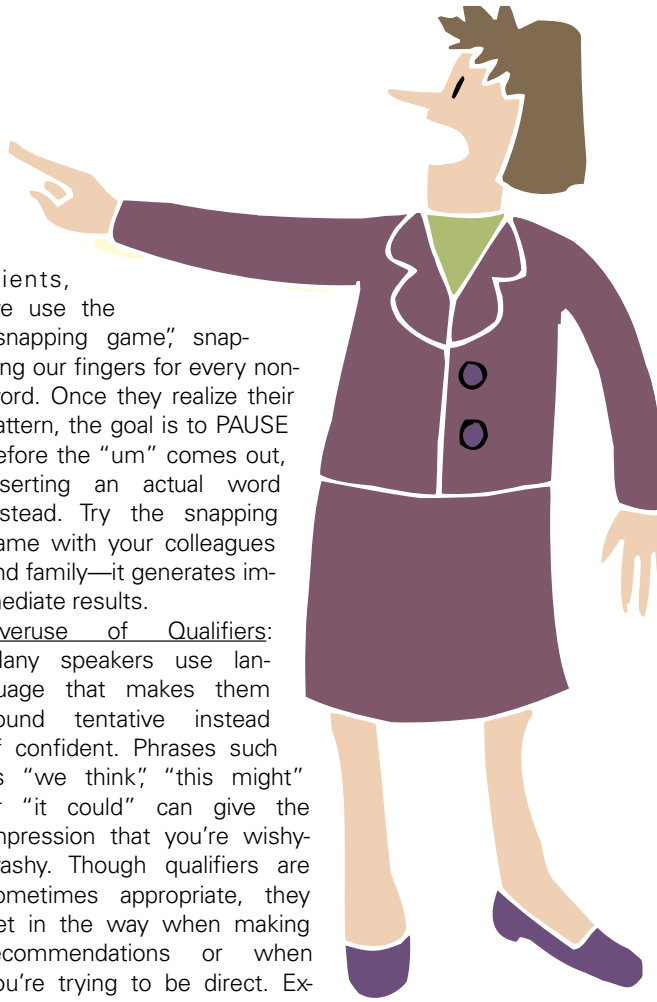

The next time you're in casual conversation, observe the gestures you use naturally, and force yourself to gesture the same way when you're under pressure.

- Movement: Moving around can be good during presentations, as long as it's intentional. Distracting movement (pacing, swaying, etc.) comes from excess energy, and can create the perception that you're uncomfortable. Make your movement PURPOSEFUL by walking to another side of the room, or coming forward to make an important point. Once you get there, plant your feet and stand straight. By doing this, any excess energy will be channeled into gestures and volume.
- Facial Expression: Too many speakers try to look serious in order to be taken seriously. The result, unfortunately, is they end up looking angry or disinterested. It's critical to convey what you're feeling, so experiment with smiling, raising your eyebrows, or scrunching up your face. Be serious when it's appropriate, but be expressive when delivering a positive message.
- Energy: Most people prefer listening to an energetic speaker rather than one who puts them sleep. Presenters who use vocal variety are much more likely to connect on an emotional level with listeners. Many speakers want to convey energy, but under pressure, they end up using a monotone voice that sounds boring and disinterested. Whether you're delivering a serious message with conviction, or trying to get the audience excited with enthusiasm, it's important to feel as if you're overdoing the energy in order to get it right.

Verbal Tendencies:

- Speaking Pace/Pausing: Are you a fast talker? Slow? Somewhere in the middle? Your pace is only an issue if it's at one of the extreme ends of the spectrum—most of us fall somewhere in the middle. Rather than slowing down or speeding up, PAUSING provides a double benefit, allowing your listeners to process what you said, and giving you time to consider what to say next. With critical information, pauses make your words sound that much more emphatic. To really make an impact, though, overdo the pauses—when you think you've paused long enough, add another second or two.
- Non-words: Instead of pausing, most speakers fill the void with sound. Non-words are noises (uh, um) or actual words (you know, like, so…) that we use without even realizing it. This habit has a negative impact—people may become so distracted that they count the number of non-words you use, or they may think, "This speaker is completely unprepared." Preparation certainly helps, but awareness is also critical. With our clients, we use the "snapping game", snapping our fingers for every non-word. Once they realize their pattern, the goal is to PAUSE before the "um" comes out, inserting an actual word instead. Try the snapping game with your colleagues and family—it generates immediate results.
- Overuse of Qualifiers: Many speakers use language that makes them sound tentative instead of confident. Phrases such as "we think", "this might" or "it could" can give the impression that you're wishy-washy. Though qualifiers are sometimes appropriate, they get in the way when making recommendations or when you're trying to be direct. Experiment with stronger language ("we know", "this will", "we're confident") and you'll notice the difference.
- Trailing Off: Many people trail off when they speak, making it difficult to hear their last few words. This happens because the speaker is thinking about their next thought before this one is finished. Since this is usually critical information, make sure it's heard. A great way to overcome this distraction is to imagine you're speaking like Regis Philbin, who always gets LOUDER and the end of THOUGHTS. ("Is that your final ANSWER?")
- Upspeaking: Similar to trailing off, upspeaking is the tendency to use run-on sentences, making statements sound like questions. Listen to pre-teens speak these days and you'll hear it right away. ("Today? In school? This kid got in trouble? Because she didn't do her homework?") Unfortunately, it's happening in the business world too, causing confident speakers to sound tentative. To overcome upspeak, imagine that each statement you make is emphatic and direct.

So, what would you rather say as you walk out of that final presentation—"I felt good" or "We got the business"? Trying something new usually feels awkward, but if it enhances your projection of confidence and conviction, then the way you FEEL shouldn't matter. And with practice, these new skills can quickly become natural.

For more information on these or other projects, visit www.pci.org/ascent.

Wilmette, IL

Completed in 1953, the Baha'i House of Worship showcases the intricate details that can be achieved with precast concrete.

Photo: This file is licensed under the Creative Commons

WHAT DO THESE BUILDINGS HAVE IN COMMON?

Rome, Italy

Architect Richard Meier used self-cleaning precast concrete to build the beautiful Jubilee Church in 2000.

Photo: Gabriele Basilico

They all use the aesthetic versatility of precast concrete to achieve their **beauty**

San Francisco, CA

Built in 1972, the iconic, 48-story, TransAmerica building is clad in beautiful precast concrete which is resilient enough to handle one of the highest seismic zones in the U.S.

Photo: Wayne Thom

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Eight Office Design Trends for the Next Generation

— By: Bill Halter, AIA, LEED AP

Intergraph's walkable landscape encouraging employees to move throughout the workday. All photos: Josh Meister Photo and Cooper Carry.

It's a well-known story in the corporate real estate world. Office developers compete to find the next best project, architects design site plans and renderings, and everyone works together to build the ultimate workspace for the next generation.

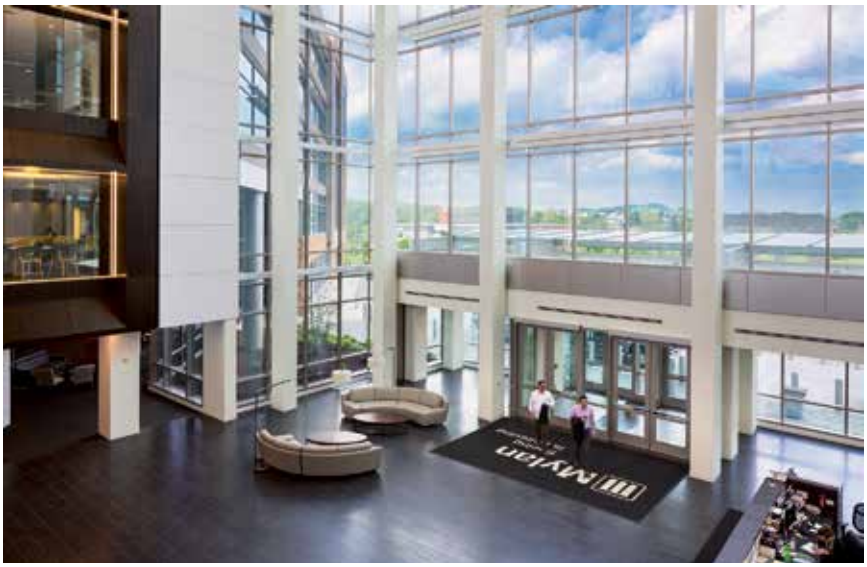
So what does this ultimate workspace look like? And who is the next generation?

The next generation of workers doesn't just involve millennials; it encompasses workers of all ages who are attracted to spaces that accommodate technology, mobility, collaboration, wellness and the environment.

– As Cooper Carry's director of corporate services, Bill has spent the last 30 years specializing in the design of corporate and commercial office buildings.

And as for creating the ultimate workspace for this next generation, here are eight office design trends we'll see more of over the next decade.

1. **Sustainability and High Performance.** Architects are embracing a holistic view of conservation as they design office buildings that efficiently address land, water and energy use. Sustainable technology and materials will continue to be a top priority. And by advancing sustainable features, we are now designing to optimize durable, high-performance attributes on a life-cycle basis, to create efficient and resilient office structures.
2. **Walkability.** The next generation does not want to depend on cars. Even in suburban settings, walkable street retail and dining is highly demanded as well as access to public transit systems.
3. **Wellness**. Office buildings no longer request taco and burger joints. They now want to offer healthier choices such as salad and juice bars. We're also seeing more standing desks, treadmill desks and corporate campus walking paths that encourage employees to move throughout the workday.
4. **Shared Space.** Private offices are less popular as today's employees demand shared, collaborative space. They want an open-concept office that fuels creativity and fosters teamwork. In designing the corporate campus for Intergraph, a software engineering giant, we eliminated all enclosed office spaces – even for senior leadership - and created flexible,



Mylan's expansive windows and ceiling heights maximize natural light.

Intergraph's lobby activated with color and energy.

open space with various sized nooks throughout the floor plan.

5. **Lobbies** increasingly are meant for true socializing and interactions between tenants. Traditional lobbies with sophisticated concierge desks and quiet, serious atmospheres are being replaced with spaces that are bustling with energy. They are now similar to coffee shops and cafes with strong wireless connections, social spaces and expansive views out to the street that invite people inside. In the design of Park Center, a 580,000-square-foot office building in Atlanta, we strategically moved public transportation traffic through the lobby to encourage people to stop at the café and coffee shop.
6. **Daylight.** Ceiling heights now average 9'-6" to 10 feet. They previously averaged 8'-6" to 9 feet and windows are expanding to let in more natural light. Workers want to bring nature indoors. Daylight appeals to very basic human needs and tends to increase productivity and overall employee satisfaction.
7. **Sun shading.** Sun shades are becoming more distinctive and personalized. In designing Intergraph, we added sunshades to not only provide energy-efficient shading, but to also add a sense of dimension.
8. **Enclosure Systems.** Expectations for the performance of a building's enclosure system continue to increase. Some of these include better thermal performance; sustainability and aesthetic versatility. For example, glass manufacturers are offering more options for fritting to customize windows to fit the office culture. In designing Intergraph, we fritted the windows with computer coding and bitmapping to personalize the look and feel of the office.

Another example is precast concrete's aesthetic versatility, which will prove crucial to designing the next generation of office space. Precast concrete offers the ability to cast in different patterns, shades and shadows. In designing Mylan's corporate campus, we used precast to emphasize the corporate wing of the building. The design includes a frame made of precast to draw attention to the executive entrance of the building. At Intergraph, we used precast in the base of the stair towers because it offered a more durable material. Precast also serves as a great structural system. And when designed as a combined structural/architectural building enclosure, such as with load-bearing insulated sandwich wall panels; it can provide an efficient (thermal, acoustical, etc.), economical and resilient office environment.

These office design trends will continue to play out as the next generations of workers populate the workforce and as technology increasingly transforms the work experience. Businesses are also more in tune than ever with creating a distinct company culture. Architects are carefully choosing color palettes, materials and interior design concepts that best align with the brand and intended office culture.

The bottom line is that people come first. And as architects, it's our job to engage with employees in order to best understand how office design and layout can impact not just culture, but also performance.

For more information on these or other projects, visit www.pci.org/ascent.

Duke Energy Building • Charlotte, NC
Tallest Building in US to use double tees

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the search for excellence

THE 2015 PCI DESIGN AWARDS

Photo: Alfonso Merchand

The **53rd Annual PCI Design Awards** is accepting entries. Join us in the search for excellence and submit your projects electronically by May 18, 2015.

Visit www.pci.org and click on the “2015 Design Awards” link for more information and submission details.

Contact: **Jennifer Peters**, jpeters@pci.org or
Brian Miller, P.E., LEED AP, bmiller@pci.org

Architectural Freedom of TPS

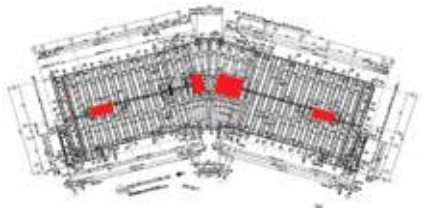
All photos: Fred J. Fuhrmeister/Time Frame Images.

Total precast/prestressed structures are a ubiquitous part of the Denver, Colorado skyline. Denver, famed for being the first location to produce a prestressed double tee, has evolved and matured the precast market from glorified double tee warehouses to sophisticated core and shell architectural masterpieces. Stresscon Corporation has continued to improve the performance of building envelopes, while enhancing the exterior features of Total Precast Structures.

The term Total Precast Structure (TPS) describes a system that includes interior framing, floor systems, vertical stair and elevator shafts, roof framing, and perimeter load bearing elements; all of which are plant manufactured precast prestressed concrete. There are many inherent advantages of a system with this number of inter-related parts, the most significant being the coordination of all components expertly managed under one subcontracted trade. Stresscon engineers and seals its own delegated design for the building system and each of the prestressed precast components, completes the manufacturing in their 70 acre facility, and is responsible for the final installation and finishing of all of their precast prestressed components that make up the superstructure. These structures reduce trade coordination, shorten construction schedules, and minimize risk for all parties involved.

Paramount to supplying all the necessary structural components of a TPS, Stresscon's Architectural Production Facility has the capacity to support multiple projects with varying architectural detail, color, finish, and structural requirements. Architectural precast concrete applications offer numerous advantages, and maximum freedom from a design standpoint. Architectural options can be used in conjunction with structural precast concrete to enhance aesthetic options and building design economy, with a wide variety of possibilities for expression and detail. Architectural precast concrete provides sculptural freedom and versatility, and it is adaptable to any building configuration. Because precast concrete is available in a broad range of architectural styles, shapes, sizes and colors, it has unlimited design potential and can be integrated into any project type to define architectural expression.

The primary structural systems of a TPS are the Lateral System, Gravity System, and Enclosure System. Prestressed precast products serve as critical elements in each of these systems. The Lateral System is comprised of stair and elevator shafts made up of in-

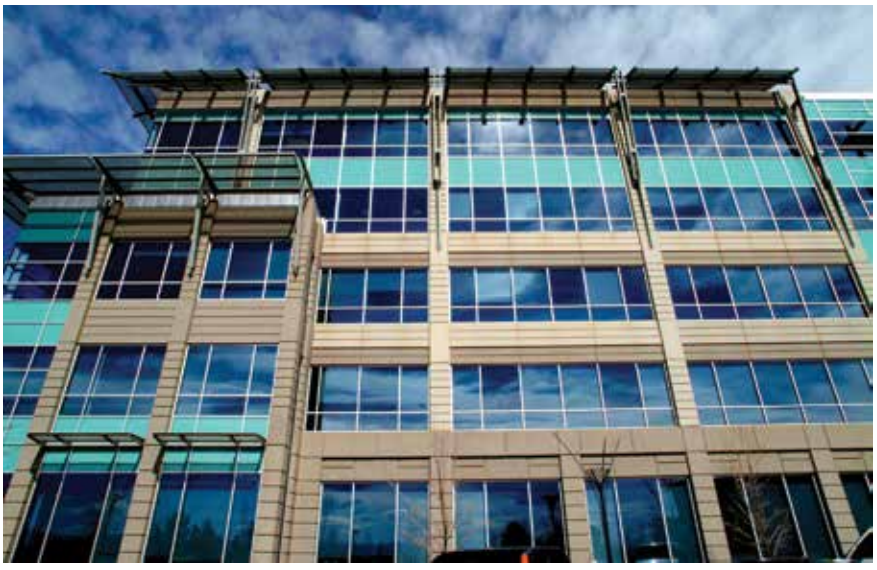


dividual wall panels, with either strong or ductile connections between members. These vertical shafts are grouted and connected in such a way that they resist lateral forces induced from seismic or wind events. The Collection System of TPS includes floors and a roof diaphragm. Typically designed as rigid diaphragms, these members ensure compatibility and movement of the vertical elements, collect either wind or seismic force, funneling these forces to the vertical shafts. The Gravity System is comprised of interior framing members, double tees, beams, and columns, as well as the vertical shafts for the stairs and cores. In an effort to limit the number of tension connections in a lateral element, Stresscon designs the structure to force the shafts to support as much dead load as possible. This also limits doubling up on systems. The final component of the Gravity System in a TPS is the Enclosure System. In this system, the exterior architectural elements serve a number of purposes. Acting as perimeter spandrels and columns, they create the first line of defense against wind and rain, acting as air and vapor barriers, and creating the architectural expression of the enclosure. The Enclosure System also acts as a portion of the Gravity System, eliminating redundancy in spandrels and columns typically used in a cladded-type structure.

Images in this editorial are from the North West Business Park, an example of a TPS, located in Broomfield, Colorado. The kinked floor plate is typical for a Class 5-A story structure. The total gross area is 340,000 sq. ft., with about 68,000 sq. ft. per floor. The precast floor and roof components include double tees and prestressed beams. The lateral system is made up of four shafts (shown in red) with cast in place topping on the floor double tees serving as the diaphragm. At the roof level, the double tees are connected to act as a diaphragm without topping. The enclosure, highly accented in architectural precast, serves as the exterior perimeter gravity system.

This complex building enclosure is made up of architectural precast manufactured to PCI MNL 117 specifications, and a glass curtain wall system. The architectural precast contains two integral colors, stone liner, and multiple lines of reveal work. There are two primary spandrel profiles, with the lower spandrel utilizing the system's darker tan stone liner, with an acid etch finish. The second, third, and roof line spandrels are two-tone, with darker tan and lighter buff concrete. These panels also show dramatic relief with multiple reveals. In this structure, Stresscon manufactured the column elements in only one color, creating a column break just above the first elevated level at the column's color transition. The single color columns feature multiple horizontal reveals that return to the window elements, and are finely finished with an acid etch.

Attention to detail is critical to a successful project, allowing companies like Stresscon to convey the highest level of professionalism and standards in their



design and detailing. Here, the Stresscon production department applied their skilled expertise, for these monolithic one piece columns. Produced with the light buff color concrete and an acid etch finish, the member is exposed on all four sides, along with a four sided reveal wrap to the windows. The building's facde is striking and dramatic, with mixed two-tone architectural precast, colored glazing, and aluminum shade screens. There are sections of the project where the perimiter support structure has been recessed to allow the use of a unique light blue spandrel panel. This detail is repeated on multiple elevations, and on multiple levels. It is this level of intricate detail that designers can rely on from Stresscon Corporation.

Stresscon tailors efficient, durable and versatile architectural total precast systems to be artistically appealing and to provide the highest performance characteristics. These pieces create a wide range of design and flexibility functions that can be incorporated into any design environment, and that allow designers to create and realize the fullest potential for a building solution. Stresscon manages these TPS designs from start to finish, and has proven success in all stages from manufacturing through final installation.

For more information, call 1-(719) 390-5041 or visit www.stresscon.com

Aggregate Innovation

New design mixes are expanding precast concrete's capabilities creating such innovative options as glow-in-the-dark designs, expanded colors, and translucent concrete

— Craig A. Shutt

Precast concrete's aesthetic versatility long has appealed to architects looking for creative, high-quality finishes for their projects. Precast can provide a range of colors, textures, and other appearance treatments. That range is expanding constantly, as precasters find new ways to use this highly engineered product to provide innovative options.

"I love working with concrete," says Jim Isermann, an artist based in Palm Springs, Calif., who designed a mosaic artwork in precast concrete using several colored aggregates at the University of Houston. "The variety of colors available was amazing. There were incredible colors to work with, and the quality control was amazing. Everything was identical and consistent."

This architectural precast concrete panel had glow-in-the-dark aggregates post-applied to the interior of the numerals cast into the panel to serve as the building's address. Photo: Gate Precast

Precast Lights-Up the Night

A standout style just starting to gain attention is glow-in-the-dark aggregates, which can be inset into panels in a pattern or other design. Gate Precast Company recently used the material on a building clad with architectural precast concrete panels by post-applying glow-in-the-dark aggregates to the base of the number in the building's address, which was embossed into one panel. Another design sprinkled some of the aggregates throughout the panel in a random pattern, adding visual interest at night.

The material consists of an angular epoxy aggregate that can be used in sizes from ½ inch to powdered, in a 1-to-1 substitution for traditional aggregates, explains Conrad Filo, quality control manager at Gate Precast Company. "It's a lighter weight than regular aggregates, reducing weight in a panel, but it's extremely dense and hard, so it's not considered a lightweight aggregate," he explains. The material cost about $70 per pound at the time this article was printed, which limits its use to specific focal points.

The material works similar to other glow-in-the-dark materials, radiating greenish light after exposure to sunlight. A 20-minute exposure allows the material to exude light for about eight hours, although it will diminish over time, Filo says. The aggregates Gate has used have a warranty for 20 years.

The material was supplied by Ambient Glow Technology (AGT) in Pickering, Ontario, which has been marketing it since 2004, says Peter Tomé, president. "Our products have been specified in numerous concrete projects around the world," he says. Many of the applications are for bridges and other high-profile exterior uses, and it has launched a higher-intensity material where greater luminosity is required, such as bike and walking paths.

AGT's glow-in-the-dark aggregates have been used in a number of buildings, including the San Antonio Planetarium in San Antonio, Texas, and the El Blok Hotel and Spa in Isle de Vieques, Puerto Rico.

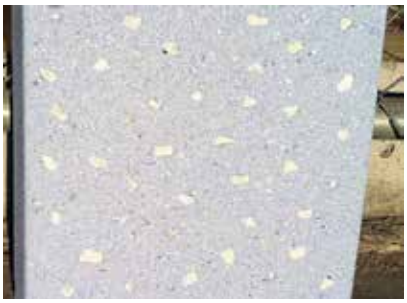
The key to expanding its applications in precast concrete buildings will be spreading the word to architects and showing them that the benefits are worth fitting the material into the budget, says Filo. "Architects need to buy into it as offering an advantage," he explains. "It's an expensive material, but in small amounts it works very well. Architects are always looking for something new, and this fills the bill."

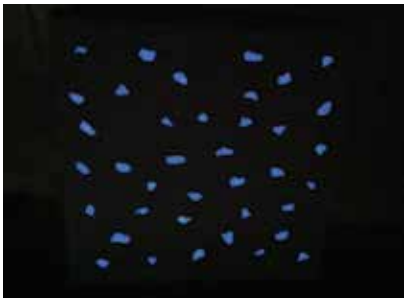
It's not a difficult material to work with, he adds. It is applied similar to a retarder, in which the aggregate is put into the form, and the glow-in-the-dark epoxy is applied "to give it an extra kick."

Lightweight Aggregates

Another type of aggregates gaining popularity on a larger scale is lightweight material that creates lighter components. "The primary benefit of lightweight aggregates is the weight reduction they provide to the component, which begins offering advantages in transportation, as more pieces can be delivered on a truck," explains Ken Harmon, director of engineering resources and territory manager for Stalite, a maker of lightweight aggregates.

The difference can mean transporting two double tees on a truck rather than one, essentially cutting transportation costs in half. It also can reduce the load of a truck to a viable weight to transport





Glow-in-the-dark aggregates can be cast into precast concrete panels, creating dramatic effects that provide illumination or accents after dark. A 20-minute exposure to sunlight provides 8 hours of light. Photos: Gate Precast

the pieces over roads with lower load requirements. Reduced crane capacities and faster erection speed also might be possible, reducing costs further.

Lightweight aggregates provide better hydration for cementitious materials, as more water is absorbed by the aggregates. This ability to provide internal curing enhances the strength of supplementary cementitious materials, such as silica fume, fly ash and metokaolin, which are used more often in design mixes today. Internal curing also minimizes early shrinkage due to rapid drying.

Lightweight aggregates essentially replace other aggregates in the mix and are made of clay, shake, or slate. They weigh about 113 to 115 pounds per cubic foot, compared to traditional aggregates' weight of 145 to 150 pounds per cubic foot. The aggregates typically are used with natural sand, although some versions replace both the aggregates and sand with lightweight aggregates, which reduces the weight to 95 to 100 pounds per cubic foot.

The aggregates are available nationwide, although sources are becoming more scarce, Harmon notes. "Since the 1960s, there's been a steady decline in available plants, as some have merged and others have left the business." Producing the aggregates has become more expensive, especially as environmental regulations have increased for the business, which requires rotary kilns to produce the aggregates. "There is a cost premium for using them due to the additional processing steps, but the savings from transportation alone are significant."

Concrete produced with lightweight aggregates also offers a higher fire rating, allowing a thinner slab to be used to achieve the required rating, he notes. That was put to good use by the 48-story Duke Energy Center in Charlotte, N.C. The project was designed with 12-foot-wide precast, prestressed concrete double tees that served as flooring in the 1.4-million-square-foot building, making it the tallest building in the world to use double tees.

The lightweight double tees, designed by Britt Peters & Associates in Greenville, S.C., span 43 feet from the exterior frame to the core. The tees, with a cast-in-place topping slab, were recommended to reduce concrete volume and efficiently achieve a two-hour fire rating, says Edward Britt, principal. "The greater fire resistance of lightweight concrete allowed us to reduce the floor thickness of the cast-in-place topping by 1 inch. That is a big building, and one inch added up to a lot of concrete and a huge savings."

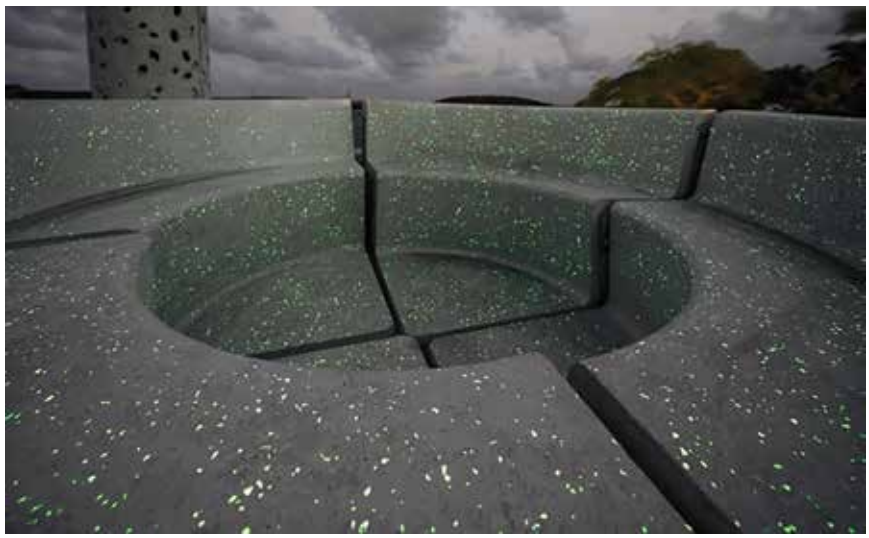
The lighter weight also made handling easier, allowing contractor Batson-Cook to complete a floor every four days. The floors were made with 32-inch-deep tees in the main tower and in the adjacent podium up to the ninth floor, after which the remaining tees were only 19 inches deep.

"We haven't done a good job of promoting lightweight aggregates to suppliers and designers," Harmon says. "They aren't discussed in architecture and engineering schools, so it's up to us to introduce it and educate professionals."

One organization working toward that goal is the Expanded Shale, Clay and Slate Institute (ESCSI), the professional organization representing makers of lightweight aggregates. "Structural lightweight concrete solves weight and durability problems in buildings and exposed structures," the group says. "It has a strength comparable to normal-weight concrete yet is typically 25% to 35% lighter. It offers design flexibility and substantial cost savings by providing less dead load, improved seismic structural response, longer spans, better fire ratings, thinner sections, decreased story height, smaller size structural members, less reinforcing steel and lower foundation costs." For more information on the group, visit www.escsi.org.

Recycled Aggregates

The growth of interest in using recycled materials in buildings, to increase the capability to add LEED rating points to a project's total, has led to interest in recycled aggregates in precast concrete members. Although crushed concrete often is used, other materials are gaining ground, including recycled porcelain



The El Blok Hotel and Spa in Isle de Vieques, Puerto Rico, used glow-in-the-dark aggregates in the precast concrete components around its grounds to provide an added aesthetic touch after dark. Photo: Ambient Glow Technology

The "Cougar Pride" walkway consists of 19 precast concrete panels, comprising four vertical and 15 horizontal panels created with an artistic mosaic of "U" and "H" figures in different color combinations. Photo: Jim Isemann

and smoked glass, which offer unique appearances.

The porcelain comes from bathroom-fixture "seconds" that didn't pass quality inspections, while much of the smoked glass being used is derived from old computer monitors and television screens that are ensured to be nonhazardous, says John Meyer, sales manager at Kafka Granite, which produces the aggregates. "Recycled porcelain is very durable, with low absorption rates, and is available in a cream or bisque neutral color." The smoked glass offers the appearance of smoky quartz at a lower price. Another aggregate growing in popularity is recycled copper slag, which offers a black, glassy appearance similar to black obsidian.

"Architects typically are looking for more aesthetics rather than an additional functional need when they use an untraditional aggregate," he says. "But some are looking at the porcelain options due to its strength, especially when used as a fine dust particulate." All of the specialty aggregates offer high durability, he notes, making them fine substitutes generally.

Colorful Aggregates

Colors are beginning to expand to offer more versatility, including for mosaics and artwork cast into the precast concrete panels. "In recent years, we've seen strong popularity for red, black, white, and buff colors," says Chris Fister, an owner at Fister Quarries. "We're also seeing interest in polished aggregates and softer hues to replicate a terra-cotta appearance. The one we're starting to hear architects are searching for is blue. But the only options to date tend to be price prohibitive."

Another popular trend of late has been colored glass, says Fister. "There are literally hundreds of color options, including recycled Coke and vodka bottles. They offer architects and designers more color options. Glass options typically are used for indoor applications, he notes, as the outdoor elements and weather can fade and darken the color.

Kafka's Meyer also has received more requests for colored options. "In architectural precast concrete applications, 90% of the requests are for black granite in the past year," he says. "But surprisingly enough, aggregates tend to be trendy. In past years, red granite was very popular, but then its popularity faded."

The versatility that can be achieved with colored aggregates can be seen in the elaborate mosaic Cougar Pride walkway and feature wall outside the football stadium at the University of Houston. Initially conceptualized as just a walkway, it expanded to include vertical panels and more presence. Both vertical and horizontal precast concrete panels feature elaborate mosaics intertwining upper- and lower-case "U" and "H" figures created with colored aggregates in the precast concrete panels.

It took 18 months to conceptualize and locate the precise colors desired by Isermann, who worked closely with Gate Precast Company to find the best options. "The precaster helped determine the most efficient approach to creating the design," he says. "I had thought we could do individual letters, but Gate showed that creating 8- by 8-foot monumental panels would be the most cost-efficient way to go. They were amazing to work with."

The most challenging part of the project was finding a red aggregate to match UH's signature red, he says. "Gate suggested recycled red glass for the 'U' letterforms. We tested several sizes and density of glass to get the final mix." A black obsidian was used for the 'H' letterforms." They were cast into 19, 8-foot-square panels in all, comprising four vertical panels and 15 horizontal walkway panels.

As many as seven colors of aggregates were cast into one panel, while the fewest colors in any one panel was four. They were cast using wheelbarrows and mortar mixers to precisely pour the proper amounts into the right portions of the formliner. "We needed to have seven mixes going at once and pour them without anything spilling over as we cast each panel," says Gate's Filo.

Black obsidian, supplied by Fister Quarries, was used rather than a black recycled glass because students would be walking over the panels, sometimes in bare feet, and the black glass could be sharp. "We needed a surface that could handle high heels and bare feet," Isermann explains. Adds Filo, "The black obsidian laid in nicely and provides good traction."

The vertical panels were placed on a concrete footing around the perimeter of the walkway, with a sand bed in the middle to support the horizontal panels. No connections were used on the horizontal portion of the project. Houston-based Metalab was the architectural firm on the project. "I couldn't have done the job without their efforts," Isermann says.

A special lithium admixture was added to the concrete design for the red glass and black obsidian, notes Filo. "The specific mix design isn't important, but designers and precasters must be aware of the

LiTraCon, based in Hungary, has created a translucent concrete consisting of concrete and glass fibers that allows opaque light to pass through, revealing shadows and shapes on the other side behind a strong light.

potential for Alklai Silica Reactivity (ASR)," he warns. It occurs when aggregates containing silica compounds react with Portland cement. "When designers suggest using new or uncommon aggregates, they and their precasters must be aware of the need for additional testing to make projects successful."

The extra efforts paid off with a dramatic, colorful, and functional artwork that serves as a strong introduction to the stadium. "As the work is outdoors, you can imagine how the glass and obsidian glow and sparkle in direct sunlight," says Isermann. "I've done many public projects before but never one with precast concrete. "I'd love to work in that medium again. I couldn't have been happier with the results."

Selecting Choices

Architects often have a specific color or texture in mind when they contact an aggregate supplier or precaster, but in some cases they simply want to know what options are available to reach a certain appearance. "Most often today, architects will review PCI's *Color & Texture Guide*, find a choice they like, and call us to match the plate number," says Fister. "That has become the standard way to approach it."

Some architects also visit aggregate manufacturers' websites to review options. "They often pick a color range they're interested in, and we'll send them four or five samples to show them what choices are readily available," says Tiffany Kafka, marketing coordinator at Kafka. The firm also provides sample rings with about 60 colors of granite, quartz, marble, and recycled materials that architects can retain in their reference library.

"The architects select the colors they want, we send them a sample to make a final decision, and then we send the aggregates to the precaster." In some cases, the precaster works directly with the architect to find the proper aggregate along with the complementary finishing technique to achieve the goal.

Kafka also offers a color-matching service, in which a designer or precasters ships them a sample of an aggregate that is no longer available or an old piece of precast concrete where the aggregate source is unknown. "If one of our 60 colors doesn't match, we'll blend different percentages of our colors to create a match," she says. The firm also meets any size specification required. "We do very thorough testing to match sizes required by different manufacturers."

Future Options

As precasters and aggregate suppliers continue to experiment with the product, and architects keep innovating and pushing the limits of the material's aesthetic properties, more options will open up. One with great potential is translucent concrete, which consists of about 4% glass fibers mixed with fine concrete. It was developed in 2001 by Hungarian architect Áron Losonczi, who worked with scientists at the Budapest University of Technology and Economics.

"The fibers form a matrix and run parallel to each other between the two main surfaces of each block," explains a spokesperson for LiTraCon, short for "Light-Transmitting Concrete," which manufactures the material. Due to the small size of the glass fibers, they blend into the concrete and become a part of its structural integrity but are not visible on the surface, the company says.

"The resulting product looks, feels, and behaves like pure concrete, but shadows and objects show through, similar to the effect of Japanese sliding screens made of rice paper." Panels can be cast up to a few meters thick without any loss of light and can be produced in various sizes and shapes.

The most notable use was in 2004 for Europe Gate, a sculpture consisting of LiTraCon blocks stacked 4 meters high, erected to commemorate Hungary's entrance into the European Union. The panels were considered as a possible sheathing for One World Trade Center in New York City, according to the New York Times.

"Europe often is four to six years ahead of us with concrete advances," says Gate's Filo. "It will take some time to develop materials like that here and interest architects in it, but new ideas always are arising." With precast concrete's capability to adapt and incorporate new ideas, innovations will continue to expand its aesthetic versatility. Architects who remain current with the latest techniques and ask their precasters for the newest ideas will ensure they take full advantage of what precast concrete can achieve.

For more information on these or other projects, visit www.pci.org/ascent.

PCI Precast/Prestressed Concrete Institute

Sustainability

with updates to LEED Version 4

PCI designer's notebook

Sustainability

Sustainability Concepts

Sustainable development is often defined as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.[1] Worldwide, people are currently using 20% more resources than can be regenerated. In particular, the U.S. population consumes more resources on a per capita basis than any other nation.

The environmental impact of constructing and operating buildings in most countries is significant. Consider that buildings consume 74% of the electricity generated in the U.S. and more than 39% of the primary energy (such as natural gas); produce 30% of the national output of greenhouse gas emissions; use 12% of the potable water in the U.S.; and employ 40% of raw materials (3 billion tons annually) for construction and operation worldwide.[2]

Building materials can have a significant effect on the environmental impact of the construction and operation of a building. Some materials may have to be used in special configurations, or employ different combinations, to achieve sustainability; the inherent properties of precast concrete, however, make it a natural choice for improving the sustainability of buildings. Precast concrete contributes to sustainable practices by incorporating integrated design; using materials efficiently; and reducing construction waste, site disturbance, and noise.

Although most consumers are concerned with the present and future health of the natural environment, few are willing to pay more for a building, product, process, or innovation that minimizes environmental burdens. The concept of sustainability, however, balances sustainable design with cost-effectiveness. Using integrated design (also called the holistic or whole-building approach), a building's materials, systems, and design are examined from the perspective of all project team members and tenants. Energy efficiency, cost, durability (or service life), space flexibility, environmental impact, and quality of life are all considered when decisions are made regarding the selection of a building design.

Triple Bottom Line

The triple bottom line — environment, society, and economy — emphasizes that economic consequences are related to environmental and social consequences. Consequences to society include impacts on employees, communities, and developing countries, as well as ethics, population growth, and security. Reducing materials and energy used, and emissions produced, by buildings has impacts far beyond those of the buildings themselves, such as:

- Using less materials means fewer new quarries are needed.
- Using less energy means fewer new power plants need to be constructed, less pollution is emitted into

the air, and dependence on foreign energy sources is reduced.

- Less emissions to air means a reduction in respiratory conditions, such as asthma.
- Using less water means a reduction in demands on the infrastructure to find and deliver new sources of water.

All of these examples indicate how building energy and utility use affect the local community. These are especially important since most communities do not want new power plants, quarries, or landfills built near them.

The community can also be considered globally. Carbon dioxide (CO_2) emissions in the U.S. increased from 5.3 ktons (4.8 ktonnes) in 2012 to 5.4 ktons in 2013. This increase was due to the increase in cold weather, which led to an increase in energy intensity. Despite this increase, 2013 levels were still 10% below 2005 levels.[3] Energy and material consumption, waste, and emissions to air, land, and water need to be considered from a global as well as regional perspective in a global market.

Cost of Building Green

A sustainable design can result in a building that is energy and resource efficient. Energy- and water-efficient buildings have lower operating costs (in the range of 25 to 30% lower energy costs) and a higher facility value than conventional buildings.[4] Lower energy costs translate into smaller capacity requirements for mechanical equipment (heating and cooling) and lower first costs for such equipment. Effective use of daylighting and passive solar techniques can further reduce lighting, heating, and cooling costs. Reusing materials, such as demolished concrete, for base or fill material, can reduce costs associated with hauling and disposing of materials.

When sustainability is an objective at the outset of the design process, the cost of a sustainable building is competitive. Often green buildings cost no more than conventional buildings because of the resource-efficient strategies used, such as downsizing of more costly mechanical, electrical, and structural systems. Reported increases in first costs for green buildings generally vary between 0 and 2% more, with costs expected to decrease as project teams become more experienced with green building strategies and design.[5] Generally, a 2% increase in construction costs will result in a savings of 10 times the initial investment in operating costs for utilities (energy, water, and waste) in the first 20 years of the building's life.

Buildings with good daylighting and indoor air quality— both common features of sustainable buildings— have increased labor productivity, worker retention, and days worked. These benefits contribute directly to a company's profits because salaries — which are about ten times higher than rent, utilities, and maintenance combined — are the largest expense for most companies occupying office space.[6] In schools with good daylighting and indoor air quality, students have higher test scores and lower absenteeism.

Integration Strategy	Sustainability Attribute
Use precast panel as interior surface.	Saves material; no need for additional framing and drywall.
Use hollow-core panels as ducts.	Saves material and energy; eliminates ductwork and charges thermal mass of panel.
Use thermal mass in combination with appropriate insulation levels in walls.	Thermal mass with insulation provides energy benefits that exceed the benefits of mass or insulation alone in most climates.
Design wall panels to be disassembled for building function changes.	Saves material; extends service life of panels.
Use durable materials.	Materials with a long life cycle and low maintenance will require less replacement and maintenance during the life of the building.
Use natural resources such as daylight, trees for shading, and ventilation.	Reduces lighting and cooling energy use. Increases indoor air quality and employee productivity.
Reduce and recycle construction waste.	Reduces transportation and disposal costs of wastes. Fewer virgin materials are used if construction waste is recycled for another project.
Use building commissioning to ensure that building standards are met.	Energy savings and indoor air quality are most likely attained during the building life if inspections are made to ensure that construction was as designed.

Table 1 Integration Strategies.

Holistic/Integrated Design

A key tenet of sustainable design is the holistic or integrated design approach. This approach requires coordinating the architectural, structural, civil, electrical, plumbing, and mechanical designs early in the schematic design phases to discern possible system interactions, and then deciding which beneficial interactions are essential for project success. For example, a well-insulated building with few windows that face east and west will require less heating and air-conditioning. This could impact the mechanical design by requiring fewer ducts and registers and perhaps allow for the elimination of registers along the building perimeter. Precast concrete walls act as thermal storage to delay and reduce peak loads, while also positively affecting the structural design of the building. **Table 1** provides other integrated design strategies.

A holistic viewpoint will also take into account the surrounding site environment:

- Are shelters needed for people who take public transportation to work?
- Can bike paths be incorporated for those who bike to work?
- Can native landscaping be used to reduce the need for irrigation?

The eight elements of integrated design are:

- Emphasize the integrated process.

- Consider the building as a whole — often interactive, often multi-functional.
- Focus on the life cycle.
- Have disciplines work together as a team from the start.
- Conduct relevant assessments to help determine requirements and set goals.
- Develop tailored solutions that yield multiple benefits while meeting requirements and goals.
- Evaluate solutions.
- Ensure that requirements and goals are met.

Contracts and requests for proposals (RFPs) should clearly describe sustainability requirements and project documentation required.[7]

3Rs – Reduce, Reuse, Recycle

The 3Rs of reducing waste can be applied to the building industry.

Reduce the amount of material used and the toxicity of waste materials

Precast and prestressed concrete can be designed to optimize (or lessen) the amount of concrete used. It is generally estimated that 2% of the concrete at a plant is waste, but because it is generated at the plant, 95% of the waste is used beneficially (see the section "Precast Concrete Production"). Industrial wastes such as fly ash, slag cement, and silica fume can be used as partial replacements for cement with certain aesthetic (color) and early-compressive-strength restrictions, thereby reducing the amount of cement used in concrete. Precast concrete generates a low amount of waste with a low toxicity.

Reuse products and containers; repair what can be reused

Precast concrete components can be reused when buildings are expanded. Concrete pieces from demolished structures can be reused to protect shorelines. Because the precast process is self-contained, formwork and finishing materials are reused. Wood forms can generally be used 25 to 30 times without major maintenance while fiberglass, concrete, and steel forms have significantly longer service lives.

Recycle as much as possible, which includes buying products with recycled content

Concrete in most urban areas is recycled as fill or road base. Wood and steel forms are recycled when they become worn or obsolete. Virtually all reinforcing steel is made from recycled steel. Many cement plants burn waste-derived fuels such as spent solvents, used oils, and tires in the manufacture of cement.

Life Cycle

A life-cycle analysis can be done in terms of the economic life-cycle cost or environmental life-cycle impact. Although the two approaches are different, they each consider the impacts of the building design over the life of the building — an essential part of sustainable design. When the energy and resource impacts of sustainable design are considered over the life of the building, a sustainable design often becomes more cost effective. Conversely, when the energy consuming impacts of a low-first-cost design are considered over the life of the building, the building may not be an attractive investment.

Practitioners of sustainable design believe that the key to sustainable building lies in long-life, adaptable, low-energy buildings. The durability and longevity of precast concrete makes it an ideal choice.

Life-Cycle Cost and Service Life

A life-cycle-cost analysis is a powerful tool used to make economic decisions for selection of building materials and systems. This analysis is the practice of accounting for all expenditures incurred over the lifetime of a particular structure. Costs at any given time are discounted back to a fixed date, based on assumed rates of inflation and the time-value of money. A life-cycle cost is in terms of dollars and is equal to the construction cost plus the present value of future utility, maintenance, and replacement costs over the life of the building.

Using this widely accepted method, it is possible to compare the economics of different building alternatives that may have different cash-flow factors but that provide a similar standard of service. The result is financial information for decision making, which can be used to balance capital costs and future operation, repair, or maintenance costs. Often, building designs with the lowest first costs for new construction will require higher costs during the building life. So, even with their low first cost, these buildings may have a higher life-cycle cost. Conversely, durable materials, such as precast concrete, often have a lower life-cycle cost. In the world of selecting the lowest bid, owners need to be made aware of the benefits of a lower life-cycle cost so that specifications require durable building materials such as precast concrete. Many owners and developers build buildings with a short time frame in mind before selling the property. In the past, these owners and developers have not been interested in long-term building performance and cost savings. However, as sustainable building design becomes more popular and is required more by regulation, market forces are beginning to influence those owners and developers who previously took a short-term approach to their buildings to consider long-term life-cycle costs.

The Building Life-Cycle Cost software from the National Institute of Standards and Technology (NIST) provides economic analysis of capital investments, energy, and operating costs of buildings, systems, and components. The software includes the means to evaluate costs and benefits of energy conservation and complies with ASTM standards related to building economics and Federal Energy Management Program requirements.

Accepted methods of performing life-cycle-cost analyses of buildings assume a 20-year life with the building maintaining 80% of its original value at the end of this time period. Buildings actually last hundreds of

years if they are not torn down due to obsolescence. Sustainability practitioners advocate that the foundation and shell of new buildings be designed for a service life of 100 years. Allowing extra capacity in columns, load-bearing walls, and floors would allow for future added floors or greater floor loads from change in use. Additionally, extra capacity in roofs for rooftop gardens adds to the building's long term flexibility.

On the other end of the spectrum, real estate speculators plan for a return on investment in seven years and generally do not adhere to the life-cycle-cost approach. Similarly, minimum code requirements for energy-conserving measures in the building shell are generally for five years, meaning initial insulation levels pay for themselves in five years. Because it is difficult and costly to add more insulation to the building shell after it has been constructed, the five-year payback for insulation is not consistent with the life-cycle cost associated with 100 -year use of buildings.

Advanced building-design guidelines from the New Buildings Institute; American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); and others specify insulation levels for those who want to build cost-effective buildings above minimum code levels. Alternatively, thermal mass and insulation can be included in the life-cycle-cost analysis to determine cost-effective levels. However, this requires whole-building energy analyses to determine annual costs to heat and cool the building. Economic levels of insulation depend on climate, location, building geometry, and building type.

Environmental Life-Cycle Inventory and Life-Cycle Assessment

A life-cycle assessment (LCA) is an environmental assessment of the life cycle of a product. An LCA looks at all aspects of a product life cycle — from the first stages of harvesting and extracting raw materials from nature, to transforming and processing these raw materials into a product, to using the product, and ultimately recycling it or disposing of it back into nature. An LCA consists of the four phases shown in **Fig. 1**.

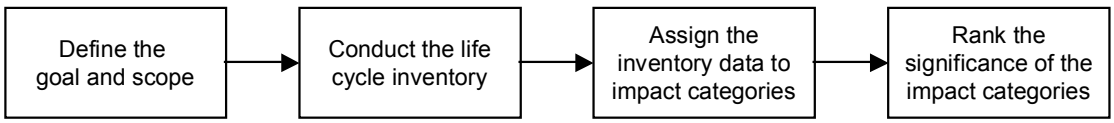


Figure 1 A life-cycle assessment consists of these four phases.

About AIA Learning Units

Please visit www.pci.org/elearning to read the complete article, as well as to take the test to qualify for 1.0 HSW Learning Unit.

The Precast/Prestressed Concrete Institute (PCI) is a Registered Provider with both the American Institute of Architects (AIA) and the National Council of Examiners for Engineers and Surveyors (NCEES). Continuing education credit is reported to both agencies.

All certificates of completion, for architects and for engineers, will be available from the Registered Continuing Education Provider (RCEP) website at www.rcep.net. PCI reports data twice per month so you should see your credits appear (and your certificate will be ready) within 30 days of our receiving your completed quiz.

If you are new to the Registered Continuing Education Provider system, www.rcep.net will email you a welcome email when PCI uploads your data. That email will contain your account password. Your login name at www.rcep.net will be your email address, so you must include it when submitting your completed quiz.

Instructions

Review the learning objectives below.

Read the AIA Learning Units article. Note: The complete article is avaliable at www.pci.org/elearning.

Complete the online test. You will need to answer at least 80% of the questions correctly to receive the 1.0 HSW Learning Units associated with this educational program.

Learning Objectives:

1. Readers will be able to better understand broad sustainability-related topics.
2. Readers will be able to explain concepts of integrated design, life-cycle assessment, and resiliency.
3. Readers will be able to discuss the different green building codes, standards, and rating systems that are in the market.
4. Readers will be able to describe how precast concrete can be used to design and build more-sustainable buildings.

Questions: contact Education Dept. - Alex Morales, (312) 786-0300; Email amorales@pci.org

PCI Continuing Education

PCI is a registered continuing education provider with the American Institute of Architects (AIA), and the National Council of Examiners of Engineers and Surveyors (NCEES). PCI also has registered programs with the Green Building Certification Institute (GBCI). PCI's educational offerings include a variety of programs to fit your schedule and preferred learning environment, such as webinars, seminars, lunch-and-learns, and online education. To learn more, visit www.pci.org/education.

Distance Learning Opportunities

Webinars

PCI webinars are presented live each month by industry experts on a variety of topics from design and construction to sustainability and more. All webinars are FREE, one-hour long and presented twice during the webinar week, at noon Pacific (3:00 p.m. Eastern) and noon Eastern. Webinars provide an inexpensive way to stay up to date on new materials, products, concepts, and more while earning continuing education credits. Visit www.pci.org/webinars for the full webinar schedule and registration information.

Upcoming Webinars

April 21 and 23: Discover High Performance Precast–Recent code changes, increasing sustainability requirements, and a challenging economy are just some of the factors increasing demand for high performance structures. However, high performance is not business-as-usual. The concept of 'high performance' encompasses sustainability; however, it goes beyond a 'this-or-that' approach by requiring optimization of all relevant attributes for a project on a life cycle basis. This presentation will explain what high performance structures are, and how precast concrete can help you achieve your high performance project goals. The presentation also covers the basics of precast concrete, its applications, finishes, etc.

Other upcoming webinar topics:

May 19 and 21: Designing for Fire–Precast concrete provides significantly enhanced passive fire protection due to its inherent inorganic composition and resistance to the effects of fire. Containment by compartmentalizing the design with a precast concrete structural system limits damage and may allow occupants more time to evacuate the premises. PCI recently published its updated fire manual including an International Code Council Evaluation Service (ICC-ES) report that allows its use as an alternate to code provisions. This presentation will provide an overview of fire safety design using the updated manual.

June 16 and 18: High Performance Athletic Facilities–The athletic facility market is expected to grow by 15% or more over the next couple of years. Furthermore, these structures have increasing requirements for designing and building for high performance and provide flexibility, functionality, and durability. This presentation will provide an overview of today's high performance athletic facility design using precast concrete systems, as well as include recommendations to optimize designs.

PCI eLearning Center

The PCI eLearning Center is the first education management system dedicated to the precast concrete structures industry. This free 24-hour online resource provides an opportunity for architects and engineers to earn continuing education credits on demand. Each course includes a webinar presentation recording, reference materials, and a quiz. Visit this resource at www.pci.org/elearning.

In-Person Learning Opportunities

Seminars and Workshops

PCI and its regional affiliates offer seminars and workshops all over the United States on a variety of topics. Visit www.pci.org/education for up-to-date seminar listings, additional information, and registration.

Upcoming Seminars and Workshops:

Quality Control Schools

Level I/II
May 12-13
Nashville, Tenn.

Certified Field Auditor
April 21-23
Hartford, Conn.

Lunch-and-Learns

PCI's lunch-and-learn/box-lunch programs are a convenient way for architects, engineers, and design professionals to receive continuing education credit without leaving the office. Industry experts visit your location; provide lunch; and present on topics such as sustainability, institutional construction, parking structures, aesthetics, blast resistance, the basics of precast, and many more. Visit www.pci.org/education/box_lunches for a list of lunch-and-learn offerings and to submit a program request.

PCI-Certified Plants

(as of March, 2015)

When it comes to quality, why take chances? When you need precast or precast, prestressed concrete products, choose a PCI-Certified plant. You'll get confirmed capability—a proven plant with a quality assurance program you can count on.

Whatever your needs, working with a PCI plant that is certified in the product groups it produces will benefit you and your project.

- You'll find easier identification of plants prepared to fulfill special needs.
- You'll deal with established producers—many certified for more than 30 years.
- Using quality products, construction crews can get the job done right the first time, keeping labor costs down.
- Quality products help construction proceed smoothly, expediting project completion.

Guide Specification

To be sure that you are getting the full benefit of the PCI Plant Certification Program, use the following guide specification for your next project:

"***Manufacturer Qualification***: The precast concrete manufacturing plant shall be certified by the Precast/Prestressed Concrete Institute Plant Certification Program. Manufacturer shall be certified at time of bidding.

Certification shall be in the following product group(s) and category(ies): [Select appropriate groups and categories (AT or A1), (B1,2,3, or 4), (C1,2,3, or 4), (G)]."

Product Groups and Categories

The PCI Plant Certification Program is focused around four groups of products, designated A, B, C, and G. Products in Group A are audited to the standards in MNL–117. Products in Groups B and C are audited to the standards in MNL–116. Products in Group G are audited according to the standards in MNL–130. The standards referenced above are found in the following manuals:

- MNL–116 *Manual for Quality Control for Plants and Production of Precast and Prestressed Concrete Products*
- MNL–117 *Manual for Quality Control for Plants and Production of Architectural Precast Concrete*
- MNL–130 *Manual for Quality Control for Plants and Production of Glass-Fiber-Reinforced Concrete Products*

Within Groups A, B, and C are categories that identify product types and the product capability of the individual plant. The categories reflect similarities in the ways in which the products are produced. In addition, categories in Groups A, B, and C are listed in ascending order. In other words, a plant certified to produce products in Category C4 is automatically certified for products in the preceding Categories C1, C2, and C3. A plant certified to produce products in Category B2 is automatically qualified for Category B1 but not Categories B3 or B4.

Please note for Group B, Category B1: Some precast concrete products such as highway median barriers, box culverts, and three-sided arches are not automatically included in routine plant audits. They may be included at the request of the precaster or if required by the project specifications.

GROUPS

GROUP A – *Architectural Products*

Category AT – Architectural Trim Units

Wet-cast, nonprestressed products with a high standard of finish quality and of relatively small size that can be installed with equipment of limited capacity such as sills, lintels, coping, cornices, quoins, medallions, bollards, benches, planters, and pavers.

Category A1 – Architectural Cladding and Load-Bearing Units

Precast or precast, prestressed concrete building elements such as exterior cladding, load-bearing and non-load-bearing wall panels, spandrels, beams, mullions, columns, column covers, and miscellaneous shapes. This category includes Category AT.

GROUP B – *Bridges*

Category B1 – Precast Concrete Bridge Products

Mild-steel-reinforced precast concrete elements that include some types of bridge beams or slabs, sheet piling, pile caps, retaining-wall elements, parapet walls, sound barriers, and box culverts.

Category B2 – Prestressed Miscellaneous Bridge Products

Any precast, prestressed element excluding super-structure beams. Includes piling, sheet piling, retaining-wall elements, stay-in-place bridge deck panels, and products in Category B1.

Category B3 – Prestressed Straight-Strand Bridge Members

Includes all superstructure elements such as box beams, I-beams, bulb-tees, stemmed members, solid slabs, full-depth bridge deck slabs, and products in Categories B1 and B2.

Category B4 – Prestressed Deflected-Strand Bridge Members

Includes all products covered in Categories B1, B2, and B3.

GROUP BA – *Bridge Products with an Architectural Finish*

These products are the same as those in the categories within Group B, but they are produced with an architectural finish. They will have a form, machine, or special finish. Certification for Group BA production supersedes Group B in the same category. For instance, a plant certified to produce products in Category B2A is also certified to produce products in Categories B1, B1A, and B2 (while it is not certified to produce any products in B3A or B4A).

GROUP C – *Commercial (Structural)*

Category C1 – Precast Concrete Products

Mild-steel-reinforced precast concrete elements including sheet piling, pile caps, piling, retaining-wall elements, floor and roof slabs, joists, stairs, seating members, columns, beams, walls, spandrels, etc.

Category C2 – Prestressed Hollow-Core and Repetitive Products

Standard shapes made in a repetitive process prestressed with straight strands. Included are hollow-core slabs, railroad ties, flat slabs, poles, wall panels, and products in Category C1.

Category C3 – Prestressed Straight-Strand Structural Members

Includes stemmed members, beams, columns, joists, seating members, and products in Categories C1 and C2.

Category C4 – Prestressed Deflected-Strand Structural Members

Includes stemmed members, beams, joists, and products in Categories C1, C2, and C3.

GROUP CA – *Commercial Products with an Architectural Finish*

These products are the same as those in the categories within Group C, but they are produced with an architectural finish. They will have a form, machine, or special finish. Certification for Group CA production supersedes Group C in the same category. For instance, a plant certified to produce products in Category C2A is also certified to produce products in C1, C1A, and C2 (while it is not certified to produce any products in Groups C3 or C4A).

Group G – *Glass-Fiber-Reinforced Concrete (GFRC)*

These products are reinforced with glass fibers that are randomly dispersed throughout the product and are made by spraying a cement/sand slurry onto molds. This produces thin-walled, lightweight cladding panels.

Visit www.pci.org for the most up-to-date listing of PCI-Certified plants.

ALABAMA

Gate Precast Company, Monroeville (251) 575-2803 — **A1, C4A**
Hanson Pipe & Precast–Pelham Precast, Pelham (205) 663-4681 — **B4, C4**

ARIZONA

Coreslab Structures (ARIZ) Inc., Phoenix (602) 237-3875 — **A1, B4, C4A**
Green Fuel Technologies LLC dba Royden Precast, Phoenix (602) 484-0028 — **B4**
LB Foster/CXT Concrete Ties, Tuscon (520) 882-3995 — **C2**
TPAC, A Div. of Kiewit Western Co., Phoenix (602) 262-1360 — **A1, B4, C4A**

ARKANSAS

Coreslab Structures (ARK) Inc., Conway (501) 329-3763 — **C4A**

CALIFORNIA

Bethlehem Construction, Inc., Wasco (661) 391-9704 — **C3A**
Clark Pacific, Fontana (909) 823-1433 — **A1, C3, C3A, G**
Clark Pacific, Irwindale (626) 962-8751 — **C4**
Clark Pacific, West Sacramento (916) 371-0305 — **A1, C3A**
Clark Pacific, Woodland (503) 207-4100 — **A1, B3, C3A**
Con-Fab California Corporation, Lathrop (209) 249-4700 — **B4, C4**
Con-Fab California Corporation, Shafter (661) 630-7162 — **B4, C4**
Coreslab Structures (L.A.) Inc., Perris (951) 943-9119 — **A1, B4, C4, C4A**
KIE-CON, Inc., Antioch (925) 754-9494 — **B4, C3**
Mid-State Precast, L.P., Corcoran (559) 992-8180 — **A1, C3, C3A**
Oldcastle Precast, Inc., Perris (951) 657-6093 — **B4A, C2A**
Oldcastle Precast Inc., Stockton (209) 466-4215 — **C2**
Precast Concrete Technology dba CTU Precast, Olivehurst (530) 749-6501 — **A1, C3A**
StructureCast, Bakersfield (661) 833-4490 — **A1, B3, C3, C3A**
Universal Precast Concrete, Inc., Redding (530) 243-6477 — **A1**
Walters & Wolf Precast, Fremont (510) 226-9800 — **A1, G**
Willis Construction Co., Inc., San Juan Bautista (831) 623-2900 — **A1, C1, G**

COLORADO

EnCon Colorado, Denver (303) 287-4312 — **B4, C2**
Plum Creek Structures, Littleton (303) 471-1569 — **B4, C3A**
Rocky Mountain Prestress LLC, Architectural Plant Denver (303) 480-1111 — **A1, C3A**
Rocky Mountain Prestress LLC, Structural Plant, Denver (303) 480-1111 — **B4, C4**
Rocla Concrete Tie, Inc., Lakewood (303) 296-3500 — **C2**
Stresscon Corporation, Colorado Springs (719) 390-5041 — **A1, B4A, C4A**

CONNECTICUT

Blakeslee Prestress Inc., Branford (203) 481-5306 — **A1, B4, C4A**
Coreslab Structures (CONN) Inc., Thomaston (860) 283-8281 — **A1, B1, C1**
United Concrete Products, Inc., Yalesville (203) 269-3119 — **B3, C3**

DELAWARE

Concrete Building Systems of Delaware, Inc., Delmar (302) 846-3645 — **B3, C4**
Rocla Concrete Tie, Inc., Bear (302) 836-5304 — **C2**

FLORIDA

Cement Industries, Inc., Fort Myers (800) 332-1440 — **B3, C3**
Colonial Construction, Concrete, Precast, LLC, Placida (941) 698-4180 — **C2**
Coreslab Structures (MIAMI) Inc., Medley (305) 823-8950 — **A1, C4, C4A**
Coreslab Structures (ORLANDO) Inc., Orlando (407) 855-3190 — **C2**
Coreslab Structures (TAMPA) Inc., Tampa (813) 626-1141 — **A1, B3, C3, C3A**
Dura-Stress, Inc., Leesburg (352) 787-1422 — **A1, B4, B4A, C4, C4A**
Finfrock Industries, Inc., Orlando (407) 293-4000 — **A1, C3**
Gate Precast Company, Jacksonville (904) 757-0860 — **A1, B4, C3A**
Gate Precast Company, Kissimmee (407) 847-5285 — **A1, C3**
International Casting Corporation, Miami Lakes (305) 558-3515 — **C3**
Metromont Corporation, Bartow (863) 440-5400 — **A1, C3, C3A**
Pre-Cast Specialties Inc., Pompano Beach (954) 781-4040 — **C4**
Spancrete Southeast Inc., Sebring (863) 655-1515 — **C2**
Stabil Concrete Products, LLC, St. Petersburg (727) 321-6000 — **A1**
Standard Concrete Products, Inc., Tampa (813) 831-9520 — **B4, C3**
Structural Prestressed Industries, Medley (305) 556-6699 — **C4**

GEORGIA

Atlanta Structural Concrete Co., Buchanan (770) 646-1888 — **C4A**
ConArt Precast LLC, Cobb (229) 853-5000 — **A1, AT, C3**
Coreslab Structures (ATLANTA) Inc., Jonesboro (770) 471-1150 — **C2**
Metromont Corporation, Hiram (770) 943-8688 — **A1, C4, C4A**
Standard Concrete Products, Inc., Atlanta (404) 792-1600 — **B4**
Standard Concrete Products, Inc., Savannah (912) 233-8263 — **B4, C4**
Tindall Corporation, Georgia Division, Conley (404) 366-6270 — **C4, C4A**

HAWAII

GPRM Prestress, LLC, Honolulu (808) 682-6000 — **A1, B3, C4**

IDAHO

Hanson Structural Precast Eagle, Caldwell (208) 454-8116 — **A1, B4, C4**
Teton Prestress Concrete, LLC., Idaho Falls (208) 523-6410 — **B4, C3**

ILLINOIS

ATMI Precast, Aurora (630) 896-4679 — **A1, C3A**
AVAN Precast Concrete Products, Lynwood (708) 757-6200 — **A1, C3**
County Materials Corporation, Champaign (217) 352-4181 — **B3**
County Materials Corporation, Salem (618) 548-1190 — **A1, B4, C4**
Dukane Precast, Inc., Aurora (630) 355-8118 — **A1, B3, C3, C3A**
Dukane Precast, Inc., Naperville (630) 355-8118 — **A1, B3, C3, C3A**
Dukane Precast, Inc., Plainfield, (815) 230-4760 — **C3**
Illini Precast, LLC, Marseilles (815) 795-6161 — **B4, C3**
KW Precast LLC, Westchester (708) 562-7770 — **B4, C4**
Lombard Architectural Precast Products Co., Alsip (708) 389-1060 — **A1**
Mid-States Concrete Industries, South Beloit (815) 389-2277 — **A1, B3, B3-IL, C3A**
St. Louis Prestress, Inc., Glen Carbon (618) 656-8934 — **B3, B3-IL, C3**
Thornton Rave Construction, LLC dba Illini Concrete Company of Illinois, Bloomington (309) 925-2376 — **B3**
Utility Concrete Products, LLC, Morris (815) 416-1000 — **B1, B1A, C1, C1A**

INDIANA

ATMI Indy, LLC, Greenfield (317) 891-6280 — **A1, C2, C2A**
Coreslab Structures (INDIANAPOLIS) Inc., Indianapolis (317) 353-2118 — **A1, C4, C4A**
Hoosier Precast LLC, Salem (815) 459-4545 — **B3, C1, C1A**
Precast, LLC dba Precast Specialties, Monroeville (260) 623-6131 — **A1, B1**
Prestress Services Industries LLC, Decatur (260) 724-7117 — **B4, C4, C4A**
StresCore, Inc., South Bend (574) 233-1117 — **C2**

IOWA

Advanced Precast Co., Farley (563) 744-3909 — **A1, C1, C1A**
Cretex Concrete Products Midwest, Inc., Iowa Falls (641) 648-2579 — **A1, B4, C4A**
MPC Enterprises, Inc., Mount Pleasant (319) 986-2226 — **A1, C3, C3A**
PDM Precast, Inc., Des Moines (515) 243-5118 — **A1, C3A**

KANSAS

Coreslab Structures (KANSAS) Inc., Kansas City (913) 287-5725 — **B4, C4**
Prestressed Concrete, Inc., Newton (316) 283-2277 — **A1, B4, C4, C4A**
Stress-Cast, Inc., Assaria (785) 667-3905 — **C3, C3A**

KENTUCKY

Bristol Group, Inc., Lexington (859) 233-9050 — **A1, B3, B3A, C3, C3A**
de AM - RON Building Systems LLC, Owensboro (270) 684-6226 — **B3, C3, C3A**
Gate Precast Company, Winchester (859) 744-9481 — **A1, C3, C3A**
Prestress Services Industries LLC, Lexington (601) 856-4135 — **A1, B4, C4, C4A**
Prestress Services Industries LLC, Melbourne (859) 441-0068 — **B4, C3**

LOUISIANA

Atlantic Metrocast, Inc., New Orleans (504) 941-3152 — **C2**
Boykin Brothers, Inc./Louisiana Concrete, Baton Rouge (225) 753-8722 — **A1, B4, C3A**
F-S Prestress, LLC, Princeton (318) 949-2444 — **B4, C3**
Fibrebond Corporation, Minden (318) 377-1030 — **A1, C1A**

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MAINE

Oldcastle Precast, Auburn (207) 784-9144 — **B2, C1**

MARYLAND

Larry E. Knight, Inc., Glyndon (410) 833-7800 — **C2**

Oldcastle Precast Building Systems Div., Edgewood (800) 523-3747 — **A1, C3A**

MASSACHUSETTS

Oldcastle Precast, Rehoboth (860) 675-1294 — **B2, C1, C1A**

Oldcastle Precast, Inc., Rehoboth (508) 336-7600 — **B4, C3**

Precast Specialties Corp., Abington (781) 878-7220 — **A1**

Unistress Corporation, Pittsfield (413) 629-2039 — **A1, B4, C4A**

Vynorius Prestress, Inc., Salisbury (978) 462-7765 — **B3, C2**

MICHIGAN

International Precast Solutions, LLC, River Rouge (313) 843-0073 — **A1, B3, C3**

Kerkstra Precast Inc., Grandville (616) 224-6176 — **A1, B3, C3A**

M.E.G.A. Precast, Inc., Roseville (586) 294-6430 — **A1, C3A**

M.E.G.A. Precast, Inc., Shelby Township (586) 294-6430 — **A1, C3**

Nucon Schokbeton/Stress-Con Industries, Inc.,
Kalamazoo (269) 381-1550 — **A1, B4, C3, C3A**

Peninsula Prestress Company, Grand Rapids (517) 206-4775 — **B4, C1**

Stress-Con Industries, Inc., Saginaw (989) 239-2447 — **B4, C3**

MINNESOTA

Crest Precast, Inc., La Crescent (800) 658-9045 — **B3A, C1A**

Cretex Concrete Products Midwest, Inc., Elk River (763) 441-2124 — **B4, C2**

Fabcon Precast, LLC, Savage (952) 890-4444 — **A1, B1, C3A**

Molin Concrete Products Co., Lino Lakes (651) 786-7722 — **C3A**

Wells Concrete, Albany (320) 845-2299 — **A1, C3A**

Wells Concrete, Wells (800) 658-7049 — **A1, C4A**

Wells Concrete–Maple Grove, Osseo (763) 425-5555 — **A1, C4A**

MISSISSIPPI

F-S Prestress, LLC, Hattiesburg (601) 268-2006 — **B4, C4**

Gulf Coast Pre-Stress, Inc., Pass Christian (228) 452-9486 — **B4, C4**

J.J. Ferguson Prestress-Precast Company, Inc., Greenwood (662) 453-5451 — **B4**

Jackson Precast, Inc., Jackson (601) 321-8787 — **A1, C2A**

Tindall Corporation, Moss Point (228) 246-0800 — **A1, C4A**

MISSOURI

Coreslab Structures (MISSOURI) Inc., Marshall (660) 886-3306 — **A1, B4, C4, C4A**

County Materials Corporation, Bonne Terre (636) 432-0225 — **B4**

Mid America Precast, Inc., Fulton (573) 642-6400 — **A1, B1, C1**

Prestressed Casting Co., Springfield (417) 581-7009 — **C4**

Prestressed Casting Co., Springfield (417) 869-7350 — **A1, C3, C3A**

MONTANA

BC Concrete, Inc. dba Missoula Concrete Construction,
Missoula (406) 549-9682 — **A1, B3, C3A**

Montana Prestressed Concrete - MT City Plant, Helena (406) 442-6503 — **B4**

NEBRASKA

American Concrete Products Co., Omaha (402) 331-5775 — **B1, B1A, C1, C1A**

Concrete Industries, Inc., Lincoln (402) 434-1800 — **B4, C4A**

Coreslab Structures (OMAHA) Inc., Bellevue (402) 291-0733 — **A1, B4, C4, C4A**

Enterprise Precast Concrete, Inc., Omaha (402) 895-3848 — **A1, C2, C2A**

Stonco, Inc., Omaha (402) 556-5544 — **A1**

NEW HAMPSHIRE

Newstress Inc., Epsom (603) 736-9000 — **B3, C3**

NEW JERSEY

Boccella Precast LLC, Berlin (856) 767-3861 — **C2**

Jersey Precast, Hamilton (609) 689-3700 — **B4, C4**

Northeast Precast, Millville (856) 765-9088 — **A1, B3, C3A**

Precast Systems, Inc., Allentown (609) 208-1987 — **B4, C4**

NEW MEXICO

Castillo Prestress, Belen (505) 864-0238 — **B4, C4**

Coreslab Structures (ALBUQUERQUE) Inc.,
Albuquerque (505) 247-3725 — **A1, B4, C4, C4A**

NEW YORK

David Kucera Inc., Gardiner (845) 255-1044 — **A1, G**

Lakelands Concrete Products, Inc., Lima (585) 624-1990 — **A1, B3A, C3A**

Oldcastle Precast Building Systems Div., Selkirk (518) 767-2116 — **B3, C3A**

The Fort Miller Company, Inc., Schuylerville (518) 695-4970 — **B3A, C1**

The L.C. Whitford Materials Co., Inc., Wellsville (585) 593-2741 — **B4, C3**

NORTH CAROLINA

Coastal Precast Systems , LLC, Wilmington (910) 604-2249 — **B2, C2**

Gate Precast Company, Oxford (919) 603-1633 — **A1, C2**

Metromont Corporation, Charlotte (704) 372-1080 — **A1, C3A**

Prestress of the Carolinas, Pineville (704) 587-4273 — **B4, C4**

Utility Precast, Inc., Concord (704) 721-0106 — **B3A**

NORTH DAKOTA

Wells Concrete, Grand Forks (701) 772-6687 — **C4A**

OHIO

DBS Prestress of Ohio, Huber Heights (937) 878-8232 — **C3**

Fabcon Precast, LLC, Grove City (952) 890-4444 — **A1, C3, C3A**

High Concrete Group LLC, Springboro (937) 748-2412 — **A1, C3, C3A**

KSA, Sciotoville (740) 776-3238 — **C2**

Mack Industries, Inc., Valley City (330) 483-3111 — **C2**

Prestress Services Industries of Ohio, LLC, (I-Beam),
Mt. Vernon (800) 366-8740 — **A1, B4, C3**

Prestress Services Industries of Ohio, LLC,, (Box Beam),
Mt. Vernon (740) 393-1121 — **B3, C3**

Sidley Precast, Thompson (440) 298-3232 — **A1, C4A**

OKLAHOMA

Arrowhead Precast, LLC, Broken Arrow (918) 995-2227 — **A1, C3, C3A**

Coreslab Structures (OKLA) Inc. (Plant No.1),
Oklahoma City (405) 632-4944 — **A1, C4, C4A**

Coreslab Structures (OKLA) Inc. (Plant No.2), Oklahoma City (405) 672-2325 — **B4, C1**

Coreslab Structures (TULSA) Inc., Tulsa (918) 438-0230 — **B4, C4**

OREGON

Knife River Corporation, Harrisburg (541) 995-6327 — **A1, B4, C4**

R.B. Johnson Co., McMinnville (503) 472-2430 — **B4, C3**

PENNSYLVANIA

Brayman Precast, LLC, Saxonburg (724) 352-5600 — **B1, C1**

Brayman Precast, LLC, Speers Plant, Belle Vernon (724) 352-5600 — **B1, C1**

Concrete Safety Systems, LLC, Bethel (717) 933-4107 — **A1, B1A, C1A**

Conewago Precast Building Systems, Hanover (717) 632-7722 — **A1, C3A**

Dutchland, Inc., Gap (717) 442-8282 — **C3**

Fabcon Precast, LLC, Mahanoy City (952) 890-4444 — **A1, B1, B1A, C3, C3A**

Faddis Concrete Products, Honey Brook (540) 775-4546 — **B2, C2**

High Concrete Group LLC, Denver (717) 336-9300 — **A1, B3, C3A**

J & R Slaw, Inc., Lehighton (610) 852-2020 — **A1, B4, C3**

Nitterhouse Concrete Products, Inc., Chambersburg (717) 267-4505 — **A1, C4A**

Northeast Prestressed Products, LLC, Cressona (570) 385-2352 — **B4, C3**

PENNSTRESS, Roaring Spring (814) 224-2121 — **A1, B4, C4**

Say-Core, Inc., Portage (814) 736-8018 — **C2**

Sidley Precast, Youngwood (724) 755-0205 — **C3**

Universal Concrete Products Corporation, Stowe (610) 323-0700 — **A1, C3A**

US Concrete Precast Group Mid-Atlantic, Middleburg (570) 837-1774 — **A1, C3, C3A**

RHODE ISLAND

Hayward Baker Inc., Cumberland (401) 334-2565 — **C2**

SOUTH CAROLINA

Visit www.pci.org for the most up-to-date listing of PCI-Certified plants.

Florence Concrete Products, Inc., Sumter (803) 775-4372 — **B4, C3, C3A**
Metromont Corporation, Greenville (864) 605-5000 — **A1, C4, C4A**
Metromont Corporation, Greenville (804) 665-1300 — **A1, C3A**
Tekna Corporation, Charleston (843) 853-9118 — **B3, C3**
Tindall Corporation, Spartanburg (864) 576-3230 — **A1, C4, C4A**

SOUTH DAKOTA

Cretex Concrete Products, Inc., Rapid City (406) 656-1601 — **B4, C3**
Gage Brothers, Sioux Falls (605) 336-1180 — **A1, B4, C4A**

TENNESSEE

Construction Products, Inc. of Tennessee, Jackson (731) 668-7305 — **B4, C4**
Gate Precast Company, Ashland City (615) 792-7608 — **A1, C3A**
Mid South Prestress, LLC, Pleasant View (615) 746-6606 — **C3**
Prestress Services Industries of TN, LLC, Memphis (901) 775-9880 — **B4, C3**
Ross Prestressed Concrete, Inc., Bristol (423) 323-1777 — **B4, C3**
Ross Prestressed Concrete, Inc., Knoxville (865) 524-1485 — **B4, C4**

TEXAS

Coreslab Structures (TEXAS) Inc., Cedar Park (512) 250-0755 — **A1, C4A**
CXT, Inc., Hillsboro (254) 580-9100 — **B1A, C1A**
East Texas Precast Co., LTD., Waller (281) 463-0654 — **C4A**
Enterprise Concrete Products, LLC, Dallas (214) 631-7006 — **B3, C3**
Enterprise Precast Concrete of Texas, LLC, Corsicana (903) 875-1077 — **A1, C1**
Gate Precast Company, Hillsboro (254) 582-7200 — **A1**
Gate Precast Company, Pearland (281) 485-3273 — **C2**
GFRC Cladding Systems, LLC, Garland (972) 494-9000 — **G**
Heldenfels Enterprises, Inc., Corpus Christi (361) 883-9334 — **B4, C4**
Heldenfels Enterprises, Inc., San Marcos (512) 396-2376 — **B4, C4**
Legacy Precast, LLC, Brookshire (281) 375-2050 — **C4**
Lowe Precast, Inc., Waco (254) 776-9690 — **A1, C3A**
Manco Structures, Ltd., Schertz (210) 690-1705 — **C4, C4A**
NAPCO PRECAST, LLC, San Antonio (210) 509-9100 — **A1, C4, C4A**
Rocla Concrete Tie, Inc., Amarillo (806) 383-7071 — **C2**
Texas Concrete Partners, LP, Elm Mott (254) 822-1351 — **B4, C4**
Texas Concrete Partners, LP, Victoria (361) 573-9145 — **B4, C4**
Tindall Corporation, San Antonio (210) 248-2345 — **A1, C3, C3A**
Valley Prestress Products Inc., Eagle Lake (979) 234-7899 — **B4**

UTAH

Granite Construction Company, Salt Lake City (801) 526-6000 — **B1**
Hanson Structural Precast Eagle, Salt Lake City (801) 966-1060 — **A1, B4, C4, C4A, G**
Olympus Precast, LLC, Sandy (801) 571-5041 — **A1, B3, B3A, C3, C3A**
Rulon Harper Companies dba Harper Precast, Salt Lake City (801) 326-1016 — **B2, C1**

VERMONT

J. P. Carrara & Sons, Inc., Middlebury (802) 388-6363 — **A1, B4A, C3A**
S.D. Ireland Companies, Williston (802) 863-6222 — **A1, B1, C1**
William E. Dailey Precast, LLC, Shaftsbury (802) 442-4418 — **A1 B4A, C3A**

VIRGINIA

Atlantic Metrocast, Inc., Portsmouth (757) 397-2317 — **B4, C4**
Bayshore Concrete Products Corporation, Cape Charles (757) 331-2300 — **B4, C4**
Bayshore Concrete Products/Chesapeake, Inc., Chesapeake (757) 545-5215 — **B4, C3**
Coastal Precast Systems, LLC, Chesapeake (757) 545-5215 — **A1, B4, C3**
Rockingham Precast, Inc., Harrisonburg (540) 433-8282 — **B4**
The Shockey Precast Group, Winchester (540) 667-7700 — **A1, C4A**
Smith-Midland, Midland (540) 439-3266 — **A1, B2, C2, C2A**
Tindall Corporation, Petersburg (804) 861-8447 — **A1, C4A**

WASHINGTON

Bellingham Marine Industries, Inc., Ferndale (360) 380-2142 — **B3, C2**
Bethlehem Construction, Inc., Cashmere (509) 782-1001 — **B1, C3A**
Concrete Technology Corporation, Tacoma (253) 383-3545 — **B4, C4**
CXT, Inc., Precast Division, Spokane (509) 921-8766 — **B1, C1A**
CXT, Inc., Rail Division, Spokane (509) 921-7878 — **C2**
EnCon Northwest, LLC, Camas (360) 834-3459 — **B1, B1A**
EnCon Washington, LLC, Puyallup (253) 846-2774 — **B1, C2**
Oldcastle Precast, Inc., Spokane, Spokane Valley (509) 536-3300 — **A1, B4, C4**
Wilbert Precast, Inc., Yakima (509) 325-4573 — **B3, C3**

WEST VIRGINIA

Carr Concrete Corporation, Waverly (304) 464-4441 — **B4, C3**
Eastern Vault Company, Inc., Princeton (304) 425-8955 — **B3, C3**

WISCONSIN

County Materials Corporation, Marathon (608) 373-0950 — **B4**
County Materials Corporation, Roberts (800) 426-1126 — **B4, C3**
International Concrete Products, Inc., Germantown (262) 242-7840 — **A1, C1**
MidCon Products, Inc., Hortonville (920) 779-4032 — **A1, C1**
Spancrete, Waukesha (920) 775-4121 — **A1, B4, C3A**
Stonecast Products, Inc., Germantown (262) 253-6600 — **A1, C1**
Wausau Tile Inc., Wausau (715) 359-3121 — **AT**

WYOMING

voestalpine Nortrak Inc., Cheyenne (509) 220-6837 — **C2**

MEXICO

PRETECSA, S.A. DE C.V., Atizapan De Zaragoza 52 (555) 077-0071 — **A1, G**
Willis De Mexico S.A. de C.V., Tecate 52 (665) 655-2222 — **A1, C1, G**

CANADA

BRITISH COLUMBIA

APS Architectural Precast Structures LTD, Langley (604) 888-1968 — **A1, B4, C3**
Armtec Limited Partnership, Richmond (604) 214-3243 — **A1, B4, C3**

NEW BRUNSWICK

Strescon Limited, Saint John (506) 633-8877 — **A1, B4, C4A**

NOVA SCOTIA

Strescon Limited, Beford (902) 494-7400 — **A1, B4, C4, C4A**

ONTARIO

Artex Systems Inc., Concord (905) 669-1425 — **A1**
Global Precast INC, Maple (905) 832-4307 — **A1**
Prestressed Systems, Inc., Windsor (519) 737-1216 — **B4, C4**

QUEBEC

Betons Prefabriques Trans. Canada Inc.,
St. Eugene De Grantham (819) 396-2624 — **A1, B4, C3A**
Papeterie, Alma — **A1, C2**
Papeterie, Alma — **A1, C3A, G**
Prefab de Beauce Inc., Alma (418) 668-6161 — **A1, C3**

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PCI-Qualified & PCI-Certified Erectors

(as of January, 2015)

When it comes to quality, why take chances? When you need precast or precast, prestressed concrete products, choose a PCI-Qualified/Certified Erector. You'll get confirmed capability with a quality assurance program you can count on.

Whatever your needs, working with an erector who is PCI Qualified/Certified in the structure categories listed will benefit you and your project.

- You'll find easier identification of erectors prepared to fulfill special needs.
- You'll deal with established erectors.
- Using a PCI-Qualified/Certified Erector is the first step toward getting the job done right the first time, thus keeping labor costs down.
- PCI-Qualified/Certified Erectors help construction proceed smoothly, expediting project completion.

Guide Specification

To be sure that you are getting an erector from the PCI Field Certification Program, use the following guide specification for your next project:

"Erector Qualification: The precast concrete erector shall be fully qualified or certified by the Precast/Prestressed Concrete Institute (PCI) prior to the beginning of any work at the jobsite. The precast concrete erector shall be qualified or certified in Structure Category(ies): [Select appropriate groups and categories S1 or S2 and/or A1]."

Erector Classifications

The PCI Field Certification Program is focused around three erector classifications. The standards referenced are found in the following manuals:

MNL–127 *Erector's Manual - Standards and Guidelines for the Erection of Precast Concrete Products*

MNL–132 *Erection Safety Manual for Precast and Prestressed Concrete*

GROUPS

Category S1 - Simple Structural Systems
This category includes horizontal decking members (e.g., hollow-core slabs on masonry walls), bridge beams placed on cast-in-place abutments or piers, and single-lift wall panels.

Category S2 - Complex Structural Systems
This category includes everything outlined in Category S1 as well as total-precast, multi-product structures (vertical and horizontal members combined) and single- or multistory load-bearing members (including those with architectural finishes).

Category A - Architectural Systems
This category includes non-load-bearing cladding and GFRC products, which may be attached to a supporting structure.

Certified erectors are listed with an asterisk.

ARIZONA

Coreslab Structures (ARIZ), Inc., Phoenix (602) 237-3875 — **A, S2**
*** RJC Contracting, Inc.,** Mesa (480) 357-0868 — **A, S2**
TPAC, Phoenix (602) 262-1360 — **A, S2**

CALIFORNIA

Walters & Wolf Precast, Fremont (510) 226-5166 — **A**

COLORADO

EnCon Field Services, LLC, Denver (303) 287-4312 — **S2**
Gibbons Erectors, Inc., Englewood (303) 841-0457 — **A, S2**
Rocky Mountain Prestress,LLC, Denver (303) 480-1111 — **A, S2**

CONNECTICUT

*** Blakeslee Prestress, Inc.,** Branford (203) 481-5306 — **S2**

FLORIDA

All Florida Erectors and Welding, Inc., Apopka (407) 880-3717 — **A, S2**
Concrete Erectors, Inc., Altamonte Springs (407) 862-7100 — **A, S2**
Finfrock DMC, Apopka (407) 293-4003 — **A, S2**
*** Florida Builders Group, Inc.,** Miami (305) 278-0098 — **S2**
*** Jacob Erecting & Construction, LLC,** Jupiter (561) 741-1818 — **A, S2**
James Toffoli Construction Company, Inc., Fort Myers (239) 479-5100 — **A, S2**
*** Pre-Con Construction of Tampa Inc./Pre-Con Construction, Inc.,** Tampa (813) 626-2545 — **A, S2**
Prestressed Contractors Inc., West Palm Beach (561) 741-4369 — **S1**
Solar Erectors U.S. Inc., Medley (305) 825-2514 — **A, S21**
*** Spancrete Southeast,** Sebring (863) 655-1515 — **S1**
*** Specialty Concrete Services, Inc.,** Umatilla (352) 669-8888 — **A, S2**

GEORGIA

Bass Precast Erecting, Inc., Cleveland (706) 809-2718 — **S1**
Jack Stevens Welding LLP, Murrayville (770) 534-3809 — **S2**
Precision Stone Setting Co., Inc., Hiram (770) 439-1068 — **A, S2**
Rutledge & Sons, Inc., Canton (770) 592-0380 — **S2**
Southeastern Precast Erectors Inc. (SPE Inc.), Roswell (770) 722-9212 — **A**

IDAHO

*** Precision Precast Erectors, LLC,** Worley (208) 231-5650 — **A, S2**

ILLINOIS

Area Erectors, Inc., Rochelle (815) 562-4000 — **A, S2**
Mid-States Concrete Industries, South Beloit (815) 389-2277 — **S2**

IOWA

Industrial Steel Erectors, Davenport (563) 355-7202 — **S1**
Northwest Steel Erection, Inc., Grimes (515) 986-0380 — **A, S2**

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* **Crossland Construction Company, Inc.,** Columbus (620) 442-1414 — **A, S2**
Ferco, Inc., Salina (785) 825-6380 — **A, S2**

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* **DLM Contractors, LLC,** Cheltenham (301) 877-0000 — **A, S2**
E & B Erectors, Inc., Elkridge (410) 360-7800 — **A, S2**
E.E. Marr Erectors, Inc., Baltimore (410) 837-1641 — **A, S2**
* **L.R. Willson & Sons, Inc.,** Gambrills (410) 987-5414 — **A, S2**

MASSACHUSETTS

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* **Prime Steel Erecting, Inc.,** North Billerica (978) 671-0111 — **A, S2**

MICHIGAN

Assemblers Precast & Steel Services, Inc., Saline (734) 368-6147 — **A, S2**
Devon Contracting, Inc., Detroit (313) 221-1550 — **S2**
G2 Inc., Cedar Springs (616) 696-9581 — **A, S2**
Midwest Steel, Inc., Detroit (313) 873-2220 — **A, S2**
* **Pioneer Construction Inc.,** Grand Rapids (616) 247-6966 — **A, S2**

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Fabcon Precast, LLC, Savage (952) 890-4444 — **S2**
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Molin Concrete Products Company, Lino Lakes (651) 786-7722 — **A, S2**
* **Wells Concrete,** Wells (800) 658-7049 — **A, S2**

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Bracken Construction Company, Inc., Jackson (601) 922-8413 — **A, S2**

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JE Dunn Construction, Kansas City (816) 292-8762 — **A, S2**
* **Prestressed Casting Co.,** Springfield (417) 869-7350 — **A, S2**

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Topping Out Inc. dba Davis Erection–Omaha, Omaha (800) 279-1201 — **A, S2**

NEW HAMPSHIRE

* **American Steel & Precast Erectors,** Greenfield (603) 547-6311 — **A, S2**
* **Newstress, Inc.,** Epsom (603) 736-9000 — **S2**

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CRV Precast Construction LLC, Eastampton (609) 518-6810 — **S2**
J. L. Erectors, Inc., Blackwood (856) 232-9400 — **A, S2**
* **JEMCO-Erectors, Inc.,** Shamong (609) 268-0332 — **S2**
Jonasz Precast, Inc., Westville (856) 456-7788 — **A, S2**

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Koehler Masonry, Farmingdale (631) 694-4720 — **S2**
Oldcastle Building Systems Div. / Project Services, Selkirk (518) 767-2116 — **A, S2**
* **The L.C. Whitford Co., Inc.,** Wellsville (585) 593-2741 — **S2**

NORTH CAROLINA

* **Carolina Precast Erectors, Inc.,** Taylorsville (828) 217-1115 — **A, S2**

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Magnum Contracting, Inc., Fargo (701) 235-5285 — **A, S2**
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Sidley Precast Group, A Division of R.W. Sidley, Inc., Thompson (440) 298-3232 — **S2**

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Allied Steel Construction Co., LLC, Oklahoma City (405) 232-7531 — **A, S2**

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Century Steel Erectors, Kittanning (724) 545-3444 — **A, S2**
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Nitterhouse Concrete Products, Inc., Chambersburg (717) 267-4505 — **A, S2**

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* **IMS Masonry,** Lindon (801) 796-8420 — **A**
OutWest C & E Inc., Bluffdale (801) 446-5673 — **A, S2**

VERMONT

CCS Conctructors Inc., Morrisville (802) 888-7701 — **S2**

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* **The Shockey Precast Group,** Winchester (540) 667-7700 — **A, S2**

WASHINGTON

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* **J.P. Cullen,** Janesville (608) 754-6601 — **A, S1**
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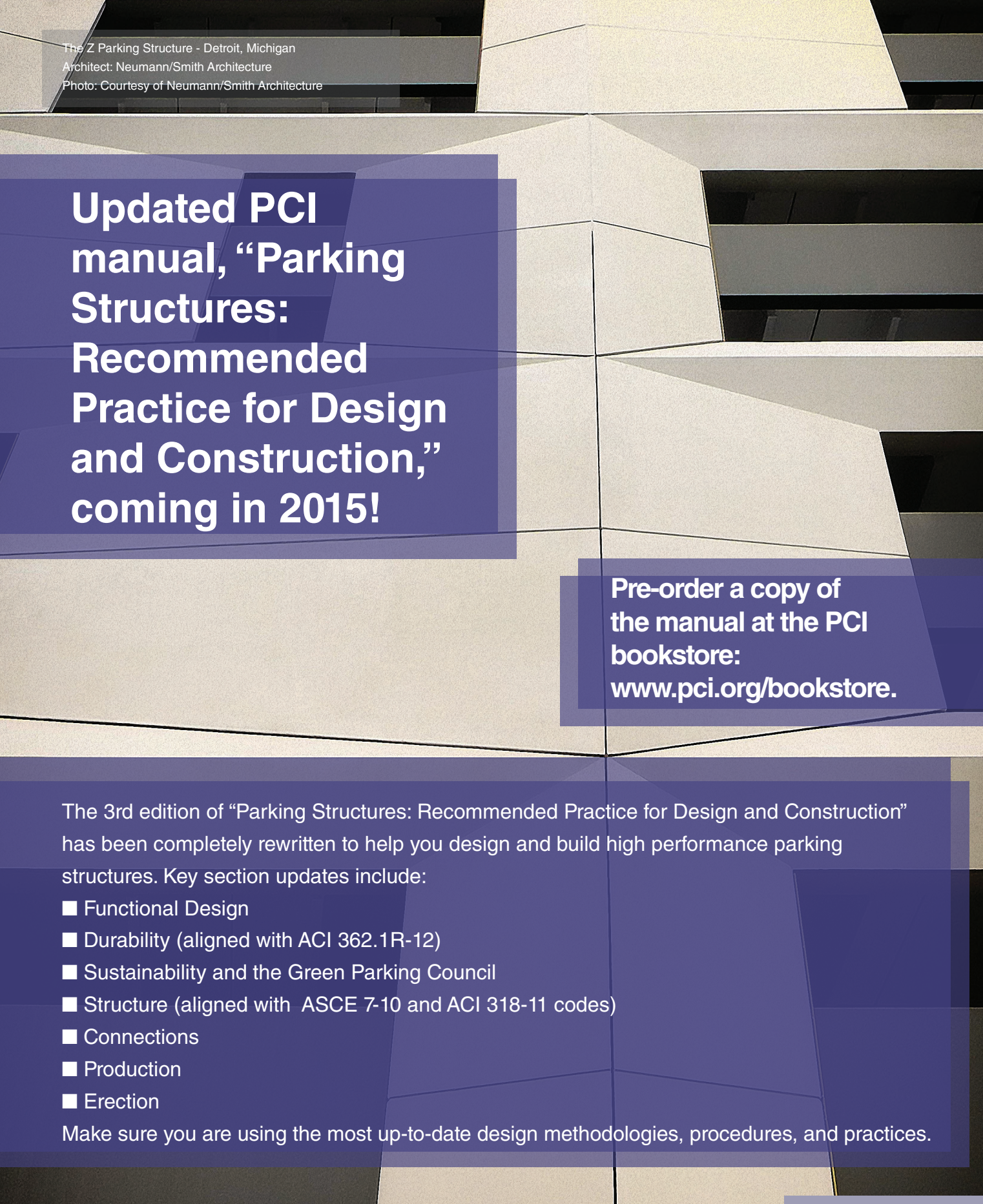

The Z Parking Structure - Detroit, Michigan
Architect: Neumann/Smith Architecture
Photo: Courtesy of Neumann/Smith Architecture

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Nordstrom, The Woodlands, TX
Architect: Callison Architecture
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