DESIGN AWARDS ISSUE

FALL 2015

# ASCENT®

2015

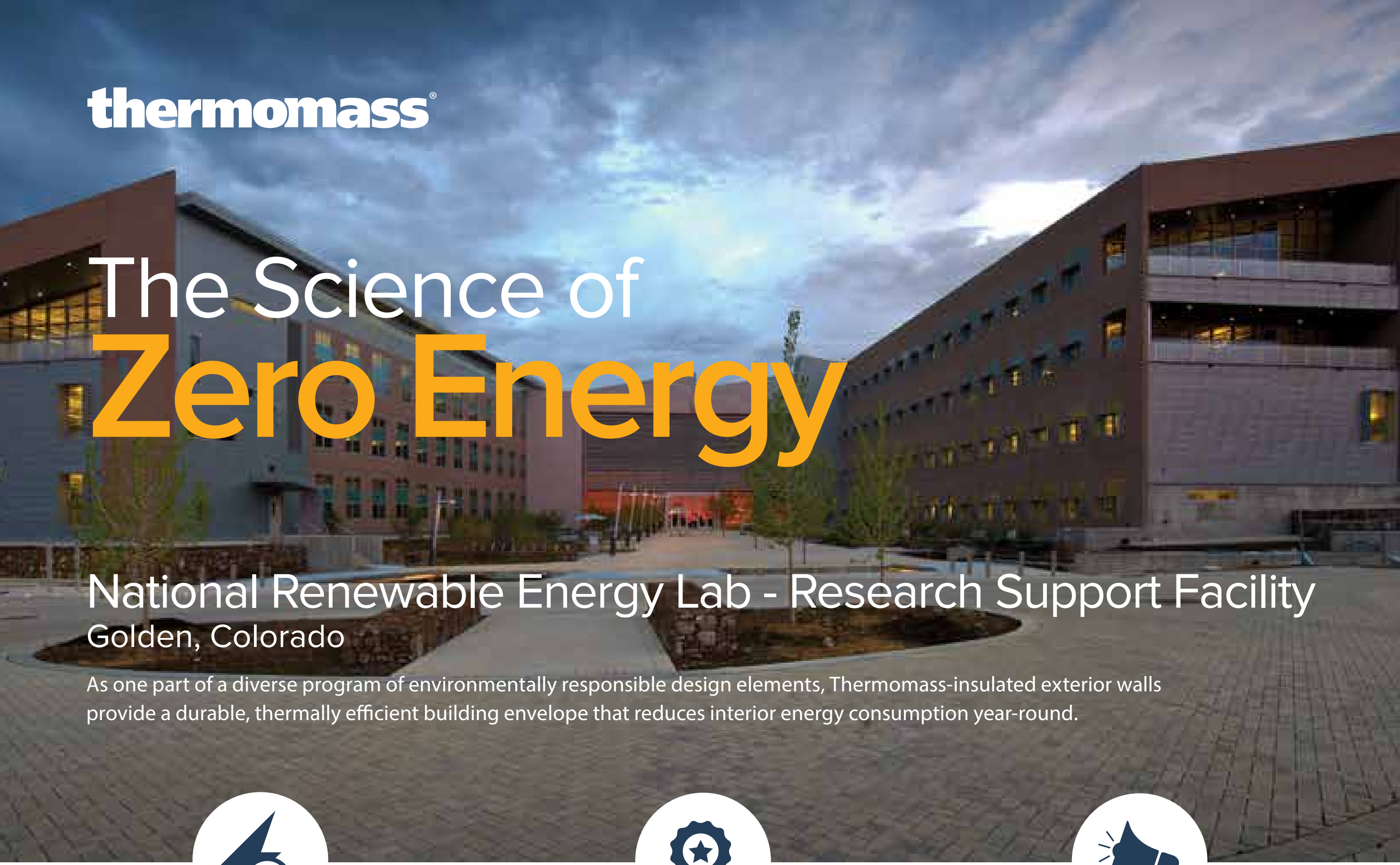
PCI

Precast/Prestressed Concrete Institute

## DESIGN AWARDS

WWW.PCI.ORG

MID-CENTRAL EDITION



thermomass

# The Science of Zero Energy

## National Renewable Energy Lab - Research Support Facility

Golden, Colorado

As one part of a diverse program of environmentally responsible design elements, Thermomass-insulated exterior walls provide a durable, thermally efficient building envelope that reduces interior energy consumption year-round.

### Net Zero
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### Platinum
USGBC LEED

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### Model Design
BEST PRACTICES

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## About Us

Thermomass manufactures a full line of concrete insulation systems for use in precast concrete projects. With over 30 years of experience, we are the industry leader in high-performance concrete sandwich wall technology. Working hand-in-hand with our clients on thousands of projects, we have developed a complete line of insulation systems designed to provide maximum energy-efficiency, durability and performance.

Learn more about this and other projects:
thermomass.com/projects

thermomass.com (800) 232-1748 Boone, Iowa, USA

## Unique Advantages

### Products
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### Experience
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### Service
We're with you for every step: from preliminary design, to panel detailing, to installation, and final walk-through. That is dedication that no other company can deliver.

*Ascent* is a publication of PCI Precast/Prestressed Concrete Institute

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# Design Awards – A Testament to High Performance

*Brian Miller, P.E., LEED AP*
*Executive Editor*
*bmiller@pci.org*

This issue highlights winners from the 53rd annual PCI Design Awards, which is a long time for any program to run. But it barely scratches the surface of time relative to the durability and resiliency that high-performance precast concrete offers. Precast concrete is a high-performance material that inherently provides the versatility, efficiency, and resiliency that high-performance structures demand.

The benefits of using precast concrete are clearly showcased by this year's winners. Juries selected 20 buildings to be honored, representing the full gamut of markets and sizes. (Bridge and transportation awards, which are presented in *Aspire* magazine, can be viewed at www.pcidesignawards.org.

As these winners show, precast concrete offers great versatility in aesthetics, form, and structure. For example, look at the light and airy design of The Broad Museum. More than 2,500 unique precast GFRC pieces were used to create the structure's enclosure that permits natural light to enter the building, but prevents direct sunlight from shining on the art inside.

Precast concrete's thermal mass and ability to incorporate continuous insulation, as well as serve as a continuous air barrier and a vapor retarder (at 3 inches thick or more), makes it a very efficient enclosure system. Designers are increasingly taking advantage of this. Nordstrom utilizes all these benefits and more—including four finishes in one panel—to create a striking new look for their upscale stores around the country.

Another great example is how the inherent resiliency of precast concrete can be used to create durable structures that resist storms, high winds, and even earthquakes. The Mercy hospital in Joplin, Mo., was designed to withstand the force of an EF 3 tornado, while the Comstock Graduate Housing facility at Stanford University in California features a precast concrete structural system that can resist seismic forces.

The examples of how designers are taking advantages of high-performance concrete are all around us. You can read about this year's winners in this issue of *Ascent*, as well as online at www.pci.org. You can also view more photos and learn about high-performance precast concrete on our website. We hope the projects in this issue will inspire you to greatness and to earning your own PCI Design Award.

**ASCENT**

**On the cover: Close-ups of the 2015 PCI Design Award Winners (see page 23). Photo: Paul Grigonis.**

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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. 4, ISSN 10796983) is published quarterly by the Precast/Prestressed Concrete Institute, 200 W. Adams St., Suite 2100, Chicago, IL 60606.

- If you have a project to be considered, send information to Brian Miller, executive editor of Ascent.
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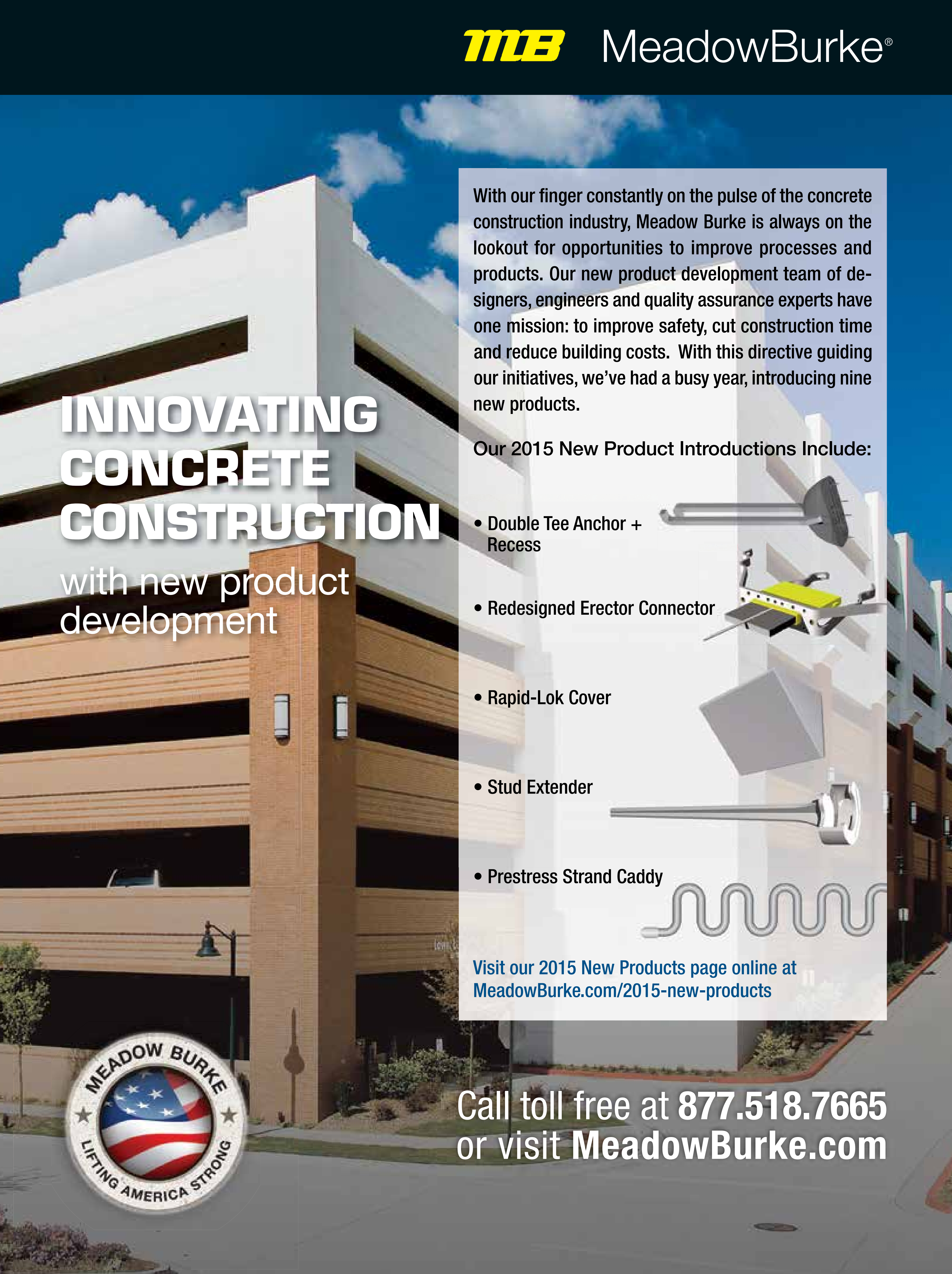
MY VISION.
OUR EXPERTISE.


MB
MeadowBurke®
INNOVATING CONCRETE CONSTRUCTION
with new product development
With our finger constantly on the pulse of the concrete construction industry, Meadow Burke is always on the lookout for opportunities to improve processes and products. Our new product development team of designers, engineers and quality assurance experts have one mission: to improve safety, cut construction time and reduce building costs. With this directive guiding our initiatives, we've had a busy year, introducing nine new products.
Our 2015 New Product Introductions Include:
• Double Tee Anchor + Recess
• Redesigned Erector Connector
• Rapid-Lok Cover
• Stud Extender
• Prestress Strand Caddy
Visit our 2015 New Products page online at MeadowBurke.com/2015-new-products
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Call toll free at 877.518.7665
or visit MeadowBurke.com

## Risser named PCI President

CHICAGO, ILLINOIS

Robert J. Risser, P.E.

PCI has named Robert J. Risser to be its new president. Risser has more than 20 years of executive association-management experience and, prior to joining PCI, served as president and CEO of the Concrete Reinforcing Steel Institute (CRSI) in Schaumburg, Ill.

"Bob has made significant contributions throughout his career and helped grow each organization he has worked for," says Chris Pastorius, PCI board chairman. "He prides himself on developing strong value propositions for members through a leadership model that is driven by collaboration We are very pleased to have an executive of Bob's caliber take the helm of our institute."

Risser joined CRSI in 2006 and accomplished many key objectives, including leading CRSI to accreditation as a Standards Development Organization of the American National Standards Institute. He also developed CRSI's government-affairs committee and established its Rebar Political Action Committee.

Before joining CRSI, he served as executive director of the Michigan Concrete Paving Association for 10 years. He has also served in a variety of construction- and concrete-related roles, including director of engineering design, director of market development, and engineering editor.

"I am honored and excited to be asked to serve such a fine organization as PCI," Risser says. "I look forward to meeting the PCI members and regional directors and working with the PCI staff to help lead PCI into this next phase."

Risser serves the ACI Foundation as a member of the board of directors for the Strategic Development Council and the executive committee of the Concrete Research Council. He was elected the first formal chairman of the Concrete and Masonry Related Associations group. He received his master's and bachelor's degrees in civil engineering from the University of Illinois and is a registered professional engineer.

## PCI's Krohn Named SEI Fellow, Freedman Honored

CHICAGO, ILLINOIS

Jason Krohn

Sidney Freedman

The Structural Engineering Institute (SEI) of the American Society of Civil Engineers (ASCE) named Jason Krohn, PCI's managing director of technical activities, a fellow during its Structures Congress in Portland, Ore. The SEI Fellow program recognizes distinguished SEI members as leaders and mentors in the structural-engineering profession.

Meanwhile, Sidney Freedman, PCI director of architectural systems and industrial operations and safety, received the Henry Crown Award from the Illinois chapter of the American Concrete Institute. The organization's highest honor, it recognized his record of professional excellence, extensive involvement with ACI and substantial contributions to the concrete industry for more than 50 years.

## Hollowcore Plank Aids Framingham State University Dorm

FRAMINGHAM, MASSACHUSETTS

Hollowcore planks used as flooring/ceiling components are helping Framingham State University add a 97,000-square-foot building for residential housing to its campus in a fast and economical way while also helping to resolve some design challenges.

The 8-inch-thick precast concrete hollowcore planks are supported by masonry walls and provide long, clear spans that facilitated design flexibility. The top face of the planks received a topping covered with sheet-rubber flooring or carpeting, while the underside received a smooth trowel finish and will be painted.

"Precast concrete provided value in several ways, especially in giving us the dimensional opportunity of reducing floor-to-floor heights," says Mark Dolny, associate principal at ARC/ Architectural Resources Cambridge. The shallow depth of the hollowcore, combined with its long-span capabilities, provided an efficient design. "Residence halls are all about efficiency, and steel beams would have reduced that efficiency," he says. "We looked to precast concrete to provide the dimensional benefits we needed."

A key structural challenge came in leaving a large central opening on the first floor, which serves as an access point for pedestrians coming onto campus from the adjacent parking facility. Strescon Ltd. in St. John, New Brunswick, cast 93,029 square feet of hollowcore plank. Consigli Construction Co. in Milford, Mass., is serving as construction manager.

The building's shell will be erected by June 2016, giving interior trades enough time to complete outfitting the facility so it will be ready to welcome students in August 2016.

## Coreslab Clads Bridgeport Hospital Outpatient Center

TRUMBULL, CONNECTICUT

The 100,000-square-foot Park Avenue Campus Outpatient Center for Bridgeport Hospital is being clad with creatively designed architectural precast concrete panels, providing an aesthetically pleasing appearance that was cost effective and quickly erected.

The facility offers a range of hospital and health-system services, including ambulatory surgery, cancer treatment, radiology, urgent and primary care, and breast care. The center serves as a hub for a unified patient-care campus, joining two existing buildings housing radiation oncology and medical offices, which are being renovated.

The panels were selected due to their speed of erection as well as the economics and aesthetics they provided, according to William Fitzgerald, project architect at Shepley Bullfinch for the project. "Precast concrete is such a plastic material that it allowed us to create some visual interest through the incorporation of a wavy pattern that extends around the building. It provides a friendly, inviting appearance and breaks down the scale of the building."

The panels feature projecting 4-inch fins that maximize or minimize their widths at window openings, creating an undulating appearance. The design provides a bas-relief motif created using BIM software. Coreslab Structures (CONN) Inc. in Tomaston, Conn., is casting 14,000 square feet of architectural precast concrete panels for the project. Gilbane Building Co. in Glastonbury, Conn., is serving as general contractor.


**The outpatient clinic for Bridgeport Hospital being constructed in Trumbull, Conn., features architectural precast concrete panels with 4-inch fins that create an undulating pattern over the facade. Photo: Coreslab Structures (CONN) Inc.**

## Hartford Civil-Engineering Students Tour Blakeslee

HARTFORD, CONNECTICUT

**Civil-engineering students at the University of Hartford toured the plant and received a presentation on Tekla software during a visit to the Blakesleee Prestress plant in Connecticut.**

Civil-engineering students from the University of Hartford in Connecticut visited the Blakeslee Prestress Inc. plant in Branford, Conn. Included was a presentation on Tekla three-dimensional-modeling programs and tours of the plant.

Blakeslee regularly provides tours to local engineering classes interested in working with the precaster and has donated money to the University of New Haven's 2015 American Society of Civil Engineers' Concrete Canoe Contest entry.

## Strescon Casts Two-Color Panels for Mixed-use Project

WALTHAM, MASSACHUSETTS

Street-level retail and 230,000 square feet of high-performance office space is being constructed at 10 CityPoint in Waltham, Mass. The project features bands of large glass windows separated by architectural precast concrete spandrels in two colors that created some challenges in production and erection.

Elkus Manfredi Architects in Boston designed the project, which has leased its first-class office space to Wolverine Worldwide to serve as the headquarters for its Sperry Top-Sider, Saucony, Keds, and Stride Rite brands, specified precast concrete due to its economics, speed of construction, and aesthetic design. The appearance consists of white spandrels with deep charcoal bands underneath the window lines, with a second thinner charcoal band at the base of the panels above the window line below.

Precaster Strescon Ltd. supplied 149 spandrels, all with the combined white and gray mix design, as well as 13 architectural infill panels and 14 architectural base panels. A key concern was the number of false joints in the panels, two of which divide the colors at the top and bottom while three more run through the white middle portion. A special system was devised to ensure the colors remained segregated during casting. Self-consolidating concrete was used for the white concrete to facilitate a crisp line between colors. A wood-float finish was applied to the panels.

Even with these added activities, the precaster produced six panels in a bed in eight hours. The typical panels were 26 to 35 feet long, 3 to 5 feet high, and 7 to 8 inches thick. The thickness was needed due to the false joints' 1 ¾ inch-deep thickness, which offered deeper shadowlines.

The project is on track to be completed in December.

**The architectural precast concrete panels cast for the 10 CityPoint office building in Waltham, Mass., features a two-color design that required special care to maintain the color segregation. Photo: Strescon Ltd.**

## Precast Concrete LCA Completed

CHICAGO, ILLINOIS

PCI has completed a third-party prepared Life Cycle Analysis (LCA) for precast concrete that outlines the benefits offered by precast concrete for sustainable design.

"Precast concrete fabricated in a quality-controlled plant employing continuous PCI Plant Certification is not only sustainable but has lifetime cradle-to-grave benefits that are hard to match with competing materials and systems," says Doug Mooradian, executive director of PCI West, a chapter of PCI representing California and Nevada.

PCI Producer Members can batch a higher strength and more durable concrete that results in less material use, with better longevity and performance, he says. "Couple this higher strength concrete with prestressing, less waste, and the use of regional and recycled supplementary cementitious materials, and the benefits and efficiencies of precast concrete become clear."

For more information on the LCA, visit https://www.pci.org/Design_Resources/Sustainability_Resources/.

## Precast Concrete Balcony Slabs Used for Sepia at Ink Block

BOSTON, MASSACHUSETTS

Designers of the Ink Block residential complex, on the site of the former Boston Herald newspaper building, wanted to create high-end residential units that would attract renters and buyers quickly to this popular part of town. One element of that design involved the addition of precast concrete balcony slabs that project out from residences to provide dramatic views.

The $200-million project—which was 60% sold before construction began—will create a residential building with 85,000 square feet of retail space and a 50,000-square-foot upscale grocery store. The building will house 315 apartments for rent and 160 condominiums.

Strescon Ltd. in St. John, New Brunswick, cast 49 6-inch-thick solid precast concrete balcony slabs for the Sepia building in the complex, encompassing 2,800 square feet. The precast concrete components provide durability and low maintenance while offering rapid construction to help keep the project on schedule. The building is scheduled to open this fall.

**Precast concrete balcony slabs will provide an additional amenity to the Sepia building in the Ink Block residential complex in Boston when it opens this fall. Photo: Strescon Ltd.**

## Gate Makes Appointments

WINCHESTER, KENTUCKY

**Steve Schweitzer**

**Jim Stini**

Gate Precast Co. has named Steve Schweitzer to serve as vice president and operations manager at its Winchester plant. He has more than 35 years of experience in the precast industry, including most recently in the commercial sales and estimating departments at Prestress Services Industries. In his new position, Schweitzer is responsible for all operational and administrative issues for Gate's Kentucky facilities.

In addition, Gate has promoted Jim Stini to manage operations at its Pearland, Texas, hollowcore concrete plant. Stini has worked for Gate since 1996, most recently as estimating and sales manager. Stini will handle all duties associated with operations in the Pearland office.

## Precast Design Handbook Edition Published

LAUSANNE, SWITZERLAND

The second edition of the Planning and Design Handbook on Precast Building Structures has been published The International Federation for Structural Concrete (*fib*). The reference book has been completely updated and widely expanded to include recent developments. The aim of the handbook is to promote a greater awareness and understanding of precast concrete buildings.

Single copies are available from *fib*, and customized copies in bulk numbers for corporate-member companies and national member groups of fib are available from ad-media GmbH. The first version of the Planning and Design Handbook on Precast Building Structures was published in 1994. More than 45,000 copies of the handbook in several languages have been distributed.

## Sassaman Joins JVA Sales Staff

LINCOLNWOOD, ILLINOIS

A. J. Sassaman has joined the sales staff of JVI Inc. to cover the Middle Atlantic and New England regions as well as Canada. He also will assist in technical presentations throughout the country due to his involvement with the precast concrete industry for more than 27 years.

## Precasters Hold Barbecue Contest for PCI Foundation

CHICAGO, ILLINOIS

More than a dozen precasters took part in a barbecue competition held by the PCI Foundation in September. The program consisted of sponsoring a lunch or dinner for employees, who in return donated money for the foundation. A panel of judges reviewed the various programs to select the most comprehensive and will award a grand prize of a $2,500 grill. Additional prizes will be awarded in other categories.

Precasters taking part in the program as of late August included Gate Precast Co. (five plants), Molin (two events), Gage Brothers, Kerkstra, Knife River, and several precasters organizing a Nebraska Tailgate Party. The winners will be announced on October 15, 2015.

## Schipper Joins eConstruct.USA Ownership

OMAHA, NEBRASKA

Bradley L. Schipper has become an owner in eConstruct.USA LLC, a structural-engineering consulting firm with special expertise in precast prestressed concrete buildings and bridges. Schipper has managed the precast building division for the past five years. His experience includes 10 years at Wilson Concrete Co. (now Coreslab Structures in Omaha) and eight years at Rick Berry Associates. Schipper, as part of eConstruct.USA, a Premiere Partner of PCI, has contributed to PCI's technical activities over the years, such as work on the PCI Industry Handbook Committee and the Fire Protection Committee.

## Kerkstra Joins AltusGroup

GRANDVILLE, MICHIGAN

Kerkstra Precast has become the seventh precast concrete manufacturer to join AltusGroup in the past two years. The precaster will manufacture CarbonCast high-performance insulated wall panels and insulated architectural cladding. Kerkstra represents the 19th precaster to join the group.

## Diaphragm Seismic-Design Methodology Progresses

RESTON, VIRGINIA

Code-change proposals as the result of Diaphragm Seismic Design Methodology (DSDM) research have been approved by the American Society of Civil Engineers/Structural Engineering Institute (ASCE/SEI) 7 committee for inclusion within the 2016 edition of Minimum Design Loads for Buildings and Other Structures (ASCE 7).

The proposals include a modification to the diaphragm design force level as well as major changes to the precast concrete diaphragm design methodology.

## Wyoming Students Use Precast Concrete for Senior Projects

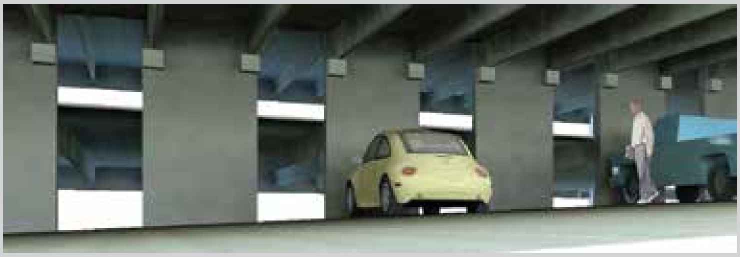
LARAMIE, WYOMING

Students at the University of Wyoming College of Architecture and Engineering designed precast, prestressed parking structures for their senior class projects under the direction of David Mukai, associate professor.

The classes were separated into small groups, which research architectural, functional, and structural design parameters and prepared schematic and design-development drawings and calculations. They then made a formal presentation to a panel of judges who helped determine the students' final grades in the class.

Site and basic parking-structure criteria are provided along with reference materials, including the PCI Design Handbook: Precast and Prestressed Concrete, the International Building Code, and the fifth edition of The Dimensions of Parking, published by the Urban Land Institute and the National Parking Association.

The classy also toured Rocky Mountain Prestress in Denver, Colo., and saw how double tees, beams, walls, spandrels, and columns are made.



**University of Wyoming College of Architecture and Engineering students designed parking structures as a senior class project. This rendering by a student was made using Revit. Photo: David Mukai.**

**Mike Hemberger of Rocky Mountain Prestress explains production methods to students from the University of Wyoming who toured the plant in Denver, while working on a parking structure project. Photo: David Mukai.**

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

# Endicott Thin Brick: The quality solution for architectural precast


Sanford Medical Center, Sioux Falls SD.

The key to growing the use of precast in architectural applications is to identify business partners that offer a diverse product line, the capacity to supply any size job, and have a track record of successful engagement within the precast industry. For architectural precast utilizing embedded thin brick the clear choice is Endicott.

**Diverse Product Line**

Endicott sets the standard for quality and craftsmanship and offers the most unique colors available today. Endicott's exclusive ironspot clays create a palette you won't find anywhere else, and its outstanding reputation promises you a product you can depend on. While ironspots are synonymous with Endicott, their color palette also includes many colors in the rose, red, tan, grey and brown tones. To add to the diversity of the product line, Endicott's colors are also offered in several textures and sizes.

Endicott's thin brick features a distinct keyback design which provides a mechanical lock into the concrete for maximum durability and permanence. Endicott also offers waxing of thin brick to provide precasters ready use and easy clean down.

For the occasions when design requires matching face brick, pavers or tile, Endicott can provide the solution, as evidenced by the dozens of projects throughout the country that have utilized both thin brick and full-size brick.

**Capacity**

Whether a precast job calls for one thousand square feet or one hundred thousand square feet, Endicott has the production capacity to supply any job. Having been in the clay products industry for nearly 100 years, and extruding thin brick for over 35 years, Endicott has continually reinvested in its plants to increase capacity and improve quality utilizing innovation and technology available nowhere else in the industry.

As part of Endicott's commitment to supplying diverse jobs it has the ability to blend several colors to meet the design requirements, and to create a signature look for the structure. (See picture).

Normandale Community College, Bloomington MN.


Normandale Community College, Bloomington MN.

University of Minnesota 17th Avenue Residence Hall, Minneapolis MN.

**Engaged**

Endicott is actively engaged in PCI and supports the mission of the PCI Foundation. Supporting the industry's product quality standards and the continuing education of architects, engineers and contractors is critical for the industry's success, and the future of sustainable design.

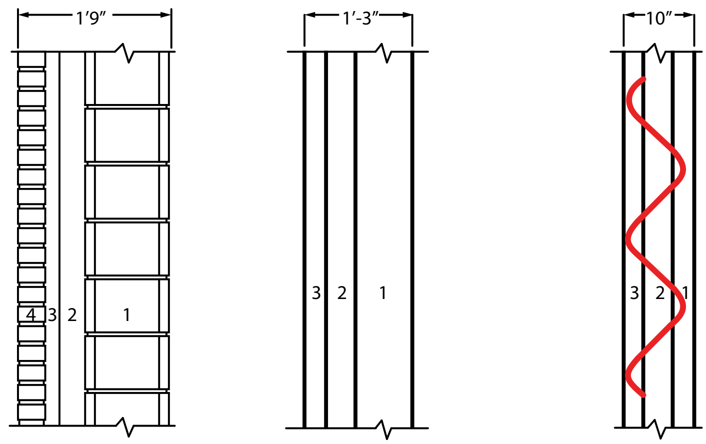
For quality, design flexibility, and architectural elegance the thin brick solution is ENDICOTT. You can learn more about Endicott at endicott.com or connect with them on Twitter or Facebook. A

**For more information, www.endicott.com.**

# THiN-Wall the All-in-One Exterior Wall Solution

THiN-Wall is a patented wall panel system currently used by 27 US precast concrete licensees and growing at a fast rate. This insulated panel system uses a proprietary zig-zag shaped glass fiber reinforced polymer (GFRP) connector (see figure) to achieve composite action between the exterior and interior concrete wythes.

The strength of the GFRP zig-zag connector, also known as the NU-Tie, is nearly twice that of conventional Grade 60 ksi reinforcing bars, thus achieving excellent strength of the wall with minimal concrete in the two wythes and very few connectors. Yet, the low modulus of elasticity of the connector ensures that panel bowing, caused by exterior/interior temperature differential is minimized. Thus, the system achieves the best of both worlds high strength and high flexibility.




1. 12" CMJ
2. 4" rigid insulation
3. 1 ¾" air space
4. 3 ⅝" brick veneer

**CAVITYWALL**

1. 8" precast/prestressed concrete
2. 4" rigid insulation
3. 3" precast concrete

**NONCOMPOSITE PRECAST PANEL**

1. 3" precast/prestressed concrete
2. 4" rigid insulation
3. 3" precast/prestressed concrete
4. 8" deep by 32" long, ⅜" diameter NU-Tie

**THiN-Wall PRECAST PANEL**

THiN-Wall is not just energy and structurally efficient, it is an integrated system that allows the precaster to use a relatively small total thickness to achieve the various requirements for moisture barrier, fire resistance, exterior finish and often a smooth interior finish surface. For example, consider three possible choices for an exterior wall system:

1. Masonry cavity wall;
2. Precast concrete non-composite wall;
3. THiN-Wall composite wall.

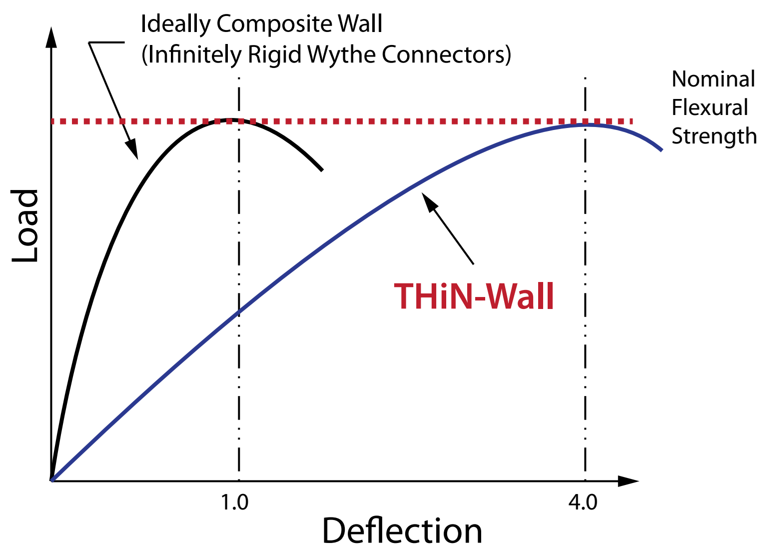
Assuming the minimum required R rating is 20. For this comparison we will assume using extruded polystyrene (XPS), which is preferred over expanded polystyrene (EPS) due to its closed cell form and high insulation rating. An R20 rating requires 4 inches of XPS. A typical thickness of a 30 ft tall masonry cavity wall is 21-inches with a 12" nominal concrete masonry unit (CMU) load bearing wythe, see figure. A noncomposite precast concrete wall which depends on the interior wythe for structural capacity would have a total width of 15 in., with the interior 8-in. wythe designed to resist the full load. For the THiN-Wall system only 10" thickness is adequate, 3" interior wythe plus XPS insulation plus 3" interior wythe. Both wythes would be designed to share in resisting the load. The exterior could be clad with ½" thin brick facing that is integrally precast with the panel. Both the appearance and the material of the exterior are the same for all three types of wall system.

The THiN-Wall panel system, and also the non-composite precast panel system, are made of high quality precast prestressed concrete. They can take advantage of high performance self consolidating concrete with high levels of fly ash and other recycled pozzolans. The inside face could be smooth-finished and painted to form the final surface. The primary advantage of the THiN-Wall system is that it uses only a total of 6 inches of concrete, only 75% of the concrete used in a non-composite wall.

All composite walls exhibit thermal bowing to various degrees. This behavior is accounted for by designers. One of the great advantages of THiN-Wall is the low modulus of elasticity of the connectors. They stretch and shorten as the outside temperature changes relative to the inside conditioned space. More pronounced bowing would result when stiff concrete block-outs and/or steel connectors are used to achieve composite action. The accompanying figures show the degree of composite action used in design of THiN-Walls and the relatively small bowing expected in service.

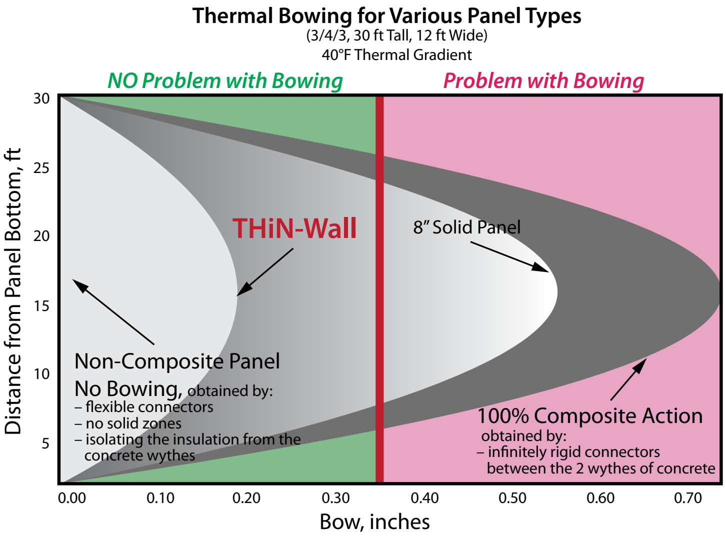
THiN Wall systems are only 25% as stiff as solid panels of the same span and thickness. Tall, slender THiN-Walls are designed with conservative assumptions:

1. P-Delta analysis is performed




# THiN-Wall Design

100% Composite Action for "Nominal Strength"
75% Composite Action for "Flexural Cracking Checks"
25% Composite Action for "Deflection Analysis"




with only 25% of the stiffness of an ideally composite section,

2. Cracking moment is reduced by 25% and also applied to factored load effects (no cracking allowed even under factored strength limit state), and
3. Flexural strength satisfied with strands which also satisfy a requirement for minimum prestress 225 psi.

This conservative approach has resulted in several million square feet of successfully completed projects around the US.

## Additional Features of the THiN-Wall System

- **Simple and production friendly.** NU-Ties preinstalled in insulation. Adequate NU-Tie embedment and thus outstanding anchorage are ensured. Modular tie and transverse reinforcement spacing ensures no interferences.
- **Versatile.** Every wall panel project can be engineered to accommodate different panel widths and specific structural capacity, including tornado-level wind loads.
- **Durable.** Can obtain 2 hour fire endurance rating using standard design. NU-Ties do not corrode.
- **Sustainable.** Reduced carbon footprint by virtue of using less concrete volume and more pozzolans; virtually no energy used for curing; significant energy savings for in-service conditions; long service life with virtually no maintenance; improved indoor air quality;
- **Continued Enhancements.** New corbel system with zero thermal bridging. New patented non-conductive side-lift device; wall connection details that ensure full thermal insulation barrier; 24 inch pitch NU Ties to be used with welded wire reinforcement; etc.

**For more information, www.http://thin-wall.com. Qualified PCI-certified precast concrete companies who wish to obtain a THiN-Wall license may contact Doug Gremel, Hughes Brothers, 210 N 13th St., Seward, NE, 402-643-2991, doug@hughesbros.com.**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# 2015 PCI DESIGN AWARDS

Precast/Prestressed Concrete Institute

# Precast Concrete Delivers High Performance

**Sarah Fister Gale**

"Better, faster, cheaper" was the rallying cry of project owners featured in the 2015 PCI Design Awards, and precast concrete solutions delivered on all three demands. This year's winners showcase versatility and performance, projects delivered with minimal disruption to the environment, lower costs, and more time savings than competitor designs, and more-durable and low-maintenance results.

Some of the highlights include a new training center and storm shelter built to withstand hurricane-strength winds without skipping a beat; a hospital and school rebuilt in ravaged Joplin, Mo., that now provide the community with beautiful, safe shelter and functional spaces; and the elegantly designed Church of Latter Day Saints (LDS) in Tijuana, Mexico, with a sparkling white facade that the owners love so much they've made it the model for all future LDS churches across South America.

"Precast concrete is the only material that could deliver the complexity and longevity that this structure required," CRSA architect Wallace Cooper says of the LDS project. He wasn't alone in that sentiment. Time and again the engineers, architects, and precasters interviewed for these awards praised the many functional, environmental, and aesthetic benefits that precast concrete brought to these projects.

Choosing the winners was certainly difficult. PCI relied on 11 judges from across the industry to assess over 100 submissions and ultimately gave awards to 20 buildings and 6 bridges, with several more honorable mentions. Leading prizes include the Harry H. Edwards Industry Advancement Award for the Comstock graduate housing project in California; the Sustainable Design Award that went to Gulf Power's Douglas L. McCrary Training and Storm Center in Florida; and the All–Precast Concrete Solution Award that was given to the new Gordon Food Service home office in Michigan. Other awards celebrate the best healthcare center, school, stadium, theater, special solutions, and a variety of bridge types and lengths. The following pages showcase the projects selected by our judges.

# This year's PCI Design Awards winners showcase high performance—versatility, efficiency, and resilience.

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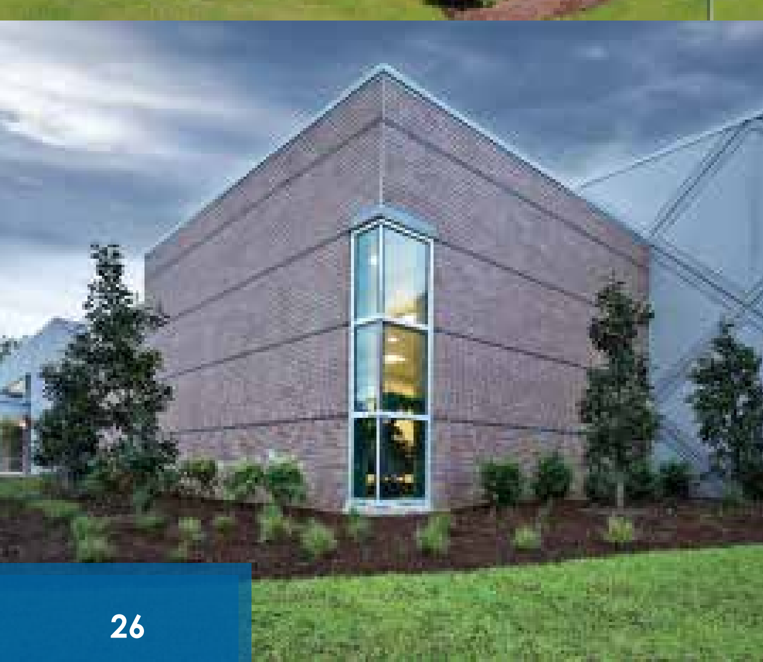
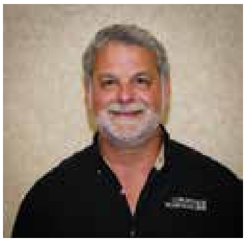
# 2015 PCI DESIGN AWARDS
# Special Awards Jury

**Harry H. Edwards Industry Advancement Award**
**Comstock Graduate Housing Project in Stanford, Calif.**

**Sustainable Design Award**
**Gulf Power Douglas A. McCrary Training Center in Pensacola, Fla.**

**All–Precast Concrete Solution Award**
**Gordon Food Service Home Office in Wyoming, Mich.**





**Stephen J. Seguirant**, PE, MASCE, FACI, FPCI, is vice president and director of engineering for Concrete Technology Corp. (CTC) in Tacoma, Wash. Seguirant began his career at CTC in 1979 as a project engineer and is now a registered civil engineer in Washington State. In his 35 years with CTC, he has held various posts, including project manager, chief project manager, and vice president and director of project management and quality assurance. Currently, he is a member of several committees at PCI, including the Research and Development Council, the Prestressed Concrete Piling Committee, the Bridges Committee, and the Transportation Activities Committee. He is also a member of the American Concrete Institute's Committee 318, Building Code Requirements for Structural Concrete, and chairman of Subcommittee G, Precast and Prestressed Concrete. Seguirant is a fellow of both PCI and ACI. He was principal author of chapter 3 of the *PCI Bridge Design Manual, Fabrication and Construction*. Seguirant has won numerous awards from PCI and ASCE for publications in *PCI Journal*, and was named among the eight Technology and Materials Innovators in the American Road & Transportation Board Association elite list of America's Top 100 Private Sector Transportation Design and Construction Professionals of the 20th Century. Seguirant earned a bachelor of science degree in civil engineering from St. Martin's College and a master of science degree in civil engineering from the University of Washington–Seattle.

**Geoff Walters**, AIA, LEED AP, is a principal at Cannon Design. As director of quality, he is focused on aligning design with all aspects of building performance and technical quality. He promotes full collaboration across disciplines in driving a high level of technically resolved design in both documentation and the final realized project. With over 35 years of experience crafting solutions for a wide range of project scales and complexity in government, education, healthcare, corporate, and civic building types, he brings a depth of knowledge and passion to this role. His responsibilities include the development and evolution of technical and document standards, project phase quality reviews, staff mentoring, and promoting an optimized project process. Walters works closely with the firm's sustainable design leadership to minimize the environmental footprint of all of its client work. He has a bachelor of architecture from Virginia Polytechnic Institute and State University.

**Helmuth (Helm) Wilden**, PE, FPCI, Vice President, Wilden Enterprises Inc. Helm Wilden has been involved in the precast/prestressed concrete industry for more than 45 years. After positons as a project engineer for Formigli Corp., one of the country's largest precast concrete manufacturers in the early 1970s, he held management positions with Thomas A. Hanson & Associates and PCI producer member Universal Concrete in Stowe, Pa. In 1978, he formed H. Wilden & Associates (HWA), a specialty engineering firm offering design and shop drawing services to precast/prestressed manufactures. Upon HWA's acquisition by TRC Worldwide Engineering in 2004, he retired from HWA in 2004 and formed Wilden Enterprises Inc., offering limited consulting services to the industry. Wilden has been active in PCI since 1976, when he served as the chairman of the first PCI Tolerance Committee. Since then, he has served on the PCI Board of Directors on four different occasions, representing professional members, the Technical Activities Council, the Research and Development Council, and the Educational Activities Council. He is an inaugural honoree as a PCI Fellow in 1994 and a PCI Titan in 2004 and a recipient of PCI's Medal of Honor in 2010. He has served on the Industry Handbook Committee since the third edition, was technical editor of the seventh edition, and serves in this capacity for the eighth edition, which is currently in progress. Wilden received a bachelor of science in civil engineering from Michigan Technological University in 1965 and was inducted into the Academy of the Civil and Environmental Engineering Department in 1999.

Photo: Bernard Andre Photography

**"Two major research projects sponsored by the precast concrete industry directly allowed precast concrete to be the solution of choice in these buildings located in a very high seismic area."**

***Susie Dow Nakaki, KPFF***

Harry H. Edwards Industry Advancement Award

# Comstock Graduate Housing Project

Stanford, Calif.

| | |
|---|---|
| **Owner** | Stanford University, Stanford, Calif. |
| **Architect** | Kenneth Rodrigues & Partners Inc., Mountain View, Calif. |
| **Precaster** | Clark Pacific, West Sacramento, Calif. |
| **Engineer of record** | Nakaki Structural Design Inc., Tustin, Calif. |
| **Contractor** | Vance Brown, Palo Alto, Calif. |
| **Cost of precast concrete** | $13.798 million |
| **Project size** | 288,000 ft$^2$ (26,800 m$^2$) |

This year's Harry H. Edwards award winner is a shining example of how precast concrete can bring durability, performance, and efficiency to any project. All of these benefits came together in the new Comstock graduate student housing at Stanford University, where the owners faced serious time and cost challenges. The project included replacing nine low-rise, two-story buildings that provided 79 beds with four new buildings to accommodate more than five times as many students. The new structures also needed to include student meeting and social gathering spaces, laundry facilities, computer clusters, music practice rooms, game rooms, and other spaces. The schedule was critical because it all had to be finished in time for the 2014 school year.

To meet these needs in the allotted schedule, the designers chose precast concrete rather than wood, says Mark Palmer of Clark Pacific, the precast concrete producer for the project. "With the speed of erection, the general contractor was able to deliver the student housing within one school year, getting students in quicker and allowing the university to start bringing in revenue earlier."

The buildings feature architecturally finished, structural precast concrete, unique vertically posttensioned, precast concrete walls for seismic resistance, and a first-ever in this region, a pretopped plank system for the flooring. The floor system consists of pretopped, prestressed concrete planks spanning from exterior wall to exterior wall, over interior bearings walls, and resulting in a two-span plank. "The integration of the performance of a structural system with the finish of an architecturally clad precast concrete product saved time and money for everyone involved," he says.

The team had to create up to 100 casts per week to match the fast-paced nature of the project. By prefabricating the components off-site, installation crews were able to keep the crowded campus clear of extra materials using just-in-time delivery, allowing cranes to lift the precast concrete pieces directly from the trucks and immediately install them. Palmer says that up to 30 truckloads arrived daily, carrying wall panels and floor planks, during precast concrete erection. "Installation crews were able to set an entire floor of wall panels and floor planks about every three days." he says.

A medium sandblast was used on all of the panels to match existing colors of the other buildings on the campus, while green and brown accent colors were used at the top of each building to add visual interest and contrast. Formliners were also used on the fourth-story panels to create a ribbed texture that wrapped around the upper floor of the dormitory buildings.

This precast concrete design also delivered a more durable solution that will require minimal maintenance and meet seismic design requirements. "One of the most interesting aspects of this system is its ability to move like a hybrid moment frame," Palmer says. "After a seismic event, the building will pull itself back to its original position." Construction on the housing complex began in April 2013 and was completed in June 2014, well in advance of the academic year, Palmer says.

The owner of the new Douglas L. McCrary Training Center on the Gulf Power Pine Forest Road campus in Pensacola, Fla., wanted a structure that offered open flexible spaces but was also durable enough to serve as an emergency operations center for the utility when high-powered hurricanes and other storms blow through town. To meet the emergency operations center requirements, the building does not just have to withstand the impact of 200 mph (322 km/hr) hurricane wind loads. It needs to remain functional and usable immediately following the weather event. That's one of the many reasons the team chose precast concrete, says Bob Cordes, facility manager for Gulf Power. "We liked the strength and the sustainability attributes that precast concrete brought to the project," Cordes says.

The precast concrete design was able to meet the stringent performance requirements of the structure while providing an aesthetically pleasing, sustainable final product at an affordable price point, says Ben Townes of Townes + architects. It would also help the building achieve LEED certification, which was another priority for the utility company. "The use of precast concrete was instrumental in achieving LEED points," Townes says. "The precast concrete components were manufactured regionally, and include recycled material and are fully recyclable." he says. "Precast concrete also contributes to overall sustainability of the project by providing durability and reducing maintenance."

The use of precast concrete double tees brought both a long-span capability and exceptional strength to the building. Reducing the number of interior columns and beams needed provided open, flexible interior space, Townes says. "It is an efficient use of the structural material that both lowered cost and improved erection times."

That was key as the owner had a short time line for the project to have it ready for the coming storm season, he says. "We were able to leverage speed of construction with precast."

The requirements for impact resistance of the walls and roof during a major weather event were met by using solid precast concrete wall panels and a double-tee roof structure. The wall panels are one piece from foundation to parapet, which reduces the number of joints and weak points that make conventional wall construction more susceptible to failure in high lateral load events, says Adrian Lovell of PTAC Consulting Engineers. "Eight inches of solid reinforced concrete has a natural and inherent capability to resist the forces of high wind and protect the occupants from windblown debris."

The designers also added series of unique angles and forms to the exterior of the building to protect openings from windblown debris, and to add stiffness and the additional strength of a folded plate. "The angles created natural recesses to tuck in the window openings," Lovell says.

"This project is a real feather in our cap," Cordes says. "It meets our sustainability goals, and we know that it will survive even after a major storm."

Sustainable Design Award

# Gulf Power Douglas A. McCrary Training Center

Pensacola, Fla.

| | | | |
|---|---|---|---|
| **Owner** | Gulf Power Co., Pensacola, Fla. | **Precaster** | Metromont, Hiram, Ga. |
| **Architect** | Townes + architects PA, Pensacola, Fla. | **Contractor** | Morette Co., Pensacola, Fla. |
| **Engineer of record** | PTAC Consulting Engineers, Pensacola, Fla. | **Project cost** | $6.8 million |
| | | **Project size** | 30,886 ft$^2$ (2,867 m$^2$) |

**"The fact that we could come up with a cost-effective sustainable solution that could withstand 200 mph winds is testament to the benefits of precast."**

***Ben Townes, Townes + architects PA***

Photo: TOWNES + architects PA

Photo: Justin Maconochie Photography

"The precast concrete floor system was a perfect fit for this approach as it proved to be the lowest first-cost solution with the fastest construction time."

*Scott Vyn, Integrated Architecture*

All–Precast Concrete Solution Award

# Gordon Food Service Home Office

Wyoming, Mich.

| | |
|---|---|
| **Owner** | Gordon Food Service, Wyoming, Mich. |
| **Architect and engineer of record** | Integrated Architecture, Grand Rapids, Mich. |
| **Structural engineer** | JDH Engineering, Grandville, Mich. |
| **Civil engineer** | Exxel Engineering, Grand Rapids, Mich. |
| **Precaster** | Kerkstra Precast, Grandville, Mich. |
| **Precaster** | Gate Precast, Winchester, Ky. |
| **Precast concrete specialty engineer** | Ericksen Roed |
| **Contractor** | Dan Vos Construction Co. Inc., Ada, Mich. |
| **Cost of precast** | $5.9 million |
| **Project size** | 384,500 ft$^2$ (35,720 m$^2$) |

When Gordon Food Service (GFS) decided to build a new corporate headquarters on its 50-acre (202,000 m$^2$) Wyoming, Mich., campus, they wanted the building to reflect the company's culture and values, which include conserving resources for the future, and investing in the local community. To embody those goals, they chose a precast concrete design that used locally mined and manufactured precast concrete pieces, which delivered sustainable attributes while creating an elegant, maintenance-free, cost-effective structure, says Scott Vyn, of Integrated Architecture.

"While several factors contributed to the choice of precast for the building's structural system, the two most prominent performance attributes of precast concrete highlighted on the project are speed of construction and durability," he says. "The overall precast concrete structural system reduced the construction period significantly, while the durability of the concrete allowed for interior columns, ceilings, and the building's exterior to remain exposed." The natural fire rating of precast concrete also supported the creation of simple, clean ceiling lines.

The new facility consists of three main areas that include test kitchens, meeting spaces, and offices that are all linked by a light-filled connector zone. This zone features a curved-glass curtain wall to transition between the spaces. The building structure, floors, and exterior walls are all made of precast concrete.

Early on, designers decided to use a raised floor hollow-core precast concrete system, which added several performance and economic benefits to the project.

"The precast concrete floor system was a perfect fit for this approach as it proved to be the lowest first-cost solution with the fastest construction time," Vyn says.

In addition to acting as the structural system for the floor, the underside of the precast concrete panels provided a paintable finished ceiling. That meant the need for a typical layer of cast-in-place concrete to create the finished floor level was eliminated as the raised platform sits directly on the panels. Vyn's team estimates that this decision alone saved roughly $1 million and weeks of construction.

Using precast concrete for the new headquarters also provided aesthetic versatility for both the exterior and interior of the building, he says. The exterior's architectural precast concrete cladding, combined with the glass and metal curtain wall, helped provide the rich, modern and timeless appearance. In addition, the use of structural precast concrete allowed for long clear spans which helped open up the office area. As a result, it provided the owner with virtually limitless options for office configuration, Vyn says. "The great thing about this project, in addition to the staff at GFS, is the timeless longevity that I am confident this building will enjoy."

2015 PCI DESIGN AWARDS
# Building Awards Jury

**Best Government or Public Building**
The Broad Museum in Los Angeles, Calif.

**Best Stadium or Arena**
Toronto Pan Am Sports Centre in Toronto, ON, Canada

**Best Healthcare/Medical Structure**
University of California at San Francisco Medical Center at Mission Bay in San Francisco, Calif.

**Best Higher Education Building**
John Brooks Williams Natural Science and Technology Center–South Building at St. Edward's University, South Austin, Tex.

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Massachusetts Bay Transit Authority Salem Intermodal Commuter Rail Station in Salem, Mass.

**Best Parking Structure Facade**
Pomona College South Campus Parking Structure in Claremont, Calif.

**Best International Building Structure**
Latter-Day Saints Tijuana Temple in Tijuana, Mexico

**Best Theater**
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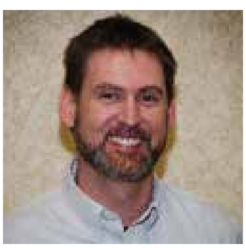
City of Loveland Service Center in Loveland, Colo.

**Best Warehouse/Storage/Distribution Center**
College of DuPage Campus Maintenance Center in Glen Ellyn, Ill.

**Best Custom Solution**
Manhattan West in New York, N.Y.

**Best Mixed-Use Building**
Fassler Hall and Dust Bowl Lounge and Lanes in Oklahoma City, Okla.

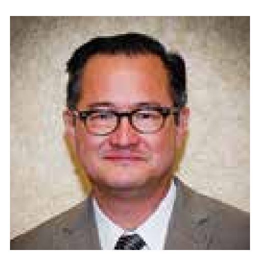
**Brad Gildea** is an associate and senior project manager at the Phoenix, Ariz., office of SmithGroupJJR, one of the largest architecture, engineering, and planning firms in the United States. As a member of the science and technology studio, he is responsible for managing the design as well as overseeing the construction process of complex laboratory projects. Most recently, Gildea was responsible for managing the $135 million Energy Systems Integration Facility for the National Renewable Energy Laboratory in Golden, Colo. He was instrumental in this design-build project, working closely with the client and contractor to deliver one of the largest and most technically advanced energy research facilities in the world for the Department of Energy. He has also served as adjunct faculty teaching design at the Arizona State University College of Architecture from 1996 to 2004. Gildea received bachelor of science and master of architecture degrees from The Ohio State University.



**Thomas M. Gormley**, AIA, NCARB, LEED AP, is principal, project manager, and project architect at GBBN Architects Inc. He has provided leadership on a diverse range of projects for GBBN's markets of healthcare, education, and community development. Gormley has directed teams on small and large projects in both urban and suburban locations, methodically and meticulously documenting projects to successful outcomes. Leading over $750 million in built construction, he has remained vigilant in his commitment to design integrity, the quality of the details, and the overall project constructability. He has intuitive knowledge of construction and project delivery methods that allows him to clearly define a project's scope. Gormley received his bachelor of science degree in architectural engineering technology from the University of Cincinnati and holds a master's in architecture with high distinction from the University of Michigan. He is a registered architect in Ohio and Kentucky.

**Marlene Imirzian**, FAIA, is principal of Marlene Imirzian & Associates Architects, with offices in Phoenix, Ariz., and Escondido, Calif. The firm was ranked as one of the Top 50 architecture firms in the United States by *Architect Magazine* in 2014. Her work is known for its design excellence, project performance, and integration of sustainable design practices for building. Her work has received numerous design awards, including local and regional American Institute of Architects (AIA) design awards, and has been published internationally. In 2013, Imirzian was awarded Fellowship by the AIA for excellence of design. Her work includes projects for higher education, civic, medical, historic preservation, commercial, and residential clients. In addition to practicing architecture, Imirzian serves as guest critic at architecture schools, has been a faculty associate at The Design School Arizona State University (ASU) Herberger Institute for Design and the Arts architecture program, and was recently a faculty mentor for the ASU master of real estate development program. She received her master of architecture degree from the University of Michigan College of Architecture and served as a member of its Alumni Board of Governors. She is licensed to practice in Arizona, California, and Michigan.

**Cathleen McGuigan** is editor-in-chief of *Architectural Record*, the nation's leading architecture publication for more than a century. McGuigan, who is the second woman to serve as editor-in-chief, was named to the post in 2011. Under her leadership, *Architectural Record* has won numerous awards, including the 2012 Grand Neal award, the top American Business Media award for journalistic excellence. A former *Newsweek* architecture critic and arts editor, McGuigan is a graduate of Brown University. She was awarded a Loeb Fellowship at the Graduate School of Design (GSD) at Harvard and has been a Poynter Fellow at Yale. Her freelance articles have appeared in The *New York Times Magazine* and *Smithsonian*, among other periodicals. She sits on the board of trustees of the Skyscraper Museum, the Center for Architecture New York, and the Alumni Council of the Harvard GSD.



**Allan Teramura**, BES, BArch, Fellow of the Royal Architect Institute of Canada, LEED AP, has been a partner at Watson MacEwen Teramura architect in Ottawa, ON, Canada, since 2009. He has considerable experience in heritage conservation issues and as a community advocate was instrumental in the establishment of Canada's first midcentury modern residential neighborhood, Ottawa's Briarcliffe Heritage Community District. Teramura has been responsible for the restoration of the Tropical Greenhouse at the Central Experimental Farm in Ottawa and the ongoing conservation of Parliament Hill's Centre Block. Teramura is also the Royal Architecture Institute of Canada's (RAIC) president-elect. He is also an active voice in Ottawa's architectural community. Teramura graduated from Carleton University in 1990, garnering a degree with a High Distinction, Research Thesis Prize and the RAIC Student Medal. Previously, he earned a bachelor of environmental studies from the University of Manitoba.

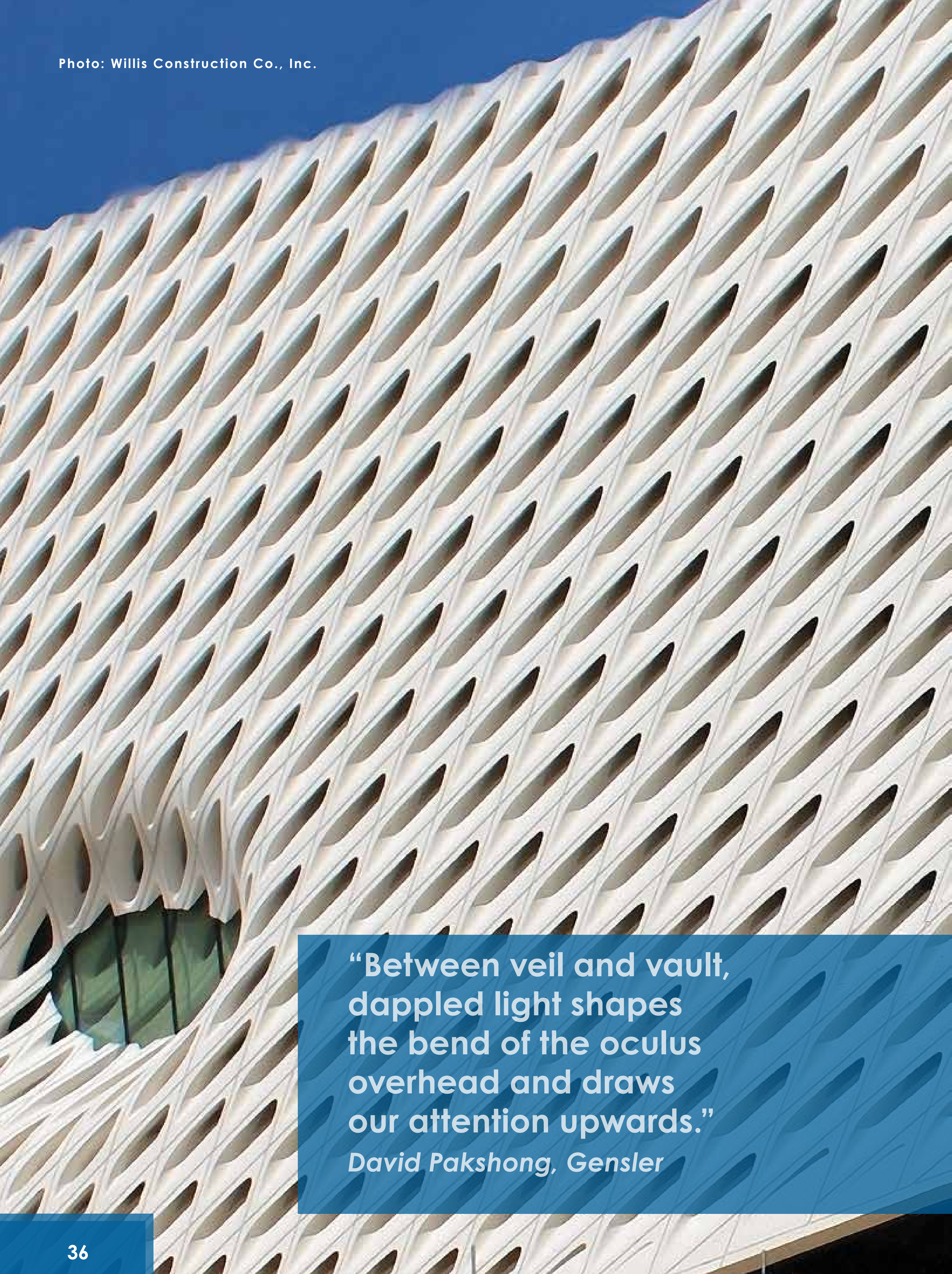


Photo: Willis Construction Co., Inc.

**"Between veil and vault, dappled light shapes the bend of the oculus overhead and draws our attention upwards."**

***David Pakshong, Gensler***

## Best Government or Public Building

# The Broad Museum

## Los Angeles, Calif.

| | | | |
|---|---|---|---|
| **Owner** | The Broad Art Foundation, Santa Monica, Calif. | **Engineer of record** | Nabih Youssef & Associates, Los Angeles, Calif. |
| **Architect** | Diller Scofidio Renfro, New York, N.Y. | **Contractor** | Matt Construction, Santa Fe Springs, Calif. |
| **Executive architect** | Gensler, Santa Monica, Calif. | **Project cost** | $140 million |
| **Precaster** | Willis Construction Co. Inc., San Juan Bautista, Calif. | **Project size** | 120,000 $ft^2$ (11,100 $m^2$) |

The new Broad Museum in Los Angeles, Calif., looks like a white wedding veil sparkling against the blue California sky. Indeed, the structure has been dubbed "the veil and the vault" by designers who created the unique facade to wrap around the museum's two key spaces: the public exhibition space and the archive/storage space that will support the foundation's extensive lending activities.

The glass-fiber-reinforced concrete (GFRC) skin ensured the additional strength and durability required for the structurally unique panel shapes, allowing for smaller tube framing and accommodating tight tolerances for panel placement to the structural steel. "GFRC proved to be the most cost effective of all the materials analyzed, while meeting the schedule and durability requirements," says David Pakshong, executive architect at Gensler.

The vault is enveloped on all sides by an airy, cellular exoskeleton structure made up of 2500 GFRC panels and 650 tons of steel lifts that span across the block-long gallery; it provides filtered natural daylight. Choosing a product with the demands for hundreds of different unique curved shapes for the exterior skin was a big challenge for the design team. Creating hundreds of conical light openings for the building and replicating the front oculus from a parabolic curve would need a product that was flexible and versatile to adapt to this design shape.

The designers created complete geometric information for each panel in three-dimensional (3-D) computer models first. The precast concrete producer imported this data directly into the tool path software to create instructions for the five-axis, computerized numerical control machine to carve molds out of high-density foam. Before skinning in fiberglass, the foam molds were sanded and sealed to create the negative formwork for the GFRC panels. The high strength of the GFRC skin ensured the additional strength required for the structurally unique shapes. The skin strength and durability allowed for smaller tube framing for the skins, which helped accommodate tight tolerances for panel placement to the structural steel. The panel strength also meets the long life and durability requirements needed at the ground floor where the public has access.

"GFRC proved to be the most cost-effective of all the materials analyzed, while meeting the schedule and durability requirements," Pakshong says.

The frames had to be fabricated to tight tolerances so the locations of the components and connection points were checked with a total station survey before and after welding. The survey data was imported back into the 3-D model of the frame to verify accuracy. Before spraying the skin, the frames were positioned on the mold, surveyed, and verified against the model. Then the setting jigs were locked into position, and the frames were removed. This step in the process was never required before. The skins were sprayed, and then the frames were replaced into the jigs and resurveyed. Finally, they did a full 3-D scan of the finished product to ensure compliance with the model.

Pakshong sees this building as one of the more innovative projects he has ever been a part of. He says, "After four years of working on the building, I am still surprised by the ability of the architecture to challenge the way we see space."

Photo: Shai Gil Photography

“The overall effective use of precast for various elements throughout the building enabled a cost-effective solution to specific design issues.”

*Mark Campbell, WSP Canada*

Best Stadium or Arena

# Toronto Pan Am Sports Centre

Toronto, ON, Canada

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|---|---|
| **Owner** | Toronto Pan Am Sports Centre Inc., Toronto, ON, Canada |
| **Architect** | NORR Ltd., Toronto, ON, Canada |
| **Precaster** | RES Precast, Innisfil, ON, Canada |
| **Precast concrete specialty engineer** | Precise Detailing, Inc., Vaughan, ON, Canada |
| **Engineer of record** | Parsons Brinckerhoff Halsall Inc., Toronto, ON, Canada |
| **Contractor** | PCL, Mississauga, ON, Canada |
| **Project cost** | $205 million CAD |
| **Project size** | 311,000 $ft^2$ (28,900 $m^2$) |

When the leaders of the Pan Am Games envisioned their new Sports Centre, they wanted it to be a showstopper. The new venue is the largest sport new-build project for the Pan Am Games and the largest investment ever made in Canadian amateur sport history.

The use of precast concrete helped the designers achieve high-performance goals that were important to the owners. The building features a fully pressure-equalized rain screen system that is durable and robust, and the siding extends above the roof plane in a number of locations to provide parapet screening around the cooling tower and generator units.

Precast concrete slabs were also used for portions of the second floor where greater ceiling spaces were required in the floor below, and precast concrete seating was used for the competition pool viewing areas to achieve larger spans with minimal depths.

The project used 256 insulated precast concrete sandwich wall panels with a blend of light-sandblasted and exposed-aggregate finishes, along with 42 panels and platforms for the dive towers.

Choosing a precast concrete design helped them achieve the grand size and dramatic look and feel, while still staying within the rigid schedule and highly scrutinized budget. "The project obviously needed to be completed in time for this summer's games, and since it is a high profile project, it was in everybody's best interest that the budget was not exceeded," says Mark Campbell, project manager of WSP in Canada, which recently acquired Parsons Brinckerhoff Halsall, the project engineer.

The design features a uniquely pitched structure and striking custom patterning that replicates themes from nature. The facade features sloping custom precast concrete panels that play against the counter slope of the main pool and field house to the north and defines the edge of a new civic plaza to the south. "The building's distinct silhouette and design was inspired by the geology of the southern Ontario landscape and the dynamic sports activities it houses," says David Clusiau, design principal at NORR Ltd. "The custom surface pattern on the exterior precast cladding and the sculptural design of the precast dive tower were key parts in communicating this theme."

The custom pattern featured on the facade combines a lightly sandblasted field with bands of exposed aggregate and reveals a pattern reminiscent of fissures and veins in a rock formation. This effect is reproduced inside the building with precast concrete cladding on the dive tower that features glass ceramic tiles rather than exposed aggregate to represent quartz veins sparkling in the background.

The dive tower, which was prefabricated at a remote site and then installed through the roof in pieces, had to meet precise tolerances to achieve international accreditation.

The use of precast concrete also helped the designers achieve high-performance goals that were important to the owners. "The overall effective use of precast for various elements throughout the building, including the cladding, slabs, bleacher seating, and dive tower, enabled a cost-effective solution to specific design issues," Campbell says.

Photo: Stantec/Rien van Rijthoven

**"Precast concrete cladding provides a quality, solid look to this building while being very economical."**

*Helen Fehr, Rutherford + Chekene*

Best Healthcare/Medical Structure

# University of California at San Francisco Medical Center at Mission Bay

San Francisco, Calif.

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|---|---|---|---|
| **Owner** | UCSF Medical Center, San Francisco, Calif. | **Contractor** | DPR Construction, Sacramento, Calif. |
| **Architect** | Stantec, San Francisco, Calif. | **Project cost** | $1.5 million |
| **Precaster** | Willis Construction Co. Inc., San Juan Bautista, Calif. | **Project size** | 878,000 $ft^2$ (81,600 $m^2$) |
| **Engineer of record** | Rutherford + Chekene, San Francisco, Calif. | | |

The University of California at San Francisco (UCSF) Medical Center at Mission Bay in San Francisco is recognized around the world for its innovative patient care, advanced technology, and pioneering research. When the owners decided to expand its facilities at the Mission Bay site to house its highly regarded cancer, children's, and women's programs, they wanted to ensure that the building reflected its leading-edge identity within a reasonable budget.

"Cost was one of the biggest challenges on this project," says Helen Fehr, executive principal of Rutherford + Chekene, the engineer on the project. "We were charged with designing a high-quality, cutting-edge hospital at a below normally accepted cost."

Fehr's team considered a variety of design options and determined that precast concrete was the best choice.

"Precast came in as a very economical, durable, and attractive option," she says.

Within the facility, each center of excellence is separate but shares a platform of support services and diagnostic treatment spaces arranged along a main spine. For the facade, the designer, Stantec, went with larger precast concrete panels, ranging in size from 4 × 10 ft to 4 × 32 ft (1.2 × 3.0 m to 1.2 × 9.8 m) for fabrication and shipping efficiency, to minimize the number of joints on the building, and reduce caulking costs.

The L-shaped design feature of the project also precluded horizontal panel joints at the windowsills, requiring the tall, skinny elements between the punched windows to be integral with the main portion of the panels. To accommodate these challenges, the team posttensioned the vertical legs so that the panels could be able to span from floor to floor. Using specially designed racks to protect them as they were transitioned to the jobsite, they were then shipped vertically.

Along with being attractive and cost effective, the facade provided the owners with a high-performance, low-maintenance structure that will be able to withstand the roughest conditions and treatment, Fehr says.

"While one hopes that the building cladding will not be marred, scratched, or run into with a vehicle, if this does happen, precast concrete is far more resistant to damage than other materials."

Fehr says that the project was delivered eight days ahead of schedule and under budget in August 2014, opening in February 2015, and that everyone involved is pleased with the results. Ultimately, Fehr says, the success was due to teamwork. "I love the fact that all players—owner, design team, and contractor—worked together for the good of the project. Precast concrete is also advantageous for fire and life safety concerns and inherent longevity."

Photo: Gate Precast Co.

"[Being] able to provide the character of masonry without the maintenance headaches was a huge benefit."

*John Ruble, Moore Ruble Yudell Architects & Planners*

Best Higher Education Building

# John Brooks Williams Natural Science and Technology Center–South Building at St. Edward's University

South Austin, Tex.

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|---|---|---|---|
| **Owner** | St. Edwards University, Austin, Tex. | **Precast concrete specialty engineer** | Stehler Structural Engineering, North Oaks, Minn. |
| **Design architect** | Moore Ruble Yudell Architects & Planners, Santa Monica, Calif. | **Structural engineer** | Datum Engineers, Austin, Tex. |
| **Architect of record** | STG Design, Austin, Tex. | **Contractor** | DPR Construction, Austin, Tex. |
| **Precaster** | Gate Precast Co., Hillsboro, Tex. | **Project cost** | $16.235 million |
| | | **Project size** | 55,000 ft$^2$ (5100 m$^2$) |

When John Ruble of Moore Ruble Yudell Architects & Planners was brought in to design the John Brooks Williams Natural Science and Technology Center–South at St. Edwards University in Austin, Tex., he knew a precast concrete design was the best choice to help the owners achieve the aesthetics they wanted at a price they could afford.

But the owners were not so sure. "They had never done a precast concrete building that wasn't a parking garage," Ruble says. So when he proposed a precast concrete design for the new center, they were not convinced that it would look sophisticated enough or fit with the other brick and limestone buildings on the campus. Ruble assured them that not only could precast concrete deliver the texture and scale they wanted for the building but that it would also provide them with greater control and precision over the design in a much more high-performance and durable structure than limestone, which is porous and prone to staining and mildew.

The 55,000 ft$^2$ (5100 m$^2$) three-story building includes a dry laboratory and classroom structure linked by a central atrium. The majority of the south side of the enclosure was developed as a precast concrete panel system that features a modular design. To provide further assurances, the precast concrete producer created a series of mock-ups in different colors to help the owner understand what the ultimate facade would look like and to tweak the final design.

"It was critical that the color not be too white," Ruble says. "In Texas, when the sun is out full force, a white surface can be blinding and powerfully hot."

They settled on an off-white color that mimics limestone but in a deeper more subdued hue. To add variety to the facade, the projected features were acid washed while the flat sections were sandblasted.

The precast concrete producer designed two forms out of poplar wood to cast all 67 panels. By shifting side rails and top and bottom rails, the precast concrete producer was able to avoid repetition in the pattern, ensuring no two panels were the same.

"The way the planes on the surface have order but are also random is reminiscent of masonry stone work," Ruble says. The dynamic surface also provides opportunities for a dynamic light and shadow experience throughout the day.

Despite their early worries, the client was thrilled with the final structure, as was Ruble. "Everyone on the team was amazed at the level of character we were able to achieve for the budget," he says. "It is our favorite precast design so far."

Photo: Nic Lehoux

“The precast concrete on the project represents a true marriage of engineering with the inherent beauty of the concrete.”

*Nat Oppenheimer, Robert Silman Associates*

## Best Higher Education Building

# Whitney Museum of American Art

## New York, N.Y.

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|---|---|
| **Owner** | Whitney Museum of American Art, New York, N.Y. |
| **Architect** | Cooper Robertson, New York, N.Y. |
| **Design architect** | Renzo Piano Building Workshop, Genoa, Italy |
| **Precaster** | BPDL Inc., Alma, QC, Canada |
| **Engineer of record** | Robert Silman Associates, New York, N.Y. |
| **Contractor** | Turner Construction Co., New York, N.Y. |
| **Project cost** | \$248 million |
| **Project size** | 220,000 $ft^2$ (20,400 $m^2$) |

Situated between New York City's High Line linear park and the Hudson River, the Whitney Museum's new 220,000 $ft^2$ (20,400 $m^2$) precast concrete and glass facility is now home to the most expansive display of modern and contemporary American art in the country. The new building is as attractive as the art that it houses inside.

The eight-story structure is demonstrably asymmetrical, with a series of terraces that step back from the adjacent elevated park. The design is organized around galleries on the south side, support spaces on the north, and an exposed precast concrete core running through the middle that contains vertical circulation and mechanical ducts. "From very early on in the design process, there was a desire to architecturally express the building's central spine distinctly from the volumes on either side," says Elisabetta Trezzani, partner-in-charge from the Renzo Piano Building Workshop, the design architect for the project.

The ability to limit expensive field labor in New York was also a contributing factor in choosing precast concrete over cast-in-place concrete. Containing all of the vertical circulation and mechanical shafts, the spine of the building presented a challenge for designers. "It had to fit in the project site while still allowing ample room for the galleries and support spaces," she says. "The use of thin precast concrete panels as cladding not only expressed the idea of the central core but also saved significant space over the alternative option of cast-in-place concrete."

By combining the precast concrete panels with closed cell polyurethane foamed-in-place insulation and a double-silicone seal between panel joints, the design team was able to also deliver a high-performance system that responds to the strict interior temperature and humidity requirements of the museum,

Stabilized laterally by the concrete core, the building uses a steel frame for vertical loads and required cross bracing only at the southwest corner. The facade features a combination of architectural precast concrete panels and a steel-plate-clad unitized curtain wall system, which is hung from the top of each panel and pinned at the bottom. "Using a similar structural support system for the precast concrete panels allowed both wall types to move similarly, thereby eliminating potential complex and unsightly differential movement joints," says Scott Newman, partner-in-charge from Cooper Robertson, the executive architect for the project. "This would not have been possible with cast-in-place concrete."

These systems typically consist of stainless steel bolts that project ½ in. (13 mm) off the face of the building to which crews tether a lanyard to lock in, level, and stabilize a platform. The team took that idea and created a denser pattern of anchors that could also be used to accommodate art installation, Newman says, noting that it further adds to the artistic beauty and functionality of this structure. "When the threaded inserts are exposed, they add visual texture and sparkle in the sunlight, adding another level of detail to the building."

Photo: Boston College

"To be able to successfully replicate these elements in precast concrete not only shows the versatility of precast concrete but also showcases the high level of skill ... involved in the project."

*Robin Larouche, BPDL Inc.*

## Best Higher Education Building

# St. Mary's Hall, Boston College

## Chestnut Hill, Mass.

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| **Owner** | Boston College, Chestnut Hill, Mass. | **Restoration architect** | McGinley Kalsow & Associates Inc., Somerville, Mass. |
| **Architect** | DiMella Shaffer, Boston, Mass. | **Contractor** | Shawmut Design & Construction, Boston, Mass. |
| **Precaster** | BPDL Inc., Alma, QC, Canada | **Cost of precast concrete** | $4.22 million |
| **Precast concrete consultant** | Building & Monument Conservation, Arlington, Mass. | **Project size** | 92,000 ft$^2$ (8500 m$^2$) |
| **Engineer of record** | LeMessurier Consultants, Boston, Mass. | | |

The Boston College campus is known for Gothic early–20th century architecture. When designers were brought in to restore the 100-year-old St. Mary's Hall, they knew they would need to faithfully replicate every detail of the building's cast stone facade—but in a material that would be better able to withstand the long, cold Boston winters. They chose precast concrete to do the job. "The biggest advantage in using precast over other materials is the great plasticity of it, which allowed for a wide range of details, as well as the quality of the process itself." says Robin Larouche of precast concrete producer BPDL Inc. in Alma, QC, Canada.

To achieve the goals of the project, the precast concrete producer had to be certain that the team could reproduce every piece and feature on the building as closely to the original as possible, says Wendall Kalsow, president of McGinley Kalsow & Associates Inc., the restoration architect on the project.

The pieces, which include angels, gargoyles, crucifixes, and other gothic elements, all feature complex shapes and details, requiring extraordinarily complex designs. "We had to make sure the replicas would look great aesthetically in terms of form, color, and quality, while also ensuring there would be no damages at the moment of demolding," Larouche says. And they had to do it quickly. The project included 16,000 pieces, more than 50 of which were museum quality sculptures. All of them had to be reproduced in precast concrete in less than 18 months to meet the mason's schedule.

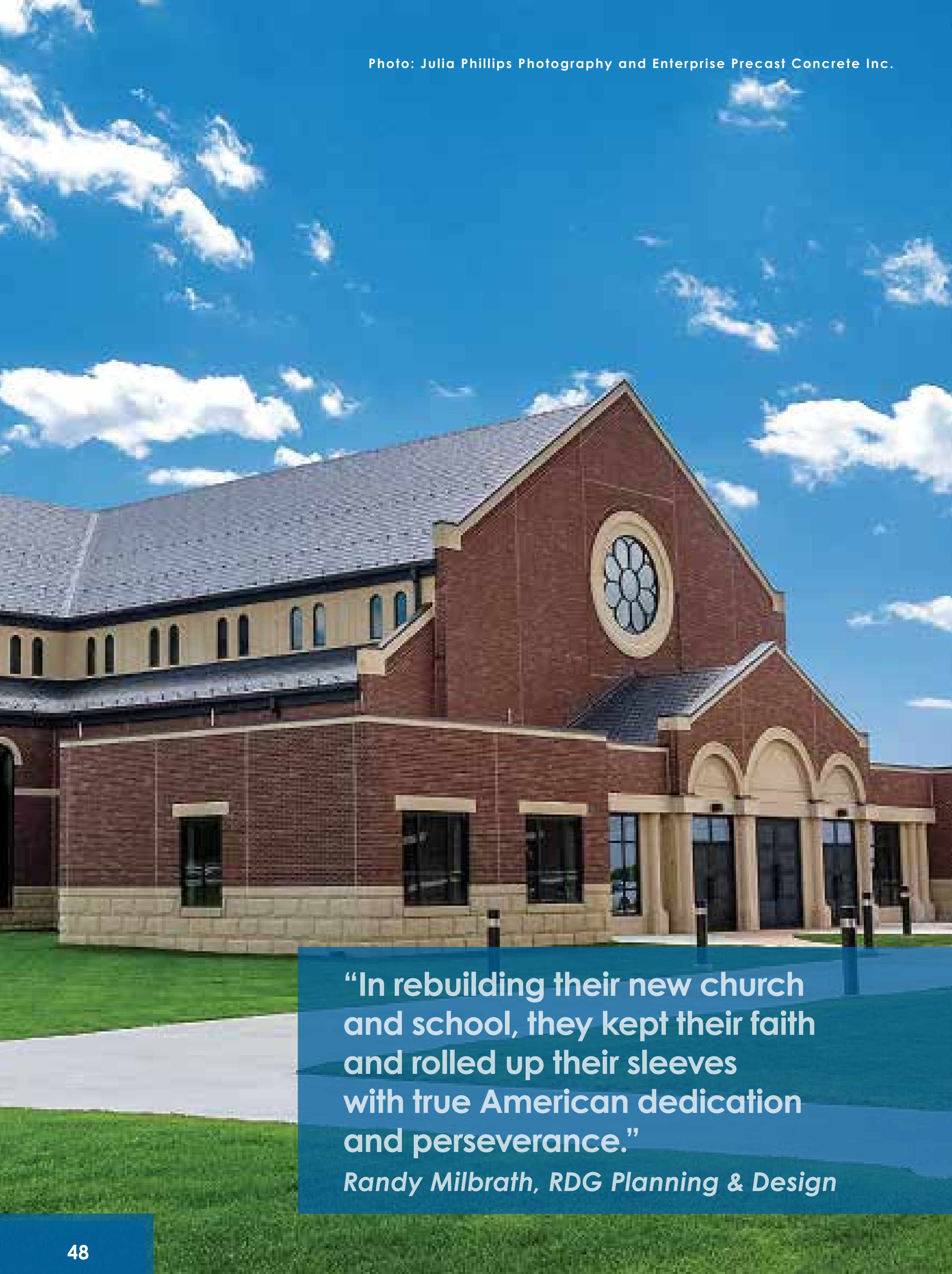
Before the molds could be created and placed, restoration artists needed to resculpt each piece in clay to simulate the natural stone–tooling and to be sure that the replicas exactly matched. Many different techniques were required to replicate the unweathered appearance of the original pieces. Kalsow says. "Some pieces required resculpting in an artist's studio with clay, other sculptures could be replicated by repairing the original pieces with high-density liquid resins, and others required intricate birch plywood molds."

The pieces were then manufactured with a light aggregate to prevent the cast stone from appearing dark as it weathers over the next hundred years. To improve the durability and long-term performance of the restored facade, the precast concrete producer engineered a new anchoring system, and some small units were combined to create larger units with false joints. Each unit was numbered to identify its location in the wall.

For example, 17 individual stones were able to be formed into a single precast concrete unit. "This large single unit dramatically reduced the time required to install each tracery section, provided a high level of dimensional control, and improved structural performance," Kalsow says.

To meet the tight deadline, masonry work was divided into 22 lifts, and many lifts were worked simultaneously. The relentless commitment to detail and precision resulted in a historic restoration that will stand the test of time.

Photo: Julia Phillips Photography and Enterprise Precast Concrete Inc.



**“In rebuilding their new church and school, they kept their faith and rolled up their sleeves with true American dedication and perseverance.”**

***Randy Milbrath, RDG Planning & Design***

Best K–12 School

# St. Mary Catholic Church and School

Joplin, Mo.

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|---|---|---|---|
| **Owner** | St. Mary's Catholic Church and School, Joplin, Mo. | **Engineer of record** | Thompson, Dreessen & Dorner Inc., Omaha, Neb. |
| **Architect** | RDG Planning & Design, Omaha, Neb. | **Contractor** | Crossland Construction, Columbus, Kans. |
| **Precaster** | Enterprise Precast Concrete Inc., Omaha, Neb. | **Project cost** | $12.9 million |
| **Precast concrete specialty engineer** | Enterprise Properties Engineering, Omaha, Neb. | **Project size** | 61,100 ft² (5680 m²) |

Everything changed for St. Mary's parish church and school on the afternoon of May 22, 2011, when a catastrophic EF-5 tornado swept through the Midwestern community and destroyed the entire parish facilities. It was officially ranked the deadliest tornado in the United States since 1947, and the town was devastated.

One structure that remained standing was St. Mary's iconic church cross, which the community embraced as a symbol of hope and courage, says Randy Milbrath of RDG Planning & Design. "It left Father Monaghan and the members of St. Mary's determined to rebuild a place of safety and peace of mind."

Local fundraising efforts supported the rebuilding. Once funds were raised, the church was eager to get the project done as quickly as possible to be ready for returning students and parish members in the fall. The owners also wanted a high-performance, durable structure that could be a haven for community members.

These goals led designers to choose a precast concrete design, featuring architectural precast concrete panels embedded with thin brick in a modern interpretation of Romanesque architecture.

"Architectural precast wall panels on the exterior allowed the new structure of the church and school to be erected quickly, which was a powerful message of hope in a city trying to rebuild much of its retail and institutional buildings all at once," Milbrath says.

The decision to go with precast concrete for the facade provided durability to the building enclosure, which was particularly important to a community rebuilding itself after a disaster. As part of the project, Federal Emergency Management Agency (FEMA) storm shelters were incorporated throughout the interior of the school. "Spaces normally used as corridors and interior rooms of the school have become safe rooms, meeting FEMA standards for the entire school population and church simultaneously," Milbrath says. The precast concrete walls of the school were finished smooth and painted but left exposed in the corridors, a request from the principal for durable wall surfaces as well as a visual reminder of their second purpose.

The designers included intricate precast concrete detailing on the facades of both buildings, including protruding brick features and areas of exposed precast concrete that simulate what cast stone would look like on a traditional masonry project. Formliners were used at the base of the school panels to emulate natural split-faced stone. Working directly with the precast concrete producer early on allowed for design, review, and production to proceed on an accelerated schedule to reopen the school in August 2014 and the church and parish hall and offices before Christmas that year.

Thanks to the use of precast concrete the tight schedule was met, and the school and church now stand as a symbol of the fortitude of Joplin's citizens, McClure says. "The same iconic cross that helped inspire the community continues to stand at its original location."

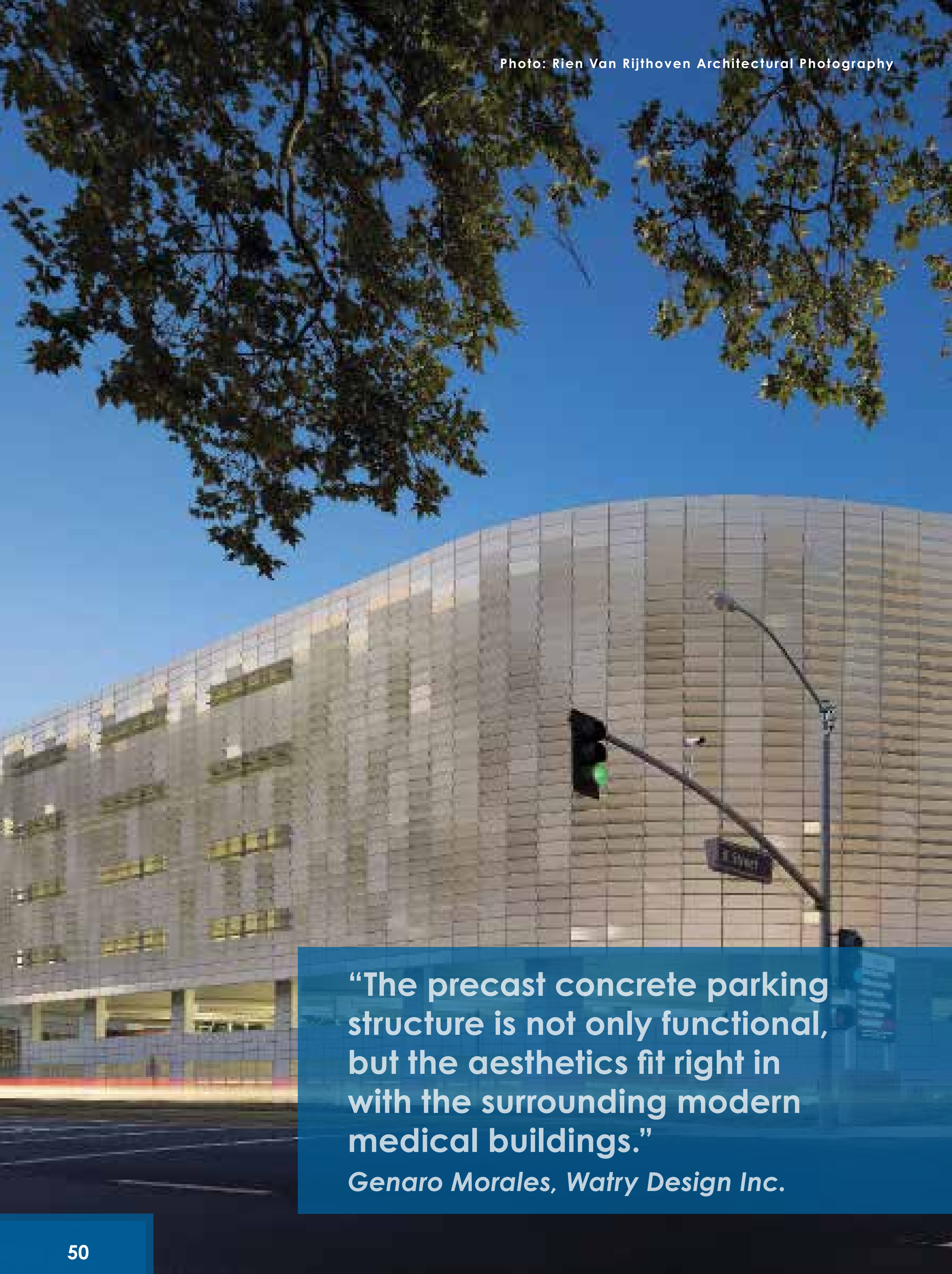

Photo: Rien Van Rijthoven Architectural Photography

**"The precast concrete parking structure is not only functional, but the aesthetics fit right in with the surrounding modern medical buildings."**

*Genaro Morales, Watry Design Inc.*

Best Hybrid Parking Structure

# University of California at Davis Medical Center Parking Structure III

Sacramento, Calif.

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|---|---|---|---|
| **Owner** | UC Davis Health System, Sacramento, Calif. | **Contractor** | McCarthy Building Cos. Inc., Rosevillfe, Calif. |
| **Architect and engineer of record** | Watry Design Inc., Redwood City, Calif. | **Project cost** | $20 million |
| **Design architect** | Dreyfuss and Blackford Architects, Sacramento, Calif. | **Project size** | 400,000 ft$^2$ (37,200 m$^2$) |
| **Precaster and precast concrete specialty engineer** | Clark Pacific, West Sacramento, Calif. | | |

When you build anything in California, safety and performance are always top of mind. When leaders of the University of California at Davis (UCD) Medical Center began planning for a new six-level parking structure to accommodate 1200 cars, they knew it would have to meet the most rigorous seismic requirements. Administrators also wanted a structure that reflected the hospital's reputation as one of the leading medical facilities in the country—and it had to adhere to a tight time line and budget.

Going with a precast concrete design enabled them achieve all of these goals. "The use of precast concrete minimized the impact of the structure, while reducing the actual on-site duration of the project," says Genaro Morales, director of architectural design for Watry Design Inc. in San Jose, Calif. "Cast-in-place would have required substantially more construction activity for forming and placement of the concrete and rebar."

Acting as a highly visible front door for patrons and patients, the new UCD III parking structure that sits at the front of the UCD Medical Center facility had to stand out while blending with the rest of the campus architecture.

The architect chose a white architectural finish for the structural precast concrete columns and spandrels to match the precast concrete's color to that of the hospital finish. Reveals were added to the spandrels, alongside thin, horizontal openings to emphasize the horizontal nature of the parking structure, and aluminum louvers were attached to the precast concrete facades facing the street. The louvers were each angled to pick up lighting from passing headlights to create an image of movement from one set of louvers to the next.

"Precast concrete allowed us to meet all of the exterior facade detailing within budget," Morales says. "Shapes, textures, and color matches were much easier and economical to achieve with precast concrete than would have been possible with cast-in-place concrete."

To meet seismic design goals, designers incorporated a precast concrete hybrid moment frame to provide seismic resistance. The use of the frame also eliminated the need for shear walls, which helped to create more wide-open interiors to maximize space. "The decision to use the precast concrete hybrid moment frame was critical, given the high seismic requirements of the structure," Morales says.

The result is a strategically located parking structure that provides optimal access for patients and visitors. "Being that the structure is located in such a high-profile site, we love the fact that it meets the high and demanding qualities of the overall campus."


Photo: William Horne

**“The owner had a desire to minimize long-term maintenance costs and provide a durable long-lasting structure. Dense precast concrete elements, stainless steel connectors, and locating the prestressing far below the deck level helped to satisfy these objectives.”**

*Joseph Clark, Desman*

Best All–Precast Concrete Parking Structure

# Massachusetts Bay Transit Authority Salem Intermodal Commuter Rail Station

Salem, Mass.

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|---|---|
| **Owner** | Massachusetts Bay Transportation Authority, Boston, Mass. |
| **Architect** | Fennick McCredie Architecture, Boston, Mass. |
| **Precaster** | Unistress Corp., Pittsfield, Mass. |
| **Precast concrete specialty engineer** | TRC World Wide Engineering, Allentown, Pa. |
| **Engineer of record** | Desman, Rocky Hill, Conn. |
| **Contractor** | Consigli Construction Co. Inc., Milford, Mass. |
| **Project cost** | $44.5 million |
| **Project size** | 250,000 $ft^2$ (23,200 $m^2$) |

The new Massachusetts Bay Transit Authority (MBTA) Salem Intermodal Commuter Rail Station in Salem, Mass., is a testament to the versatility and high-performance characteristics that precast concrete can bring to the design and detailing of a project.

This rail station project had several major components, including excavation of the site and construction of a five-level parking structure, a passenger waiting shelter, at-grade bus platform, taxi lane, drop-off/pick-up area, sidewalks, and a pedestrian bridge, connecting a raised street to the second level of the structure. The owners originally wanted to use brick to fit in with the surrounding historic structures; however, they did not have the time or budget necessary for a traditional hand-laid brick design. Maintaining a safe, accessible, and convenient environment for passengers during construction was also paramount.

The use of precast concrete allowed the project architects and engineers to fast track the schedule with the use of early competitive bidding and an efficient erection process, says Scott Brodsky, senior architect and associate principal of Fennick McCredie Architecture, the architect and prime consultant for the project. "The precast concrete pieces were fabricated while soil modification and foundations were being installed, then erected quickly," he says. "This was critical to making the completion date required by the stakeholders." In addition, the use of embedded brick greatly reduced the need for future maintenance associated with traditionally laid brick. "Overall, the use of precast was preferred for the minimal maintenance and long-term durability demanded by the owner."

The layout of the site featured one end at grade level for the train station with a covered lobby and a covered drop-off, which drove a desire to maximize open space to enhance sightlines and pedestrian movement. The precast concrete design was able to maximize open space through the use of fluid lock devices (FLDs) connecting double tees across the building joint between two segments of the parking structure to transmit the lateral force from the side with no shear wall to the side that has shear walls, which are resisting forces in the longitudinal direction. "By transferring loads in this manner, shear walls in one direction were eliminated in one segment, providing the open space desired," says Joseph Clark, senior engineer and associate of Desman, the engineer of record for the project. The use of precast concrete was also an aesthetic option for the design team. To acknowledge the historic significance of the former rail yard, the designers incorporated patterned precast concrete spandrels on the facade to evoke images of steam locomotive wheels and drive bars. The design was accomplished through the use of sculpted, deeply ribbed formliners.

"We loved the ability to embed the special railroad and local history right in the facade of the building by exploiting the plasticity of precast concrete," Brodsky says. "Unistress embraced the artistic aspect of this and took extra care in constructing, handling, and placing these unique elements."

Photo: StructureCast

**"The use of architectural precast concrete panels gave the owner an attractive structure that blends into the environment."**

*Brent Dezember, StructureCast*

Best Parking Structure Facade

# Pomona College South Campus Parking Structure

Claremont, Calif.

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|---|---|---|---|
| **Owner** | Pomona College, Claremont, Calif. | **Contractor** | Whiting Turner Construction, Irvine, Calif. |
| **Architect and engineer of record** | Watry Design Inc., Redwood City, Calif. | **Project cost** | $21 million |
| **Precaster and precast concrete specialty engineer** | StructureCast, Bakersfield, Calif. | **Project size** | 12,000 $ft^2$ (1100 $m^2$) of precast concrete panels |

What do you do when the parking structure that you need to build takes up valuable park space on a crowded college campus? Build a full-sized soccer field on the roof. This was just one of the many innovative design solutions that the project incorporated into this LEED platinum–certified, three-story parking structure built on the Pomona College South Campus in Claremont, Calif.

"From the beginning, the owner was very concerned about losing an existing soccer/Lacrosse field," says Brent Dezember of StructureCast, the precast concrete producer for the project.

They also wanted the structure to blend into the natural surroundings as well as with the older stately buildings that dot the campus. "Using a precast concrete facade enabled them to address all of these issues," Dezember says.

The parking structure was constructed with a cast-in-place concrete frame to meet seismic load requirements. To make it more attractive, it was then clad with 165 architectural precast concrete panels, tinted to match the surrounding architecture.

"The precast panels were a key design element to make the parking structure more attractive," Dezember says.

Because it is built on sloping land, part of the structure is underground with only one side exposed. The southeast corner of the structure is bermed so that it fuses into the campus, and provides active space on the roof.

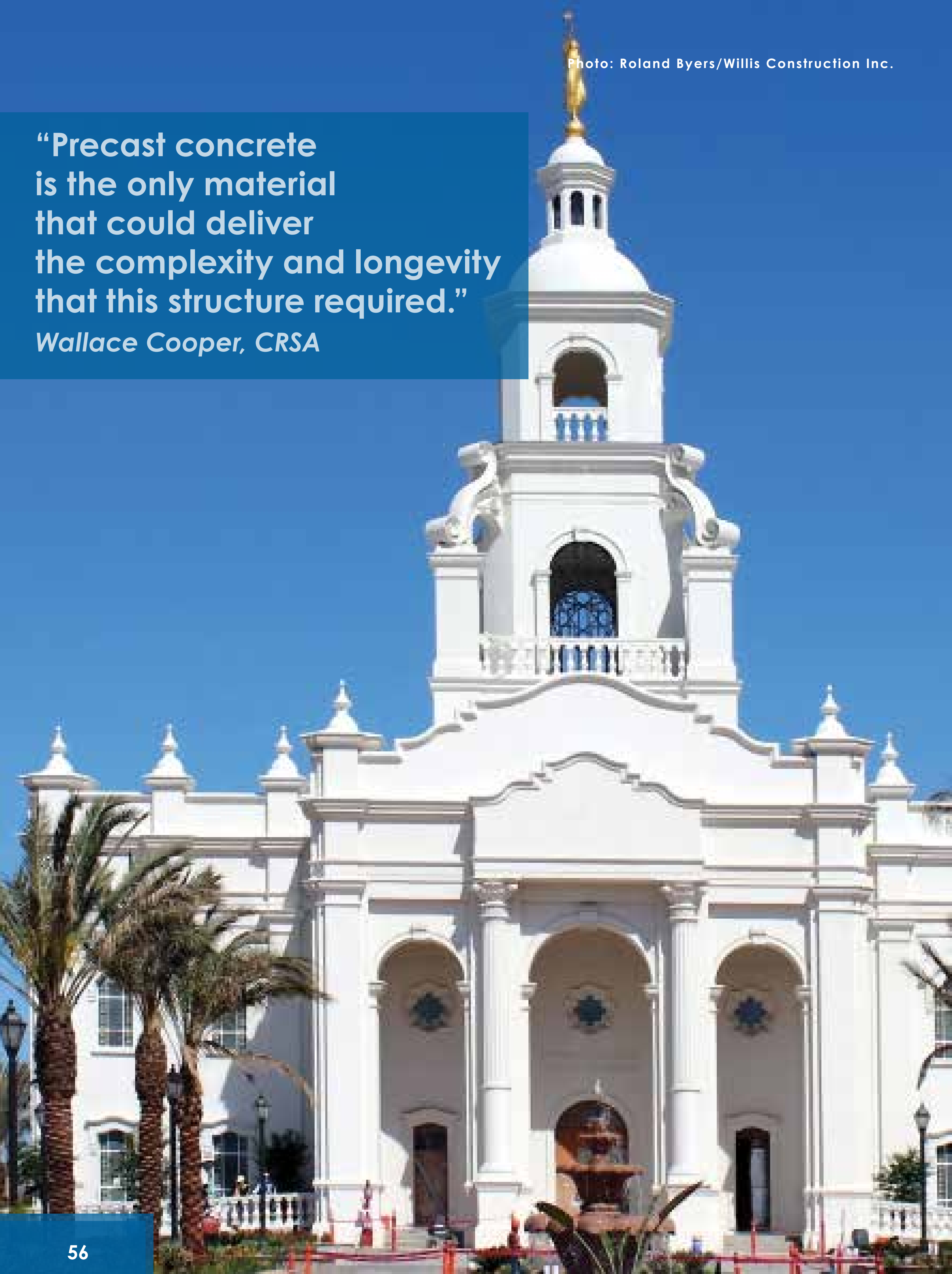
"The result is not only a durable and aesthetically pleasing parking structure but also one that matches up with the campus initiative to go green," Dezember says.

To accommodate spectators on the soccer field, roof-level panels were designed with integral precast concrete benches. "This was one of the biggest challenges on the project," Dezember says. The benches were cast directly onto the precast concrete spandrels, which had to follow the flowline of the cast-in-place concrete structure. In some cases, the cast-in-place concrete features were not completely level, requiring Dezember's team to adjust the spandrels to achieve a level base. "Otherwise, spectators would have been sitting on tilted benches," he says.

Dezember explained that the use of precast concrete also helped the owner achieve the coveted LEED platinum rating, winning project points for producing the panels locally and for using recycled steel in all of the connectors and other metal elements, he says.

The resulting structure is attractive, resilient, and multifunctional. Dezember says, "The client is very happy with the way it all turned out."

Photo: Roland Byers/Willis Construction Inc.



**"Precast concrete is the only material that could deliver the complexity and longevity that this structure required."**
*Wallace Cooper, CRSA*

# Best International Building Structure
# Latter-Day Saints Tijuana Temple
## Tijuana, Mexico

| | |
|---|---|
| **Owner** | The Church of Jesus Christ of Latter-Day Saints, Salt Lake City, Utah |
| **Architect** | CRSA, Salt Lake City, Utah |
| **Precaster** | Willis Construction Co. Inc., San Juan Bautista, Calif. |
| **Engineer of record** | ARW Engineers, Ogden, Utah |
| **Contractor** | Haskell, Jacksonville, Fla. |

The Church of Latter Day Saints (LDS) temple in Tijuana, Mexico, is more than just a religious structure. Church leaders wanted it to be a powerful statement to the people of Tijuana, says Wallace Cooper of CRSA, the architect for the project. "There was a conscientious effort to create a temple that said, 'You are incredibly important to our church.'"

The temple design went through three iterations, with each successive set of drawings pushing the designers to go further, and to create a more visually striking structure that would stand out against the crowded Tijuana backdrop. "It had to be something that was truly outstanding," he says.

Precast concrete was chosen early on in the process because it was the only material that could deliver the soaring design and sophisticated details that the church desired. "With each iteration, the precast pieces became more complicated and intricate in detail and jointing," he says.

The final design is a three-story structure with a stucco white facade that mimicks the traditional plaster finish common in Mexico's architecture. The entrance features three ornate arches reaching two stories high, and the spire is flanked by precast concrete scrolls at each corner.

According to Cooper, the ornate pieces and sweeping scale forced CRSA's team to look for creative strategies to conceal joints. To do this, they designed the facade using overlapping panels and columns so that the final structure has only one horizontal seam spanning the circumference of the building.

The designers were also eager to eliminate wall-mount holes on the backs of the precast concrete panels to keep the building enclosure tight and avoid the need for backfilling. Typically, precast concrete panels will leave an interior opening for wall mounts, but Willis Construction, the precast concrete producer on the project, came up with a system that enabled all of the panels to be mounted from the exterior of the building, completely eliminating the interior holes. "There would have been up to 1000 holes to fill with the traditional system, but with our design there were none," Cooper says. The innovative mounting strategy saved time on the project allowing subcontractors to start working on internal features while the exterior was still under construction. "It was an amazing solution," he says.

The designers also worked with only local craftspeople for construction, and a local precast concrete facility to create the panels, which allowed the team to avoid expensive cross-border taxes. Cooper says he was initially concerned about finding the right local teams to do the job—but he need not have been. "The final work was fantastic, and everyone did a great job," he says.

Cooper says the project was finished in June 2014, and the owners are so happy with the result that they are now modeling other churches across South America on this project. He says, "It has changed the way the church designs its temples."

Photo: Becker Architects for Bellevue Youth Theatre

**“As architects, we love the fact that a single material, concrete—precast along with poured-in-place—was able to efficiently provide organic forms and structure that allowed for a theater to be designed as environmental sculpture”**

***Robert Becker, Becker Architects***

Best Theater

# Bellevue Youth Theatre

Bellevue, Wash.

| | | | |
|---|---|---|---|
| **Owner** | City of Bellevue–Parks Department, Bellevue, Wash. | **Engineer of record** | CT Engineering Inc., Seattle, Wash. |
| **Architect** | Becker Architects, Bellevue, Wash. | **Contractor** | Pease Construction Inc., Lakewood, Wash. |
| **Precaster and precast concrete specialty engineer** | Oldcastle Precast, Spokane, Wash. | **Project cost** | $9.3 million |
| | | **Project size** | 13,448 ft² (1249 m²) |

How do you build a theater in a park without taking up valuable park land? Build it into the side of a hill and let the children play on top.

This was the basic design idea behind the Bellevue Youth Theatre in Bellevue, Wash., says Robert George Becker, principal and owner of Becker Architects in Bellevue. The theater includes a living roof comprising lawn, soil, irrigation, and a waterproofing system, which are all placed on top of a structural precast concrete roofing system.

"One of the main aesthetic design goals was to have an exposed concrete roof and wall structural system because it allows the building to appear as if it is extruded out of the ground," Becker says.

Coming up with a visually integrated design that both showcases the theater from the front and obscures it from the back, was only half the challenge on this project. The designers also had to address practical issues, such as how to design a waterproof roof that could handle the weight of landscaping and associated traffic while contributing to effective sound attenuation and insulation within the building. "Together all these challenges contributed to the final design approach and mandated a precast concrete roofing system that would easily join up with concrete structural and retaining walls," Becker says.

The roof system consists of precast concrete beams, hollow-core planks, and a precast concrete exhaust dome hub that was cast off-site then lifted into place over the span of a couple of weeks. "That is just a fraction of the time a cast-in-place system would have required," Becker says.

The project architect, Tanja Reiners, explained that the precast concrete beams were curved at the top with projecting steel reinforcing to engage the precast concrete hollow-core planks. She says, "By end supporting the precast concrete beams on the outside concrete wall and then supporting the beams on the interior concrete wall surrounding the main theater, we were able to cantilever the beams to the center precast concrete hub, where they are all joined together."

The precast concrete compression hub at the center of the theater was placed after all of the critical cantilevered beams were in place. The hub, which is hollow, allows unwanted air to be exhausted directly to the outside, thereby eliminating the need to use energy to recirculate the air back into the theater where it would be cooled before recirculating it back to the theater. Because the cantilevered precast concrete roof beams and hub system needed only two main concentric load-bearing concrete walls to support them, it created a wide-open theater space, optimizing capacity and viewing for performances.

The resulting structure is a durable building that has become a unique part of the broader park design, Becker says. "This theater was designed as environmental sculpture seamlessly integrated into the park's surrounding hillside lawn area."


Photo: Connie Zhou/OTTO

**“Precast concrete’s polished and burnished finishes elevate the design approach by blending high-end sophistication with a new modern expression for the owner’s brand.”**

*Michael Lee, Callison*

Best Retail Facility

# Nordstrom, The Woodlands

The Woodlands, Tex.

| | |
|---|---|
| **Owner** | Nordstrom Inc., Seattle, Wash. |
| **Architect** | Callison, Seattle, Wash. |
| **Precaster** | Gate Precast Co., Hillsboro, Tex. |
| **Precast concrete specialty engineer** | Stehler Structural Engineering, North Oaks, Minn. |
| **Engineer of record** | Coffman Engineers, Seattle, Wash. |
| **Contractor** | W. E. O'Neil Construction Co., Chicago, Ill. |
| **Project size** | 138,000 $ft^2$ (12,800 $m^2$) |

Nordstrom, the iconic American retail brand, has been building retail stores for decades. Its newest building in The Woodlands, Tex., represents a completely evolved approach to structure design, says Michael Lee, principal of Callison, the architect for the project. The owner wanted the facade of its latest addition to convey a sense of lightness, warmth, and elegance using multiple shades and detailing—all within a relatively tight budget.

"One of the biggest challenges in designing this building was finding a cost-effective material that could truly express the detail and articulation of the new Nordstrom facade design," Lee says.

Precast concrete was the solution. "Precast was a natural choice," Lee says. "The wide variety of textures and finishes allowed the design team the freedom to develop a complex design pattern, weaving several finishes within individual panels."

The facade was developed through design-assisted collaboration between the architect and the precast concrete producer, Gate Precast Co. The projecting feature design incorporates horizontal bands with four finishes: polished, burnished, acid etched, and sandblasted. The strategically placed finishes were designed to break down the building mass and to create an inviting scale for the customer.

Initially, Lee's team wanted a super-white base color, but the first panels were so intensely white that it was difficult to distinguish the different finishes. Gate solved the problem by using a special mixture proportioning that features limestone with a small amount of sand to provide a sparkle effect, which caused the various shades to stand out, Lee says. "The burnished, honed, acid-etched, and polished portions of the panels each reflect light differently when seen from different angles, thus taking on a light and airy quality throughout the day."

At the entry of the store are 1 in. (25 mm) thick reveals that feature a ribbed pattern that provides color contrast and dimension. Polished outer projections add further character, simulating natural stones.

To take full advantage of the high-performance aspects of precast concrete, the designer chose oversized panels with continuous insulation, which reduced the number of panel joints. This resulted in a seamless facade design, that was quick to erect and provided excellent *R*-values, helping improve the overall energy efficiency of the building, Lee says. "It also allowed the building enclosure to be completed very quickly, which in turn enabled to contractor to meet the overall construction schedule."

The final design was such a success that it has become the choice for Nordstrom's new stores. "Only through great partnership were we able to create unique mixes, finishes, and designs that surpassed all preconceived notions of concrete and supported the store brand elements," Lee says. "The combination of horizontal reveals, layers of multiple finishes, and the building's proportions formed a natural warmth from a modern mass."

Photo: EnCon United

**"One of the things that is great about precast is that you can add different colors, tones, and patterns in the formliner."**
***Jonathan Flager, RNL Design***

Best Warehouse/Storage/Distribution Center

# City of Loveland Service Center

Loveland, Colo.

| | | | |
|---|---|---|---|
| **Owner** | City of Loveland, Loveland, Colo. | **Contractor** | Golden Triangle Construction, Longmont, Colo. |
| **Architect** | RNL Design, Denver, Colo. | **Project cost** | $13.2 million |
| **Precaster** | Stresscon, Colorado Springs, Colo. | **Project size** | 45,274 $ft^2$ (4206 $m^2$) |
| **Engineer of record** | Monroe & Newell, Denver, Colo. | | |

RNL in Denver, Colo., has been designing structures for the Loveland Service Center, in Loveland, Colo., for decades. RNL was the original master planner for the service center in 1983, and the company was again chosen for the expansion plans for the campus, adding four new buildings this past year. In the current phase, they designed new buildings for the public works' solid wastes, storm water, and streets departments.

The primary goal for this project was to create durable, low-maintenance structures that would relate to the existing campus buildings and provide a high level of thermal resistance to reduce energy costs, says Jonathan Flager, architect with RNL. They also needed to be erected as quickly as possible with minimal disruption to the active service center campus. "The various precast panel types allowed us to meet all of these goals."

Using precast concrete, the designers were able to create a uniform building envelope with multiple colors and simple detailing with an architectural gray and white acid-etched design to match nearby building color schemes.

"The use of a formliner allowed for aesthetic architectural detailing on the facade of the building without the need of an extensive and time-consuming detailing process and additional drawings," Flager says.

They chose high-performance insulated precast concrete wall panels to add durability and energy efficiency. These load-bearing panels also eliminated the need for columns inside the office, which supported the desire to maximize usable space and allow for more modular workstations. The inherent mass of the precast concrete panels and the continuous simple detailing also guard against lateral wind forces and weather infiltration at joints.

Because the panels were cast off-site, erection time and the associated disruption were limited, which turned out to be a crucial component for keeping the project on track. The original construction process was scheduled to begin in the middle of September, but massive rains and associated flooding on the project site threw the schedule off track. "The site was saturated by the rains," Flager says.

Once the storms subsided, the team spent several weeks stabilizing the site, and by the time construction began it was well into winter, with temperatures dropping below freezing.

"Because of the nature of precast concrete, we were still able to do the work, and that got the project back on schedule," he says.

The project was delivered close to schedule, Flager says. The city leaders have fallen in love with the building.

Flager says, "These facilities met all of the functional requirements with a durable and attractive design that will improve the City's bottom line through increased efficiencies for years to come."

Photo: James Steinkamp, Steinkamp Photography

“The building’s concept specified wall planes that were highly textured in one color in the north/south direction, while smooth, nontextured panels in another color separated these planes in the east/west direction.”

*Jay Johnson, Legat Architects*

Best Warehouse/Storage/Distribution Center

# College of DuPage Campus Maintenance Center

Glen Ellyn, Ill.

| | |
|---|---|
| **Owner** | College of DuPage, Glen Ellyn, Ill. |
| **Architect** | Legat Architects, Oak Brook, Ill. |
| **Precaster** | ATMI Precast, Aurora, Ill. |
| **Precast concrete specialty engineer** | Losch Engineering, Palatine, Ill. |
| **Engineer of record** | Larson Engineering of Illinois, Naperville, Ill. |
| **Contractor** | Pepper Construction, Barrington, Ill. |
| **Project cost** | $9.4 million |
| **Project size** | 35,789 $ft^2$ (3325 $m^2$) |

The new campus maintenance center for the College of DuPage campus in Glen Ellyn, Ill., may have been designed to be durable and maintenance-free; but when the sun sets over the newly built structure, the only thing you notice is how the highly textured precast concrete panels glow magnificently in the evening light.

"This building demonstrates how beautiful a precast concrete building can be, using integral color and formliners creatively," says Jay Johnson, principal and architectural project manager for Legat Architects.

The $9.4 million, 35,789 $ft^2$ (3325 $m^2$) building would replace a pre-engineered metal building, providing the operations and planning and development staffs with a new modern center of operations that includes a large, heated vehicle storage area with mechanics bays and a wash bay, as well as shops, offices, and storage space.

When developing the design, Johnson's team was tasked with creating a high-performance structure that would also reflect the same aesthetic expression of other student-focused facilities on each campus—all on a much tighter budget. They concluded that precast concrete was the best choice.

"Precast wall panels offered both a distinctive exterior wall and a durable interior skin without requiring multiple trade contractors," he says. That saved materials costs and sped up the schedule—the precast concrete panels were manufactured in approximately 40 days, and basic erection of the panels took only one week.

"The panels also provided for the sub-structure and superstructure, which allowed for steel joists and deck to be erected very quickly," Johnson says.

The exterior walls facing east and west feature a natural wood grain finish, which the precast concrete producer achieved using random plank patterned formliners and an "Indian brown" tint. The walls facing north and south, however, are composed of nontextured, mocha-colored panels to accentuate other planes. On the east side of the facility, a large wall of this material also screens the rear yard where mulch, gravel, plants, and other campus maintenance materials are stored. The use of precast concrete for these walls not only screens the materials but also braces the screen wall and separates the materials.

The resulting structure is beautiful and durable, and blends perfectly with the rest of the campus.

Johnson says, "This project shows how precast concrete, a material typically perceived as a solution for large, nondescript industrial buildings, can be used to create a high level of design customization and visual appeal on a modest budget."

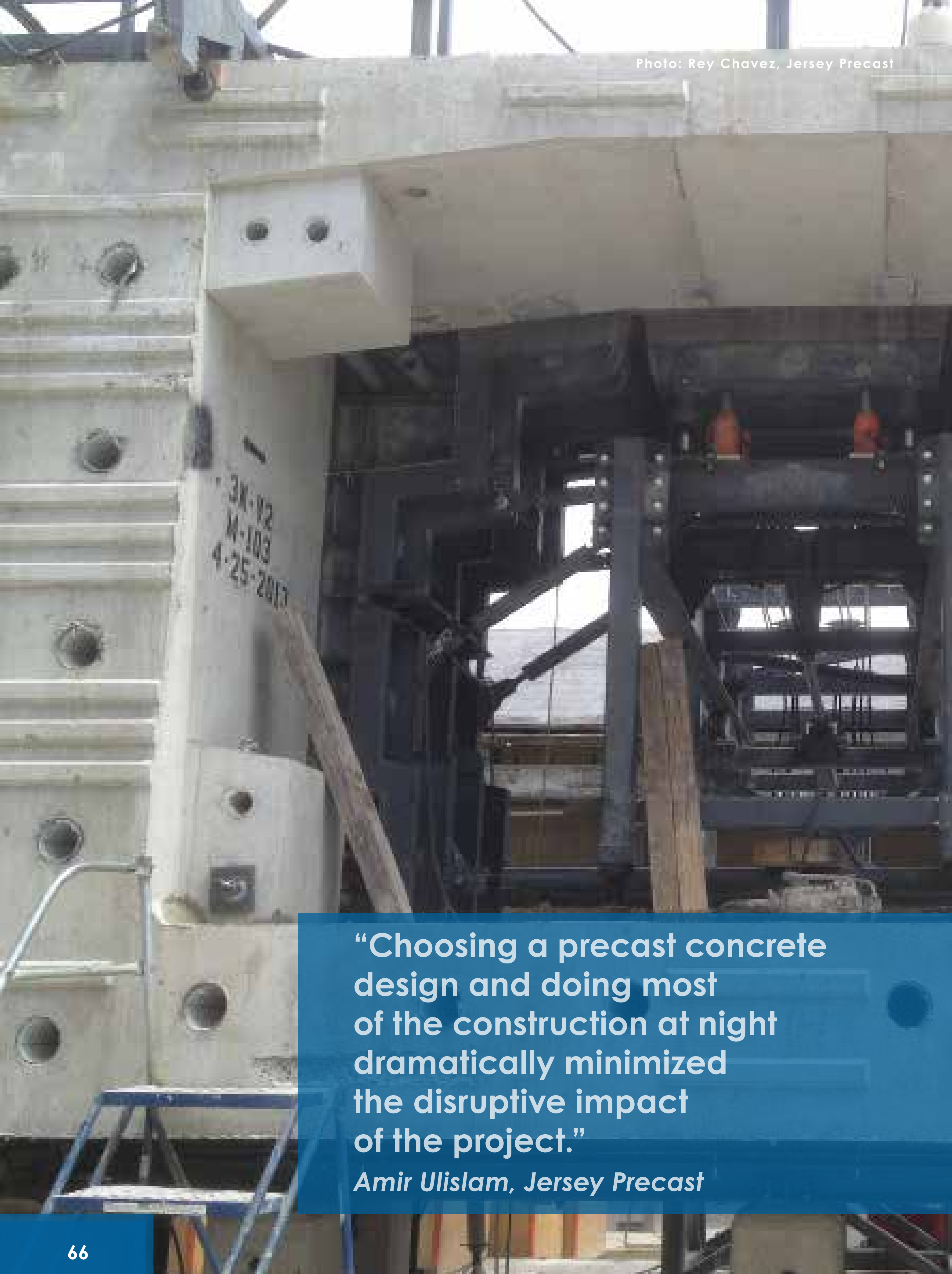


Photo: Rey Chavez, Jersey Precast

**“Choosing a precast concrete design and doing most of the construction at night dramatically minimized the disruptive impact of the project.”**

*Amir Ulislam, Jersey Precast*

Best Custom Solution

# Manhattan West

New York, N.Y.

| | |
|---|---|
| **Owner** | Brookfield Office Properties, New York, N.Y. |
| **Architect** | Skidmore Owings & Merrill, New York, N.Y. |
| **Precaster** | Jersey Precast, Hamilton Township, N.J. |
| **Precast concrete specialty engineer** | McNary Bergeron & Assoc., Broomfield, Colo. |
| **Engineer of record** | Entuitive, Toronto, ON, Canada |
| **Contractor** | Turner Construction Co., New York, N.Y. |
| **Project cost** | $70 million |
| **Project size** | 130,000 $ft^2$ (12,100 $m^2$) |

How do you build a plaza over the busiest set of railroad tracks in the busiest city in America without bringing traffic to a screeching halt?

Go with a precast concrete design, says Amir Ulislam, of Jersey Precast. Ulislam was the precast concrete producer on the Manhattan West project to erect a massive platform over the tracks leading into Manhattan's Pennsylvania Station without disrupting the 55 live rail lines running constantly underneath. "The number of trains passing on these tracks is unbelievable," he says.

Along with not stopping traffic, a key component of the project was finding a way to span the 240 ft (73 m) without installing intermediate steel columns, which would be too close to the rails to be safe. They also needed the structure to be highly fire resistant. The designer achieved all of these high-performance design goals using massive precast concrete spans in a segmental box and lift design. Each span consists of 36 or 37 segments that weigh 1100 tons (98 kN) in total. Due to the strength of precast concrete, no additional supports were needed, and because precast concrete is noncombustable, no fire-proofing was necessary. "If we had gone with a steel design, we would have needed extra support columns, and a lot of fire-proofing," Ulislam says.

The project also included a 2400-ton (21,000 kN) launching gantry, which was designed by DEAL, a subsidiary of Rizzani de Eccher USA, the general contractor for the project. "Rizzani de Eccher added tremendous value to this project," Ulislam says.

A total of 612 precast concrete pieces were manufactured at the precast concrete producer's Hamilton, N.J. facility, each weighing roughly 56 tons (500 kN). They were then delivered into Manhattan by truck over the course of five months.

The erection crew assembled them overnight when there was minimal train traffic, though getting the pieces to the site was not easy. Because of different state transportation laws regarding movement of oversized loads, each truck had to cover the first leg of the trip through New Jersey during the day and then wait at the George Washington Bridge until dusk to finish the trip into Manhattan. "It took a lot of planning and coordination to make it work," Ulislam says.

In the end, the owner and all key stakeholders were thrilled. "We got everything done without interrupting service, and the entire team did a fantastic job," he says. "I'm very proud of this project."

Photo: Coleman Harrison with Coreslab Structures (OKLA ) Inc.

**“The upside-down double-tees provide a really unique planter- and bench-style seating that has never been done before.”**

*Sean Morris, Coreslab Structures*

Best Mixed-Use Building

# Fassler Hall and Dust Bowl Lounge and Lanes

Oklahoma City, Okla.

| | | | |
|---|---|---|---|
| **Owner** | Midtown Renaissance Group, Oklahoma City, Okla. | **Engineer of record** | Obelisk Engineering Inc., Oklahoma City, Okla. |
| **Architect** | Fitzsimmons Architects, Oklahoma City, Okla. | **Contractor** | Lingo Construction Services, Oklahoma City, Okla. |
| **Precaster and precast concrete specialty engineer** | Coreslab Structures (OKLA) Inc. Oklahoma City, Okla. | **Total project cost** | $5 million |
| | | **Project size** | 37,046 $ft^2$ (3441 $m^2$) |

Patrons who visit the Fassler Hall/Dust Bowl Lounge and Lanes complex in Oklahoma City, Okla., are immediately taken in by the roaring fire on the open deck and exposed precast concrete elements that make up the core infrastructure.

The design idea came from existing building types that are common to the Midtown District and adjacent Automobile Alley, says Jason Leach, project manager from Fitzsimmons Architects.

"This area of town was developed in the mid-20th century with a lot of board-formed concrete designs," he says. "That's what drew us to precast concrete for this project."

The designers used precast concrete columns, beams, and double tees that are similar to the board-formed tee structure found in the nearby Plaza Court building and other buildings in the district. They also incorporated areas of smooth and wire-cut brick in patterns that are only visible in certain sunlight as a subtle nod to the quilt-work pattern and finish variations that were the result of years of design upgrades to many local structures.

The precast concrete design also helped the team address operational goals, which included meeting strict schedules and budgets and working within a tight worksite.

"We were able to erect the superstructure much quicker than we could have with any other system," Leach says. "Timing was critical to the owner."

Along with being inspired by local architecture, the designers needed to find an innovative way to combine two unique entertainment concepts: a bar with an outdoor beer garden and a lower-level indoor bowling alley that met the aesthetic and structural demands of the two operations. They addressed these needs by creating separate entrances with individual identities for each—the lower level, accessed via 10th Street, is devoted to the Dust Bowl, while the upper level, accessed via Park Place, is devoted to Fassler Hall.

In the beer garden and indoor bar, they left the precast concrete tees partially exposed to reflect the utilitarian designs of the local architecture. The precast concrete tees are cantilevered and extend to different lengths over the beer garden, creating an overhang in the seating area, Leach says. The designers also employed upside-down double tees and used the flipped bases to create large combination benches and planters in the beer garden.

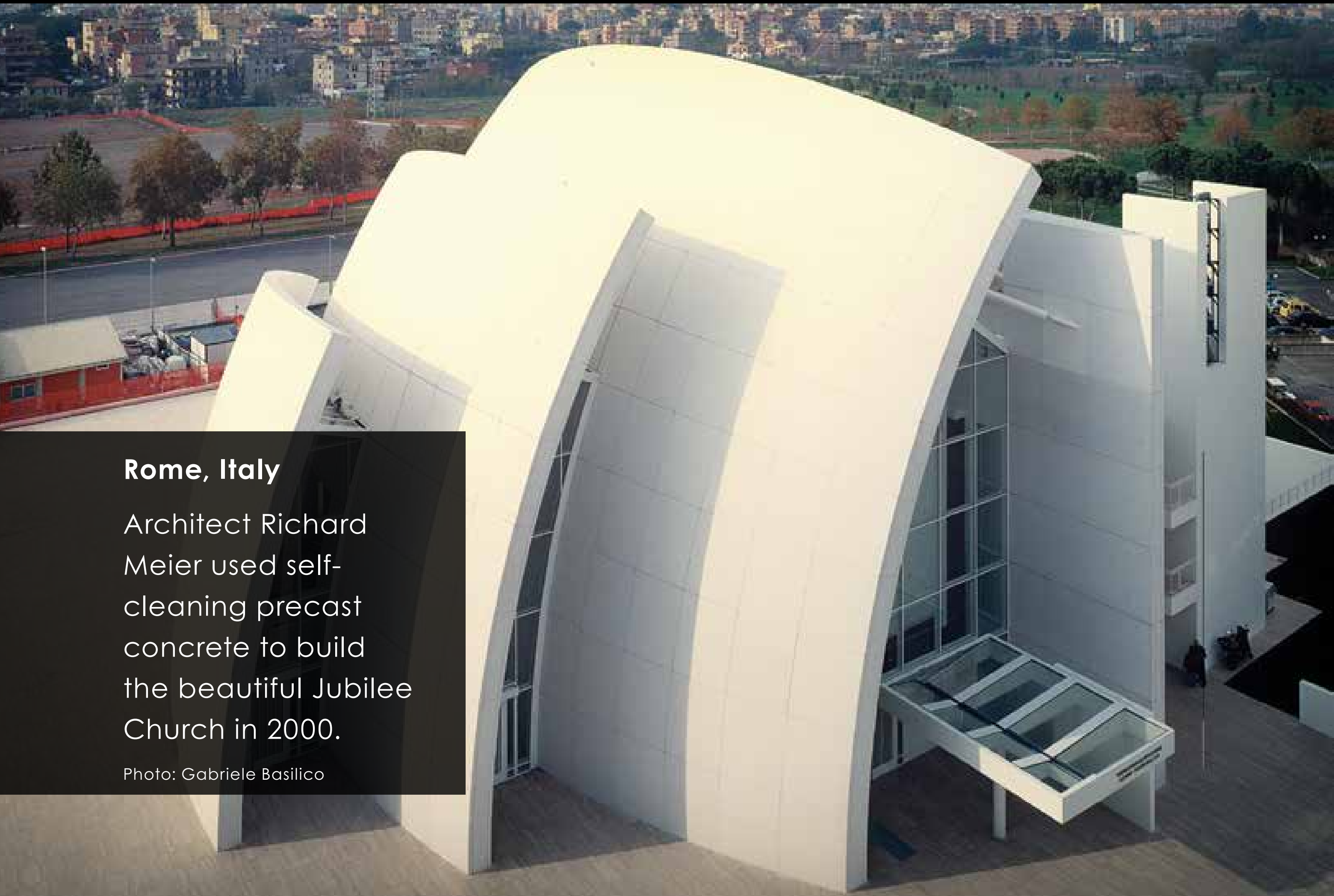
The innovative high-performance design was exactly what the owner wanted, and everyone was pleased with how it turned out. "This project showcases what can be done with structural grey precast concrete components besides just providing the structural frame of the building," says Sean Morris, engineering manager for Coreslab Structures. "There is enough intrinsic beauty and simplicity that an architectural statement can be accomplished as well, without the need for a facade to cover up the raw structural components of which the building is composed."

**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

# Expanded Horizons

Students throughout University of Southern California's architecture program have expanded their knowledge of precast concrete with PCI Foundation sponsored studio concept

— Craig A. Shutt

*Studio participants give presentations in class to outside experts, including local precasters.*

When the Architecture School at the University of Southern California began its precast concrete studio in conjunction with the PCI Foundation three years ago, the material wasn't represented in the curriculum. Today, precast solutions have become an integral part of classwork at all levels, and the school has introduced a number of programs and events that address its attributes and benefits.

"Prior to the studio's introduction, there was effectively nothing on precast concrete being taught in material-sciences classes, they only really addressed cast-in-place concrete," says Douglas Noble, associate professor. "It's been a pretty dramatic change since then. It's not only become a focus in the studio course but also part of the general curriculum, including second-year students through graduate students."

The studio, held each spring semester, has been so successful that a variety of programs and events have developed from it. They include an annual conference on precast concrete for local design and construction professionals and a published book planned for this fall showcasing precast concrete case studies. A hypothetical annual project located in a nearby national park also will go live this year.

The program began about five years ago, when PCI West Executive Director Doug Mooradian contacted Noble about the possibility of introducing a studio course with the support from the PCI Foundation. The Foundation sponsors studios within architecture schools at 11 universities. Noble and assistant professor Karen M. Kensek developed the course, which initially involved 12 fourth-year students.

The two have worked together for more than 30 years and share an office, making their partnership a natural. Noble's architectural background focuses on facades, while Kensek focuses on technology aids and design-support tools, BIM, and analysis of reinforcing and similar topics.

## Getting Started

"The first semester was fun, because there were so many things we didn't know about precast concrete, and that includes us as instructors, as well," Noble says. "We invited local precasters to view the projects we created, and they asked basic questions that we hadn't considered, like why we weren't using precast concrete framing and foundations. That first year really changed our understanding of the material's capabilities."

'The first semester was fun, because there were so many things we didn't know about precast concrete.'

Part of their increased understanding came from the faculty attending the PCI Convention to see what other university studios were doing and participate in sessions. "The professors at USC were not especially knowledgeable about precast concrete at the start of the program," Noble admits. "We had a lot to learn about embeds, GFRC, hollowcore, double tees, and myriad other facets of the industry. The intense rhythm of the 24-hour cycle in the precast plant is not something that most architects fully appreciate."

'The precast studio became the most popular studio in the architecture school, leading administrators to find ways to expand on the instruction.'

That has changed at USC. The precast studio became the most popular studio in the architecture school,

| PCI FOUNDATION STUDIOS | | | | | | | |
|---|---|---|---|---|---|---|---|
| COLLEGE/UNIVERSITY | PROGRAM | | | STRUCTURES STUDIED | | PARTNERSHIPS | |
| | Architecture | Engineering | Construction Management | Structures/ Buildings | Transportation | Local Partner | Secondary Partners |
| CalPoly Pomona<br>Pomona, CA | ✓ | ✓ | | ✓ | | PCI West | |
| Clemson<br>Clemson, SC | ✓ | | | ✓ | ✓ | G/C PCI | Metromont Tindall |
| IIT<br>Chicago, IL | ✓ | | | ✓ | | PCI IL & WI | Lombard Architectural |
| MSU Mankato<br>Mankato, MN | | ✓ | ✓ | ✓ | ✓ | Wells Concrete | PCI Midwest |
| NJIT<br>Newark, NJ | ✓ | | | ✓ | | MAPA | |
| RISD<br>Providence, RI | ✓ | | | ✓ | | PCINE | |
| SDSU<br>Brookings, SD | ✓ | | ✓ | ✓ | | Gage | PCI Midwest |
| USC<br>Los Angeles, CA | ✓ | | | ✓ | | PCI West | |
| UNCC<br>Charlotte, NC | ✓ | ✓ | | ✓ | | G/C PCI | |
| UNF<br>Jacksonville, FL | | ✓ | | ✓ | ✓ | Gate Precast | |
| UTA<br>Arlington, TX | ✓ | | | ✓ | ✓ | PCMA | |
| UW Milwaukee<br>Milwaukee, WI | ✓ | ✓ | | ✓ | ✓ | Spancrete* | |

*The Spancrete studio took place prior to the start of the PCI Foundation Studio program.

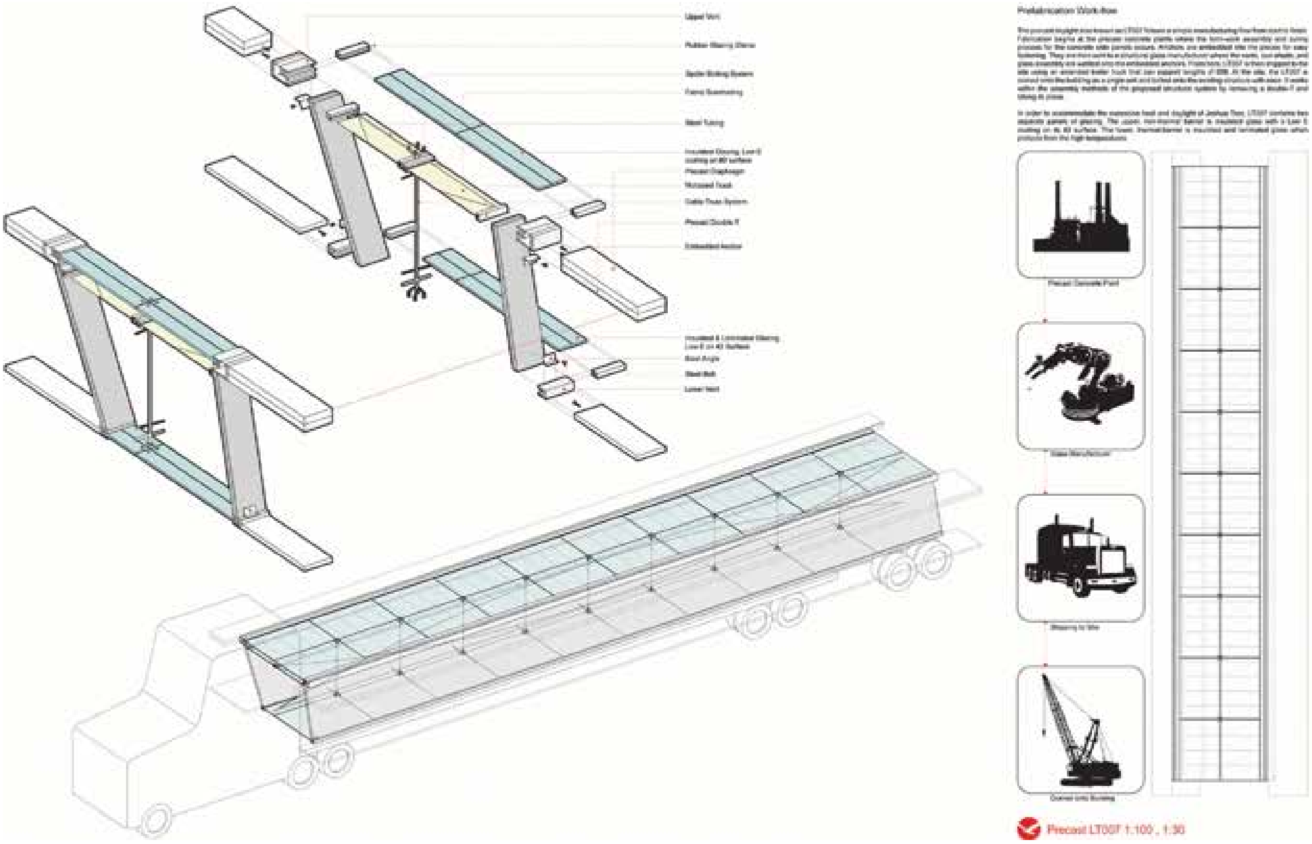
*Plant tours, including this one to Clark Pacific, give students a better understanding of the processes involved in producing precast concrete components and finishes.*

leading administrators to find ways to expand on the instruction. Other courses now have integrated precast concrete content, starting with second-year material and methods classes. "They work in teams to create a real cast-concrete project so they can learn hands-on about it," Noble says. "It introduces new concepts to them that they don't consider with other materials, such as reusing forms."

Students in the studio explore aspects of precast concrete on their own for part of the class, looking at its properties, processes, and implementations. One student attempted to create a "self-tanning" concrete that would lighten when it was warm and darken as it cooled. "The tests worked but proved prohibitively expensive," Noble says.

Another student wove a complicated textile of fiber optics that was embedded into a model of a precast concrete wall panel to transfer daylight from the exterior to the interior in more energy-sustainable ways. Yet another tried using sound absorbing materials as aggregates to improve acoustic properties (not promising). Although only 12 students participate in the class, the others in the 80-student school take part in projects and hear lectures as part of their own coursework.

Masters' degree and PhD candidates also work with the material, including one who is studying Frank Lloyd Wright's use of prefabricated concrete in the 1920s and determining how he might have used precast concrete in his housing designs today. Part of that work examines the prefabricated concrete blocks used to build the textile-block style Freeman House, owned by USC, and how it can be renovated to best withstand seismic events.



*Classwork includes creating drawings of precast concrete components as well as considering aspects that include transportation and erection.*

*Field trips include site visits to buildings underway, including these three adjacent projects in downtown Los Angeles: the Grand Avenue Apartment tower, the Grand Avenue bridge park, and the Broad Museum.*

## Joshua Tree Project

The highlight of each year's program is the creation of design drawings to construct a building in the Joshua Tree National Park. "It teaches the students how to use the material's advantages for the unique extreme climate of the eastern desert area," Noble explains. Students learn to handle the large daily temperature swings in the location by using precast concrete's thermal-mass characteristics, crafting a Net-Zero energy building.

"The site is far from any source of water, electricity, or other resources," he says. "They learn the benefits of prefabrication and off-site construction for structural and façade systems to lower construction-site impacts. That's an important attribute in national parks but also at dense downtown construction sites."

The students take field trips to nearby projects, including the Broad Museum's which features a latticed GFRC skin and the adjacent Grand Avenue Apartments. They also tour local PCI-member manufacturing plants to see components being designed and cast.

"We work with all 11 members of PCI West, and they've been great," he says. Clark Pacific is the school's sponsor-host, and they provide plant tours and employees to give lectures and judge projects. "They're willing to do anything we ask of them." Mooradian also gives several lectures during the semester on various aspects of precast concrete.

Noble and Kensek work closely with Bob Clark, Clark Pacific president of operations, and Bradley Williams, plant manager, to arrange programs. "They have been especially helpful. The whole Clark Pacific team has been astoundingly supportive. We use up a lot of their time."

## Other Events

The program's success led to the introduction of a precast concrete conference, which also has proven popular with local designers. The

*Members of the class met with park rangers at the Joshua Tree National Park, where their hypothetical project to design a precast concrete structure was to be located.*

*Studio students look over the harsh, isolated terrain at Joshua Tree National Park, the site of a hypothetical project they were designing. In 2016, the class will build an actual structure there.*

first attempt to integrate courses on precast occurred during a one-day seminar held in conjunction with the school's on-going Façade Tectonics program, a series of conferences held for several years. "We got a good crowd, but it was mostly precasters," Noble says.

The next year, the content was blended into a larger three-day architecture conference, which provided more exposure. "Once architects saw precast concrete related course options at the conference they were attending, they went to learn more," he says. With that base of interest planted, the program has been split off for January 2016 and will feature a variety of local precast concrete case histories.

That event will tie into another activity, the production of a book of case histories showcasing local precast concrete innovations, to be published by the end of the year. The 8 ½- by 11-inch, four-color book, produced in collaboration with PCI Foundation Executive Director Marty McIntyre, will feature a variety of creative facades with descriptive text written by the students. "Architects love books," says Noble. "They aren't as web-oriented for this type of material."

The school's three-year funding grant from the Foundation has expired, but the program will continue to grow, he says. A significant amount remains in reserve, which will allow the school to fund prizes for a variety of class projects and even expand on its signature project.

## Student Comments

Student feedback on the precast concrete studio indicates how popular the program has become:

"I didn't know the design potential of precast. It's not all double tees and parking garages! Some of the finishes and details that can be produced are really impressive."

– Christopher Penfold, fourth-year student

"Visiting Clark Pacific gave me new insight on the flexibility and wide array of possibilities that precast can do in aiding and enhancing design. I really enjoyed seeing the formwork and how the panels are transported in the work yard with huge, traveling crane machines."

– Caroline Kim, fourth-year student

"The Clark Pacific visit counts among the most informative experiences within my time at USC. The team was able to demonstrate how the architectural and structural benefits of precast concrete allow architects to create ambitious spaces with lower environmental impact, cost, and consistency than cast-in-place concrete."

– Sean Gowin, fourth-year student

"I never realized how many buildings use precast concrete elements, and it made me rethink the ways in which precast could be used."

– Wendy Lee, fourth-year student

'We intend to take our Joshua Tree National Park project and actually build it at full size.'

"We intend to take our Joshua Tree National Park project and actually build it at full size," he says. A pavilion-like structure with four walls, each with different openings and finishes, is currently planned. "It will give students a strong concept for casting, transporting, and erecting precast concrete under adverse conditions."

The Foundation's sponsorship has gotten the program off to a good start. "Our collaboration has become strong, and the precast emphasis will live on in courses and studios," he says. "We're just getting started."

# 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

**October 27 and 29: Precast Helps Meet Code Requirements**–Building and energy codes have changed a lot over the past decade. These new codes can be challenging to meet, while still maintaining budgets, schedules, and other program requirements. This presentation will walk you through some of the key code changes affecting buildings in the IBC, ASHRAE and ACI codes, and will identify how precast concrete can be used to meet these challenges efficiently and will discuss Performance Based Design. Examples will be used to highlight scenarios.

### 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:

**PCI High Performance Building Enclosures Seminar**
October 27, Omaha, NE (By PCI Midwest)
October 28, Des Moines, IA (By PVI Midwest)
December 9, Kansas City, MO (By PCI Midwest)
December 15, Chicago, IL (By PCI IL/WI)

Visit www.pci.org/schools for more information and to register.

**Quality Control Schools**

Level I/II
December 7-9, Nashville, TN

Level III
December 9-12, Nashville, TN

### 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 Online Academy

PCI's Online Academy offers weekly, 90-minute evening sessions focused on helping working professionals earn their continuing education credit without impacting their work day. This January PCI's Online Academy returns with a unique program for all professionals involved in the special inspection of precast concrete structures.

PCI's Special Inspector's Program is a one-of-a-kind program designed to help special inspectors comply with the training requirement of the building code. Inspection of precast concrete construction requires the expertise of an approved special inspector in order to ensure compliance with the International Building Code and approved construction documents. Special inspectors are required to provide written documentation to building officials demonstrating competence and relevant experience or training, and this program uniquely fits the bill for special inspector of precast concrete structures.

This three-week course is scheduled for Thursday evenings January 14, 21 and 28, 2016 and will be presented by the programs principle author. Each session will include a post-course assessment to measure learning and participants will earn a total of 4.5 professional development hours. Visit us online for special rate information at http://www.pci.org/Education/Online_Academy/

# PCI-Certified Plants

*(as of October, 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, C4, C4A
**Hanson Pipe & Precast–Pelham Precast,** Pelham (205) 663-4681 ______ B4, C4

## ARIZONA

**Coreslab Structures (ARIZ) Inc.,** Phoenix (602) 237-3875 ______ A1, B4, C4, C4A
**Green Fuel Technologies LLC dba Royden Precast,** Phoenix (602) 484-0028 ______ B4
**LB Foster/CXT Concrete Ties,** Tuscon (520) 882-3995 ______ C2
**Stringer Bridge & Iron,** Coolidge (520) 723-5383 ______ B4
**TPAC, A Div. of Kiewit Western Co.,** Phoenix (602) 262-1360 ______ A1, B4, C4, C4A

## ARKANSAS

**Coreslab Structures (ARK) Inc.,** Conway (501) 329-3763 ______ C4, C4A

## CALIFORNIA

**Bethlehem Construction, Inc.,** Wasco (661) 391-9704 ______ C3, 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, C3, C3A
**Clark Pacific,** Woodland (503) 207-4100 ______ A1, B3, C4, C4A
**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 ______ B4, B4A, C2, C2A
**Oldcastle Precast Inc.,** Stockton (209) 466-4215 ______ C2
**Precast Concrete Technology dba CTU Precast,** Olivehurst (530) 749-6501 A1, C3, 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, C3, C3A
**Rocky Mountain Prestress LLC, Architectural Plant** Denver (303) 480-1111A1, C3, C3A
**Rocky Mountain Prestress LLC, Structural Plant,** Denver (303) 480-1111 ______ B4, C4
**Rocla Concrete Tie, Inc.,** Pueblo (303) 296-3500 ______ C2
**Stresscon Corporation,** Colorado Springs (719) 390-5041 ______ A1, B4, B4A, C4, C4A

## CONNECTICUT

**Blakeslee Prestress Inc.,** Branford (203) 481-5306 ______ A1, B4, C4, C4A
**Coreslab Structures (CONN) Inc.,** Thomaston (860) 283-8281 ______ A1, B1, C1
**Oldcastle Precast,** Avon (860) 673-3291 ______ B2, C1, C1A
**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, C3, 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 ______ C4, C4A
**Coreslab Structures (ATLANTA) Inc.,** Jonesboro (770) 471-1150 ______ C2
**Metromont Corporation,** Hiram (770) 943-8688 ______ A1, C4, C4A
**Spancrete Southeast, LLA,** Newman (770) 252-8944 ______ C2
**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, B4, 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, C3, C3A
**AVAN Precast Concrete Products,** Lynwood (708) 757-6200 ______ A1, C3
**County Materials Corporation,** Champaign (217) 352-4181 ______ B3, B3-IL
**County Materials Corporation,** Salem (618) 548-1190 ______ A1, B4, B4-IL, C4
**Dukane Precast, Inc.,** Aurora (630) 355-8118 ______ A1, B3, B3-IL, C3, C3A
**Dukane Precast, Inc.,** Naperville (630) 355-8118 ______ A1, B3, C3, C3A
**Dukane Precast, Inc.,** Plainfield, (815) 230-4760 ______ C3
**ICCI Illini Concrete, LLC,** Tremont (309) 925-2376 ______ B3, B3-IL
**Illini Precast, LLC,** Westchester (815) 795-6161 ______ B4, B4-IL, C3
**KW Precast LLC,** Westchester (708) 562-7770 ______ B4, B4-IL, C4
**Lombard Architectural Precast Products Co.,** Alsip (708) 389-1060 ______ A1, C2, C2A
**Mid-States Concrete Industries,** South Beloit (815) 389-2277 _ A1, B3, B3-IL, C3, C3A
**St. Louis Prestress, Inc.,** Glen Carbon (618) 656-8934 ______ B3, B3-IL, C3
**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, B4-IL, 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, B4-IL, C4, C4A
**MPC Enterprises, Inc.,** Mount Pleasant (319) 986-2226 ______ A1, C3, C3A
**PDM Precast, Inc.,** Des Moines (515) 243-5118 ______ A1, C3, 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, C3, C3A
**F-S Prestress, LLC,** Princeton (318) 949-2444 ______ B4, C3

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

**Fibrebond Corporation,** Minden (318) 377-1030 ____ A1, C1, C1A

## MAINE

**Superior Concrete, LLC,** 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, C3, C3A

## MASSACHUSETTS

**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, C4, 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, C3, C3A
**M.E.G.A. Precast, Inc.,** Shelby Township (586) 294-6430 ____ A1, C3, C3A
**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 ____ B3, B3A, C1, C1A
**Cretex Concrete Products Midwest, Inc.,** Elk River (763) 441-2124 ____ B4, C2
**Fabcon Precast, LLC,** Savage (952) 890-4444 ____ A1, B1, C3, C3A
**Molin Concrete Products Co.,** Lino Lakes (651) 786-7722 ____ C3, C3A
**Wells Concrete,** Albany (320) 845-2299 ____ A1, C3, C3A
**Wells Concrete,** Wells (800) 658-7049 ____ A1, C4, C4A
**Wells Concrete–Maple Grove,** Osseo (763) 425-5555 ____ A1, C4, 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, C2, C2A
**Tindall Corporation,** Moss Point (228) 246-0800 ____ A1, C4, 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.,** Ozark (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, C3, C3A
**Cretex Concrete Products, Inc.,** Billings (406) 656-1601 ____ B4, C3
**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, C4, C4A
**Coreslab Structures (OMAHA) Inc.,** Bellevue (402) 291-0733 ____ A1, B4, C4, C4A
**Enterprise Precast Concrete, Inc.,** Omaha (402) 895-3848 ____ A1, C2, C2A

## NEVADA

**Precast Management Corporation,** Sloan (702) 370-5217 ____ C2

## 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, C3, 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
**Ferreri Concrete Structures Inc.,** Albuquerque (505) 344-8823 ____ A1, C4, C4A

## NEW YORK

**David Kucera Inc.,** Gardiner (845) 255-1044 ____ A1, G
**Lakelands Concrete Products, Inc.,** Lima (585) 624-1990 ____ A1, B3, B3A, C3, C3A
**Oldcastle Precast Building Systems Div.,** Selkirk (518) 767-2116 ____ B3, C3, C3A
**The Fort Miller Company, Inc.,** Schuylerville (518) 695-4970 ____ B3, 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, C3, C3A
**Prestress of the Carolinas,** Pineville (704) 587-4273 ____ B4, C4
**Utility Precast, Inc.,** Concord (704) 721-0106 ____ B3, B3A

## NORTH DAKOTA

**Wells Concrete,** Grand Forks (701) 772-6687 ____ C4, 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
**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
**Rocla Concrete Tie, Inc.,** Sciotoville (740) 776-3238 ____ C2
**Sidley Precast,** Thompson (440) 298-3232 ____ A1, C4, 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, C4A
**R.B. Johnson Co.,** McMinnville (503) 472-2430 ____ B4, C3

## PENNSYLVANIA

**Architectural Precast Innovations, Inc.,** Middleburg (570) 837-1774 ____ A1, C3, C3A
**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, B1, B1A, C1, C1A
**Conewago Precast Building Systems,** Hanover (717) 632-7722 ____ A1, C3,C3A
**Dutchland, Inc.,** Gap (717) 442-8282 ____ C3
**Fabcon Precast, LLC,** Mahanoy City (952) 890-4444 ____ A1, B1, B1A, C3, C3A
**High Concrete Group LLC,** Denver (717) 336-9300 ____ A1, B3, C3, C3A
**J & R Slaw, Inc.,** Lehighton (610) 852-2020 ____ A1, B4, C3
**Nitterhouse Concrete Products, Inc.,** Chambersburg (717) 267-4505 ____ A1, C4, 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, C3, C3A
**US Concrete Precast Group Mid-Atlantic,** Middleburg (570) 837-1774 ____ A1, C3, C3A

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## RHODE ISLAND

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

## SOUTH CAROLINA

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

## SOUTH DAKOTA

**Gage Brothers,** Sioux Falls (605) 336-1180 ____ A1, B4, C4, C4A

## TENNESSEE

**Construction Products, Inc. of Tennessee,** Jackson (731) 668-7305 ____ B4, C4
**Gate Precast Company,** Ashland City (615) 792-7608 ____ A1, C3, C3A
**Mid South Prestress, LLC,** Pleasant View (615) 746-6606 ____ 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, C4, C4A
**CXT, Inc.,** Hillsboro (254) 580-9100 ____ B1, B1A, C1, C1A
**East Texas Precast Co., LTD.,** Waller (281) 463-0654 ____ C4, 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, C3, 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
**Harper Precast,** Salt Lake City (801) 326-1016 ____ B2, C1
**Olympus Precast, LLC,** Sandy (801) 571-5041 ____ A1, B3, B3A, C3, C3A

## VERMONT

**J. P. Carrara & Sons, Inc.,** Middlebury (802) 388-6363 ____ A1, B4, B4A, C3, C3A
**S.D. Ireland Companies,** Williston (802) 863-6222 ____ A1, B1, C1
**William E. Dailey Precast, LLC,** Shaftsbury (802) 442-4418 ____ A1, B4, B4A, C3, 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
**Faddis Concrete Products,** King George (540) 775-4546 ____ B2, C2
**Metromont Corporation,** Richmond (804) 665-1300 ____ A1, C3, C3A
**Rockingham Precast, Inc.,** Harrisonburg (540) 433-8282 ____ B4
**Smith-Midland,** Midland (540) 439-3266 ____ A1, B2, C2, C2A
**The Shockey Precast Group,** Winchester (540) 667-7700 ____ A1, C4, C4A
**Tindall Corporation,** Petersburg (804) 861-8447 ____ A1, C4, C4A

## WASHINGTON

**Bellingham Marine Industries, Inc.,** Ferndale (360) 380-2142 ____ B3, C2
**Bethlehem Construction, Inc.,** Cashmere (509) 782-1001 ____ B1, C3, C3A
**Concrete Technology Corporation,** Tacoma (253) 383-3545 ____ B4, C4
**CXT, Inc., Precast Division,** Spokane (509) 921-8766 ____ B1, C1, 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, B1A, C2, C2A
**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,** Janesville (608) 373-0950 ____ B4, B4-IL
**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,** Valders (920) 775-4121 ____ A1, B4, C3, 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, C3, C3A
**Papeterie,** Alma ____ A1, C2
**Papeterie,** Alma ____ A1, C3, C3A, G
**Prefab de Beauce Inc.,** Alma (418) 668-6161 ____ A1, C3

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# PCI Certified Erectors

*(as of October, 2015)*

When it comes to quality, why take chances? When you need precast or precast, prestressed concrete products, choose a PCI 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 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 Certified Erector is the first step toward getting the job done right the first time, thus keeping labor costs down.
- PCI 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 certified by the Precast/Prestressed Concrete Institute (PCI) prior to the beginning of any work at the jobsite. The precast concrete erector shall be 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.

### ARIZONA

**Coreslab Structures (ARIZ), Inc.,** Phoenix (602) 237-3875 ____ **A, S2**
**RJC Contracting, Inc.,** Mesa (480) 357-0868 ____ **A, S2**
**TPAC, A Division of Kiewit Western Co.,** Phoenix (602) 262-1360 ____ **A, S2**

### COLORADO

**EnCon Field Services, LLC,** Denver (303) 287-4312 ____ **S2**
**Rocky Mountain Prestress,LLC,** Denver (303) 480-1111 ____ **A, S2**

### CONNECTICUT

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

### FLORIDA

**Concrete Erectors, Inc.,** Altamonte Springs (407) 862-7100 ____ **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 ____ **S2**
**Solar Erectors U.S. Inc.,** Medley (305) 825-2514 ____ **A, S2**
*** 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

**Northwest Steel Erection, Inc.,** Grimes (515) 986-0380 ____ **A, S2**
**US Erectors, Inc.,** Des Moines (515) 243-8450 ____ **S2**

### KANSAS

**Carl Harris Co., Inc.,** Wichita (316) 267-8700 ____ **A, S2**
**Crossland Construction Company, Inc.,** Columbus (620) 442-1414 ____ **A, S2**
**Ferco, Inc.,** Salina (785) 825-6380 ____ **A, S2**

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## MARYLAND

**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

**Atlantic Bridge & Engineering,** Salisbury (978) 465-4337 ____ S1
**Prime Steel Erecting, Inc.,** North Billerica (978) 671-0111 ____ A, S2

## MICHIGAN

**Assemblers Precast & Steel Services, Inc.,** Saline (734) 368-6147 ____ A, S2
**G2 Inc.,** Cedar Springs (616) 696-9581 ____ A, S2
**Pioneer Construction Inc.,** Grand Rapids (616) 247-6966 ____ A, S2

## MINNESOTA

**Amerect, Inc.,** Newport (651) 459-9909 ____ A
**Fabcon Precast, LLC,** Savage (952) 890-4444 ____ S2
**Landwehr Construction Inc.,** St. Cloud (320) 252-1494 ____ A, S2
**Molin Concrete Products Company,** Lino Lakes (651) 786-7722 ____ A, S2
**Wells Concrete,** Maple Grove (800) 658-7049 ____ A, S2

## MISSISSIPPI

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

## MISSOURI

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

## NEBRASKA

**Structural Enterprises Inc.,** Lincoln (402) 423-3469 ____ A, S2
**Topping Out Inc. dba Davis Erection–Omaha,** Omaha (800) 279-1201 ____ A, S2

## NEW HAMPSHIRE

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

## NEW JERSEY

**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

## NEW YORK

**Koehler Masonry Corp.,** Farmingdale (631) 694-4720 ____ A, 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 DAKOTA

**PKG Contracting, Inc.,** Fargo (701) 232-3878 ____ S2

## OHIO

**Precast Services, Inc.,** Twinsburg (330) 425-2880 ____ A, S2
**Sidley Precast Group, A Division of R.W. Sidley, Inc.,** Thompson (440) 298-3232 ____ S2

## OKLAHOMA

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

## PENNSYLVANIA

**Century Steel Erectors,** Kittanning (724) 545-3444 ____ A, S2
**Conewago Precast Building Systems,** Hanover (717) 632-7722 ____ A, S2
**High Structural Erectors, LLC,** Lancaster (717) 390-9203 ____ S2
**Kinsley Construction Inc. t/a Kinsley Manufacturing,** York (717) 757-8761 ____ S1
**Maccabee Industrial, Inc.,** Belle Vernon (724) 930-7557 ____ A, S2
**Nitterhouse Concrete Products, Inc.,** Chambersburg (717) 267-4505 ____ A, S2

## SOUTH CAROLINA

**Davis Erecting & Finishing, Inc.,** Greenville (864) 220-0490 ____ A, S2
**Tindall Corporation,** Spartanburg (864) 576-3230 ____ A, S2

## SOUTH DAKOTA

**Henry Carlson Company,** Sioux Falls (605) 336-2410 ____ A, S2

## TENNESSEE

**Mid South Prestress, LLC,** Pleasant View (615) 746-6606 ____ S1

## TEXAS

**Coreslab Structures (TEXAS) Inc.,** Cedar Park (512) 250-0755 ____ A, S2
**Derr and Isbell Construction, LLC,** Euless (817) 571-4044 ____ A, S2
**Precast Erectors, Inc.,** Hurst (817) 684-9080 ____ A, S2

## UTAH

**IMS Masonry,** Lindon (801) 796-8420 ____ A

## VIRGINIA

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

## WISCONSIN

**J.P. Cullen,** Janesville (608) 754-6601 ____ A, S1
**Spancrete,** Valders (920) 775-4121 ____ A, S2

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