WWW.PCI.ORG

Winter 2017

ASCENT®

DESIGNING WITH PRECAST

Mixed-Use Structures

CONVENIENCE + PARKING

South Tower at Cook Children's Medical Center Expansion
Fort Worth, Texas
CallisonRTKL
David M. Schwarz Architects
Linbeck

Hospital Utilizes Technological Advances to Enhance Façade

The architect for the Cook Children's new South Tower envisioned using technological advancements in precast façade systems to emulate the randomness in coloring of natural stone and imperfections of hand laid masonry used on the existing campus over 25 years ago. The thermally efficient precast enclosure system which acts as air, water and vapor barrier features XPS foam insulation, embedded glazed brick and a simulated limestone finish that successfully captures the timeless character of the historic campus.

Gate Precast — Architects' Choice for Iconic Architecture

GATE PRECAST COMPANY
precast concrete systems

Monroeville, AL
Jacksonville, FL
Kissimmee, FL
Winchester, KY
Oxford, NC
Ashland City, TN
Pearland, TX
Hillsboro, TX

WWW.GATEPRECAST.COM
(888) 470-3450

2016
WINNER OF THE
PCI DESIGN AWARDS
FOR **PARKING STRUCTURES**

EXPRESS YOUR VISION IN PRECAST

At Tindall, we don't just deliver concrete. We deliver solutions that bring imaginative designs to life. With a rich history of innovation, a diverse project history, and a skilled engineering team, Tindall has what it takes to develop customized precast solutions for complex projects, such as The Park at South Market in New Orleans. And we do it all while building strong partnerships that make the construction process effective, efficient, and professionally rewarding.

Make the Tindall advantage your advantage.

tindallcorp.com

SPARTANBURG, SC | PETERSBURG, VA | CONLEY, GA | MOSS POINT, MS | SAN ANTONIO, TX

Tindall
ADVANCING ENGINEERED PRECAST SOLUTIONS

ADVANTAGE:
TINDALL

LOWER
LIFE CYCLE COSTS

ACCELERATED
SCHEDULE

DESIGN
OPTIONS

Get ready for the architecture and design event of the year.

convention.aia.org

ORLAIANDO!

AIA Conference on Architecture 2017
April 27–29, Orlando, FL

WANTED

THE SHOOTER

A telescopic, invisible gravity support solution for double tees.

During Casting the inner tube is contained within the outer tube, requiring no additional form work.

During Erection the inner tube is extracted once the double tee is in the final position into an oversized pocket by using a dependable system of pull-out and pull-in wires. A detent pin is installed through the inner tube to prevent retraction.

Benefits:

- Detailed Design Guide
- Eliminates Corbels and Ledges
- Hot Dipped Galvanized Finish
- Safe and Simple Installation on site
- Eliminates Dap Forming, Reinforcing and Bearing Plate

Your Connection Connection

7131 North Ridgeway Avenue • Lincolnwood, IL 60712 USA
847-675-1560 • 1-800-742-8127 • **www.jvi-inc.com**

ENDICOTT™

endicott.com

PERFORMANCE *comes* STANDARD

When your precast project demands the best thin brick, Endicott is the choice. With the industry's most unique color palette and the most exacting tolerances, Endicott delivers versatility and efficiency that you can depend on.

Choosing the world's best thin brick shouldn't come with compromises. It should be Endicott.

Lucas Oil Stadium
Indianapolis, IN

For the name of your nearest quality Endicott provider, or to request samples, literature and BIM models, call or visit us online today.

PCI Premier Partners

Endicott Thin Brick & Tile, LLC · P.O. Box 645 · Fairbury, NE 68352 · 402-729-3323 · endicott@endicott.com

Endicott thin brick is manufactured to meet the requirements of ASTM C1088, Exterior Grade, Type TBX and the more stringent size tolerances of +0"-1/16 required for precast applications.

PCI
Precast/Prestressed Concrete Institute

ASCENT IS A PUBLICATION OF PCI

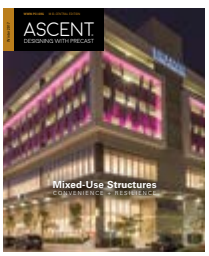
Executive Editor: Dawn Parker, MBA
Editor: Jim Lewis, RA
Managing Editor: Craig Shutt
Editorial Administration: Becky King
Ascent Layout Concept:
MB Piland Advertising + Marketing
Graphic Design: Leader Graphic Design Inc.
Graphic Designers: Mark Leader, Jim Henson
Ad Sales:
Kirstin Osgood
Sr. Manager, Sales and Member Development
kosgood@pci.org
(312) 360-3206
Reprint Sales:
Becky King
(312) 360-3201
bking@pci.org
Precast/Prestressed Concrete Institute:
Robert Risser, PE, President and CEO
Industry Technical Review Team: Alicia Allamena, Peter Finsen, Sidney Freedman, Corey Greika, Thomas Ketron, Ed Knowles, Jane Martin, Mark McKeny, Brian Miller, and Kim Wacker

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. 27, No. 1, 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 Becky King.
(312) 360-3201
bking@pci.org



On the cover: Braman Auto Showroom
Photo: Photo: Robert Giordano/Design216.

FEATURES

Marist College Housing. Photo: Robert A.M. Stern Architects.

DEPARTMENTS

DAWN PARKER, MBA
EXECUTIVE EDITOR
DPARKER@PCI.ORG

Multi-Generational Buildings For Today And Tomorrow

When we look at our quickly changing world demographics, we see a shift to an aging population, whose demands move away from durable goods and towards services such as health care. The younger generation, Millennials typically want different things than previous generations. Additionally, urbanization, an increasing need to build in small spaces, is experiencing growth.

However, one thing that both generations agree on is the desirability of a live-work-play environment and the convenience of having that provided in a single location. Parking structures can be integrated into mixed-use development, providing an even higher level of convenience.

In the precast concrete construction industry, we recognize these shifts and changes, and we adapt, which is why we chose to highlight mixed-use with parking projects in the following pages.

A mixed-use development is not standardized and it can be built in an urban setting or a suburban setting. Often the density levels are higher in an urban setting. It can differ in relation to its surroundings. Mixed-use can be an infill project in an established urban setting or it can be a new development in the growth corridor in a suburban setting.

Regardless of the site (urban or suburban), or the purpose of the building project, (commercial with multifamily residential or health care services with parking and retail), you will discover in the articles featured in this issue that precast concrete provides the precise building products and system of superior quality to exceed the owners and developer's expectations and achieve the architect's vision.

New.
Fresh.
Visionary.

Follow us on

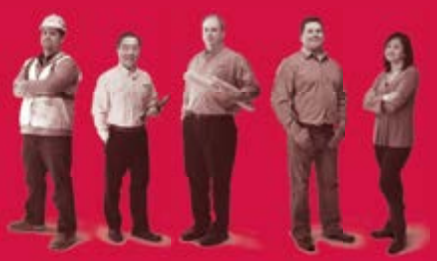
INSIGHT

MY VISION. OUR EXPERTISE.

WHAT'S YOUR DREAM?

LET'S BUILD IT.

You see the finished building before the ground is even broken.
Our team of experts bring that vision to life.

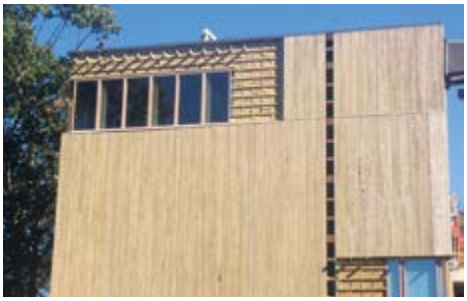


70TH Anniversary
SPANCRETE
1946-2016

SPANCRETE®
Building Innovation.™

spancrete.com
855-900-SPAN

PARKING | EDUCATION | COMMERCIAL | INDUSTRIAL | RETAIL | RESIDENTIAL



College Features Hemlock Board Finish

WELLESLEY, MASSACHUSETTS

When completed, the Pendleton West classroom building on the Wellesley College campus will feature a façade clad with architectural precast concrete panels with a distinctive board-replication finish. The designers value-engineered to use precast concrete to save time and money.

An existing classroom was gutted to make better use of the space for its current uses, and the 10,000-square-foot addition is being built adjacent to it. The addition will feature a contemporary lecture hall seating approximately 50 students and will connect via an arts courtyard and walkway to Lulu Hall next door. The project was designed to achieve LEED certification.

The initial plan to use a cast in place façade was changed to precast concrete panels for design and schedule flexibility. The architects chose a selection of hemlock boards to pour the precast against to replicate the look of hemlock. That offered a more distinctive look in an economical, efficient way.

The site sits on a hill, complicating delivery and erection of the panels and making coordination of embeds and connections more difficult, especially in areas where through-bolts were required but access was restricted. Even so, the erection moved quickly and was completed in less than 3 weeks using one crane. The renovations wrapped up in the fall of 2016, with classes set to return to the facility for the spring 2017 semester.

Freightliner Dealer Creates Precast HQ

DEFOREST, WISCONSIN

The nation's largest Freightliner dealer group, Truck Country in Deforest, Wis., turned to precast concrete to help create the structural system for their new full-service location. The building, at 105,000 square feet, is more than twice the size of the previous center. It features precast concrete panels and hollow-core slab supported by steel framing, along with some masonry foundation.

The structure houses a full-service dealership comprising sales office, corporate-parts warehouse, and maintenance and repair bays. The facility also accommodates natural-gas trucks, an option becoming more popular with customers.

Two precasters joined forces to supply the precast concrete components: County Materials supplied 21,582 square feet of hollow-core slab, while Mid-States Concrete Industries fabricated 119 panels covering 33,346 square feet.

The hollow-core slab helped facilitate more open interiors for the bays, providing a perimeter mezzanine for office space. Specifying hollow-core slabs created long spans and met the load requirements for the office space, reducing the need for supports in the repair bays. The planks were finished with a topping once in place.

The wall panels provided fast erection and could be cast as site work and steel framing was erected, so they could begin installation as soon as the site was ready. The panels feature a gray finish with decorative reveals and will be painted white when the building is complete.

The project construction began in June 2016 and is planned for completion in February 2017. Korb & Associates in Milwaukee, Wis. was the architect on the project, with Beaudry Services in Waukesha, Wis., serving as general contractor. Pierce Engineers Inc. in Milwaukee was the structural engineer.

Holmes to Head PCI's Mid-Atlantic Association

LANCASTER, PENNSYLVANIA

The Mid-Atlantic Precast Association (MAPA), a regional association of precast/prestressed concrete manufacturers, has named Tom Holmes to the position of executive director. Holmes has more than 30 years of experience in the industry, spanning technical, business and marketing aspects of the industry.

Holmes will operate from MAPA's new headquarters office in Lancaster, Pa., and will work closely with industry professionals in Delaware, Maryland, New Jersey, Pennsylvania, Virginia, Washington, D.C., and West Virginia.

Submit your headline news for consideration in a future issue of Ascent to Becky King at bking@pci.org.

Gate to Supply Panels for Charlotte Control Tower

CHARLOTTE, NORTH CAROLINA

Gate Precast's Oxford, N.C., plant has begun casting structural and architectural precast for a 370-foot-tall air traffic-control tower at Charlotte Douglas International Airport. The tower will be one of the tallest free-standing precast structures ever to be erected by the contractor and the second tallest control tower in the United States.

"Air traffic-control-tower construction is a highly specialized market, primarily due to its stringent tolerances," says Chris Galde, Gate's director of sales and marketing in Oxford. "There are very detailed connections from panel to panel, and the tolerances for the connections are very tight."

The tower's structural components will be made of heavily-reinforced 6,000-psi concrete within three sets of custom steel forms. The architectural precast panels will be cast with lightweight concrete at 118 pounds per cubic foot. The plant will produce 457 load-bearing precast pieces (70,000 square feet) for the tower base and 162 pieces of lightweight architectural precast concrete (23,000 square feet) for the controllers' cab and the TRACON (Terminal Radar Approach Control) support building.

The tower base will be erected in a series of rings, comprising of 8 pieces that reach about 10 feet tall. The rings will be tied together with splice sleeves. During erection, a subcontractor will grout mechanical connectors into the joints at each level. Archer-Western Contractors of Charlotte is the general contractor and AECOM, of Atlanta Ga., is the engineer/architect.

Texas PCI Foundation Students Visit Hamilton Form

FORT WORTH, TEXAS

The PCI Foundation-sponsored studio at the University of Texas at Arlington recently visited Hamilton Form in Fort Worth, Tex. The students and their professor, Brad Bell, met with the Hamilton Form engineering staff and toured the plant. The group gained insights into the form-making process and learned more about the precast/prestressed concrete industry. Bill Daily, president of Hamilton Form, led the tour and answered student questions. For more information on the PCI Foundation, visit the website at pci-foundation.org.

Spancrete Promotes Wacker to VP

WAUKESHA, WISCONSIN

Kimberly Wacker has been promoted to vice president of marketing and communications at Spancrete. She will develop marketing and service policies, programs, and systems to support the company's plans and develop the marketing strategy for both the precast and global divisions of the company. Wacker joined Spancrete in 2006 and has more than 18 years of strategic marketing experience working for business-to-business organizations. She also serves on PCI's Board of Directors and chairs the PCI Marketing Council.

Submit your headline news for consideration in a future issue of Ascent to Becky King at bking@pci.org.

PCI HEADQUARTERS
phone: (312) 786-0300
email: info@pci.org
www.pci.org

Central Atlantic Bridge Associates—Monica Schultes, P.E.
phone: (888) 542-0666
email: info@caba-bridges.org
www.caba-bridges.org

Florida Prestressed Concrete Association—Diep Tu, P.E.
phone: (407) 758-9966
www.floridaprestressedconcrete.org

Georgia/Carolinas PCI (GCPCI)—Peter Finsen
phone: (678) 638-6220
email: peter.finsen@gcpci.org
www.gcpci.org

Mid-Atlantic Precast Association (MAPA)—Tom Holmes
phone: (302) 222-1385
email: info@mapaprecast.org
www.mapaprecast.org

PCI Central Region—Phil Wiedemann
phone: (937) 833-3900
email: phil@pci-central.org
www.pci-central.org

PCI Gulf South—Dan Eckenrode
phone: (228) 239-3409
email: pcigulfsouth1@att.net
www.pcigulfsouth.org

PCI of Illinois & Wisconsin (PCI-IW)—Amy Holliday
phone: (312) 505-1858
email: info@pci-iw.org
www.pci-iw.org

PCI Midwest—Mike Johnsrud
phone: (952) 806-9997
email: mike@pcimidwest.org
www.pcimidwest.org

PCI Mountain States—John Dobbs, P.E.
phone: (303) 562-8685
email: jdobbs@pcims.org

PCI Northeast—Rita L. Seraderian, P.E., LEED AP
phone: (888) 700-5670
email: contact@pcine.org
www.pcine.org

PCI West—Doug Mooradian, AIA
phone: (818) 247-6177
email: doug@precastconcrete.org
www.precastconcrete.org

Precast Concrete Manufacturers Assn. of Texas (PCMA of Texas)—Chris Lechner
phone: (210) 633-6743
email: lechner@pcmatexas.org
www.pcmatexas.org

Precasters Join to Help Build High School

PITTSFIELD, MASSACHUSETTS

Coreslab Structures (CONN) Inc., Thomaston, Ct., has been selected to participate in the design-assist project for a new Taconic High School in Pittsfield, Mass. It has subcontracted fellow PCI member Unistress Corp. to manufacture some components for specific areas of the building, which is now under construction.

A one-story structural precast concrete podium floor plate will support a two-story steel structure that will be clad with insulated architectural panels on half of the building's footprint. A series of four mix design and various textures have been chosen, including some with custom formliners.

The project has been designed by the architectural firm DRA in Waltham, Mass., with Gilbane Co. in Boston serving as general contractor. Engineer Design Group in Malden, Mass., is the structural engineer, while TRC Worldwide, Alantown, Penn. provided precast specialty engineering services.

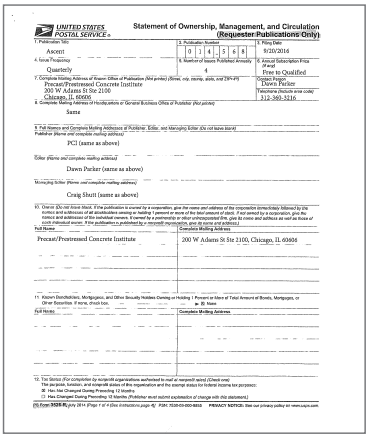
Coreslab will provide a variety of precast concrete components for the building, including structural walls and columns, hollow-core, rectangular beams, L-beams, and IT-beams, and insulated architectural walls and spandrels. Unistress, in Pittsfield, will provide double tees that will be used for the ceilings of the school's new technical shop.

Submit your headline news for consideration in a future issue of Ascent to Becky King at bking@pci.org.

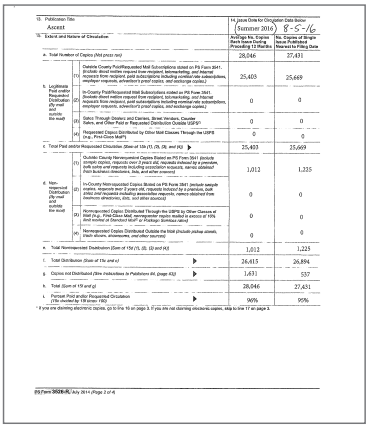
Ironrock Hires Schrock as Sales Manager

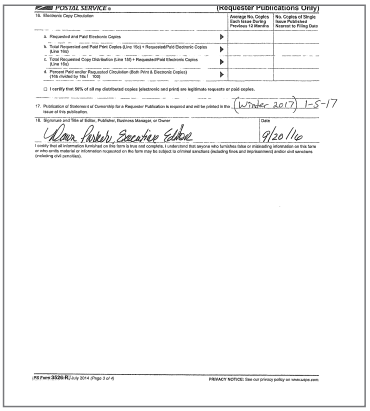
CANTON, OHIO

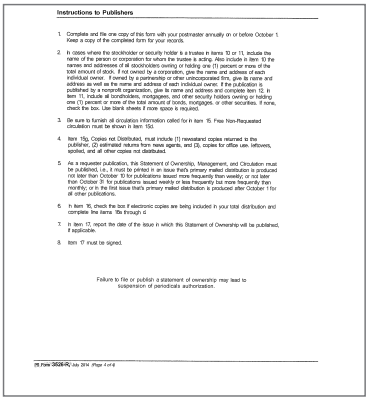
Ironrock has named Rob Schrock its new national sales manager for thin brick. Schrock will make presentations to architects and specifiers, distributors, precasters, field-applied systems companies, and other users and influencers for the firm's Metrobrick and Royal Thin Brick product lines. Schrock has more than 25 years of construction-industry experience, including stints with Tabs Wall Systems and Glen-Gery Corp.



Statement of Ownership, Management, and Circulation (Requester Publications Only)







Instructions to Publishers

Colors, Finishes and Blends **to Fit any Design**

The Harbor Center in Buffalo, New York features a hotel, ice rinks, restaurants and retail shops. METROBRICK was used on much of the exterior of the building. Two distinctive colors where used in a blend. One of the colors was also used in accent areas.

METROBRICK®
ARCHITECTURAL THIN BRICK

metrothinbrick.com | 1.888.325.3945 | email:info@ironrock.com | P.O. Box 9240 Canton, OH 44711

Ascent Magazine is pleased to announce the formation of our Ascent Professional Advisory Committee. This group of design professionals was instrumental in the redesign of Ascent and will continue to help develop content that is relevant, track emerging trends in the design world and share ideas for articles and projects that will resonate with their peers in the design community. Please join us in welcoming them to our our team.

Charles Jones

One to One Design

Charles D. Jones is a principal of One to One Design and currently serves as a faculty member and the director of Digital Fabrication at the Tulane School of Architecture. Jones received his Bachelor of Architecture from Louisiana State University in 2006. Over the past 10 years, Jones has had the opportunity to participate and contribute to both professional and educational institutions of architecture with a strong focus technology's influence on fabrication techniques—both analog and digital.

Jones' focus has allowed him the opportunity to lead initiatives for the design, implementation, and management of cutting-edge fabrication facilities at academic institutions within and outside of the United States. Through research and seminars at Tulane University, Jones has experimented with a variety of different fabrication techniques involving CNC milling. While at American University of Sharjah, notable contributions included the procurement, installation, and management of a multi-million dollar digital fabrication facility.

Julia Louie

HDR Architecture Inc.

Julia Louie is a senior project manager for HDR Architecture, Inc., received her Bachelor of Architecture at Illinois Institute of Technology. She is a healthcare architect and has been involved in the healthcare arena for over 18 years. Louie consistently exhibits exceptional qualities in leadership, dedication, expertise, and relationships. As a master organizer and communicator, she has extensive experience leading integrated project teams, bringing people together for one unified vision and project approach. Louie is recognized for her management skills and comprehensive approach to project delivery of complex facilities.

Marty Huie

WHR Architects

Marty Huie has the unique ability to challenge established concepts and to synthesize the complicated and often conflicting thoughts and requirements from both clients as well as the construction trade industry. With the ability to truly listen and then communicate back outside-the-box thinking we're able to alter the industry. In addition to regulatory requirements that impact the design of healthcare facilities he is able to communicate these critical issues in a way that is clear, engaging and enjoyable. "It doesn't have to be puzzle" is his mantra. He educates clients and the design community through in-person and association presentations nationally, as well as writing for recognized industry publications. Huie has served as a National Fire Protection Association (NFPA) Healthcare Subcommittee member since 2004. He has actively debated code issues on the floor at the NFPA national committee meeting.

Michael C. Lee

CallisonRTKL

Michael Lee is a vice president for CallisonRTKL, an architecture and planning consultancy with offices all over the world that has created some of the world's environments for developers, retailers, investors, institutions, and public entities.

Over the last 25 years Lee has established a wide range of design expertise in retail, urban master planning, and mixed-use projects across North America, China, and the Middle East. His expertise is in placemaking and creating successful commercial environments. With a deep understanding of how the various components of a project need to work together to connect people to places and a strong background in commercial and retail planning, Lee truly grasps what it takes to create a community asset.

Photo: Robert A.M. Stern Architects.

Michael Zensen

Cannon Design

Michael Zensen, AIA, CDT, LEED AP, is an associate vice president of Cannon Design. He received his BArch from the University of Kansas. Zensen has over 25 years of experience and has been responsible for assisting clients from project conception to completion including initial programmatic issues, architectural design, documentation, coordinating city/code matters, and engineering. He has experience in a wide variety of project types acting as project architect.

Paul Naprstek

Robert A.M. Stern Architects LLP

Paul Naprstek is an associate and the director of Building Technology for Robert A.M. Stern Architects, where he has worked since 2011. Naprstek has contributed to the design of two new residential colleges at Yale University in New Haven, Conn.; Stephen A. Schwarzman College at Tsinghua University in Beijing, China; and a renovation and expansion of the Music Department, Student Center, and Rotunda at Marist College in Poughkeepsie, N.Y. As director of Building Technology, Naprstek spearheads RAMSA's Quality Assurance/Quality Control program and related intra-office educational initiatives.

Naprstek received his Bachelor of Science in Journalism degree from Northwestern University and his Master of Architecture degree from the University of Pennsylvania, where he served as co-editor of VIA 10: Ethics and Architecture (Rizzoli, 1990). He is a registered architect in the Commonwealth of Pennsylvania and is a member of the American Institute of Architects.

Sean Nohelty

DMS Architects

Sean Patrick Nohelty, AIA, is a principal of David M. Schwarz Architects Inc. (DMS) and serves as corporate secretary and project manager. He has been with the firm since 1997 after receiving his BArch from the University of Notre Dame School of Architecture. Nohelty is a registered architect in the District of Columbia and Texas and holds a LEED AP BD+C accreditation.

Outside the office, Nohelty is actively involved in the Institute for Classical Architecture & Art (ICAA) and the American Institute of Architects (AIA), having served on the Washington Chapter Board of Directors for 6 years, including as president in 2014. His service on other boards includes two terms as a member of the Notre Dame School of Architecture Advisory Council, founding director of the Montana Society, and founding director of the Ngoma Center for Dance, a a charitable organization that aims to provide minority youths and adults with a deeper understanding of dance as an art and a discipline.

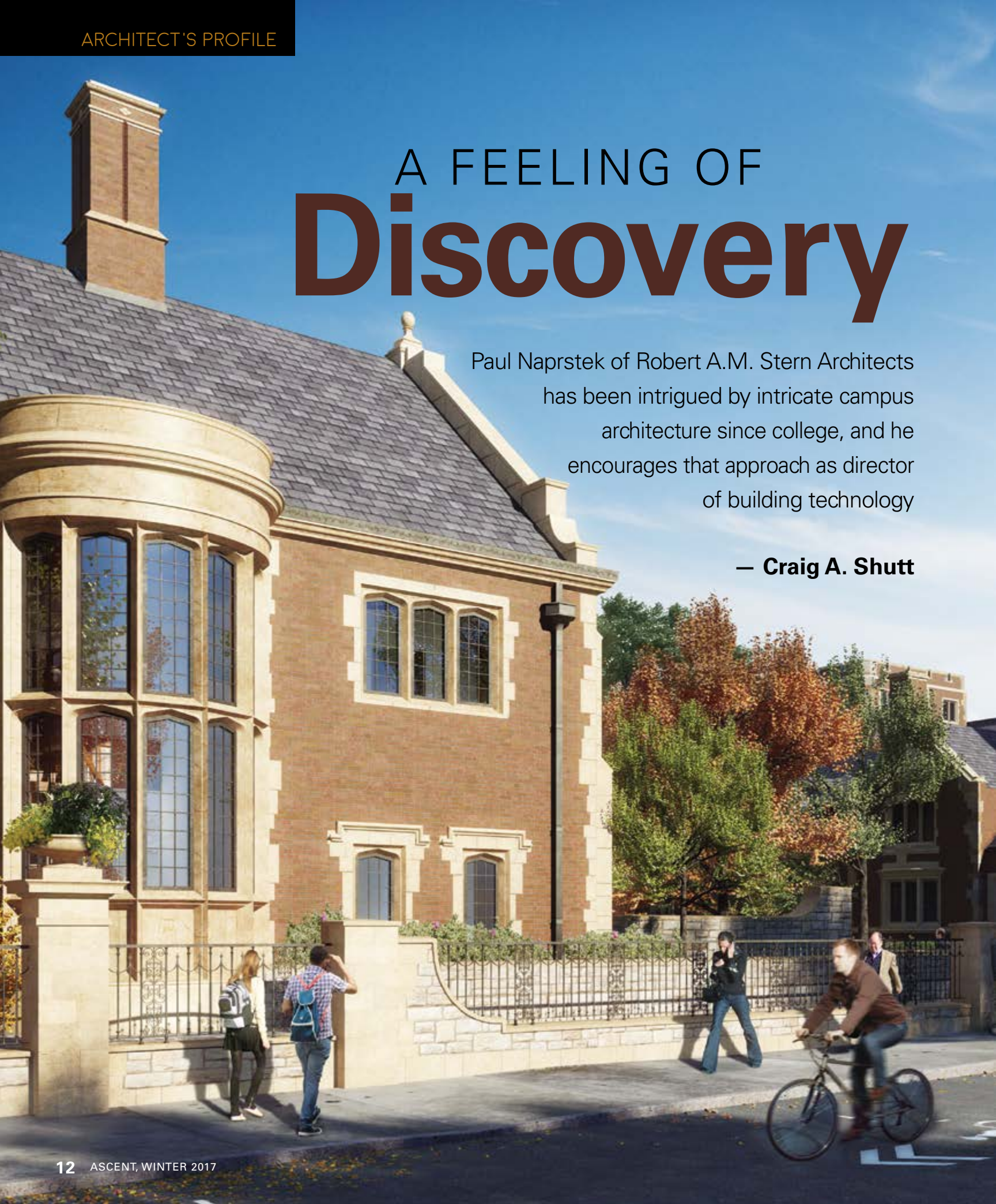
Sasha Vinitsky

Wakefield Beasley & Associates

Sasha Vinitsky is a principal and the director of the Office/Industrial Studio for Wakefield Beasley & Associates. Vinitsky received his Master of Architecture from Technical University of Moldova.

With 35 years' experience in architecture, Vinitskys' professional work has covered a wide variety of projects, including mixed-use developments, offices, hospitality, industrial, educational, residential, and medical facilities. He takes pride in both his design abilities and his technical knowledge. As Vinitsky explains, "When I draw a form, I know how to build it."

He understands that some clients are most concerned about the architectural appearance of a facility, while others place the highest priority on maximizing the cost efficiency of a project (dollars per square foot). Keeping these issues in mind, Vinitsky is equally capable of creating simple but well-proportioned designs, or more complex and dynamic forms, as the project demands.



A FEELING OF Discovery

Paul Naprstek of Robert A.M. Stern Architects has been intrigued by intricate campus architecture since college, and he encourages that approach as director of building technology

— Craig A. Shutt

SIMILAR LOOKS
RAMSA's designs for two 452-bed residential colleges at Yale University feature similar palettes of brick and limestone detailing, evoking the school's original Gothic designs. Photo: dbox.

Paul Naprstek. Photo: Robert A.M. Stern Architects.

Paul Naprstek was struck by the intricacy and hidden details around him as he walked the Northwestern University campus as an undergraduate in the late 1970s. The school's Deering Library and sorority quad, both designed by James Gamble Rogers, famed for his 1920s and 1930s university buildings, evoked a sense of discovery at every turn. Today, he enables the noted Modern Traditionalist architect Robert A.M. Stern and his 300 colleagues to design buildings with that same sensibility as director of Building Technology at Robert A.M. Stern Architects (RAMSA).

Naprstek attended Northwestern's famed journalism school, but it was the beauty of the campus's buildings that stayed with him. "They made me fall in love with architecture," he says. "The sorority quad had small passages everywhere and dormer windows poking out of every corner. There was always something new to discover." RAMSA is now recapturing that feeling in its design for Yale University, where eight of the existing 12 colleges (as well as the university library) were designed by Rogers.

The project consists of two 452-bed residential colleges, Yale's new Pauli Murray and Benjamin Franklin Colleges. Fraternal twins with similar palettes of brick and limestone detailing, they evoke Rogers's original Gothic designs.

"They're a little bit controversial," Naprstek admits. "A lot of architects think the new colleges should present a modern appearance and that Yale is taking a step backward with these designs. But I think there's something wonderful about being able to evoke that sense of discovery every time students walk through the buildings." He notes that Yale's two Modernist residential colleges, both by Eero Saarinen, have consistently been the least popular with students.

'I think there's something wonderful about being able to evoke that sense of discovery every time students walk through the buildings.'

The colleges incorporate precast concrete elements in two critical locations: tall chimneys that draw the eye to the buildings' roofs, and a tower that serves as a focal point for the entire complex. Both feature precast concrete architectural panels with embedded brick as well as exposed precast accents.

The chimneys presented a challenge because the lower portions of the building will feature hand-laid brick, requiring the masons to align their bricks with the embedded brick in the panels above, which were erected first. For a time, it created the disorienting look of brick hanging off the chimney tops. "It will come together when the masons finish up," Naprstek promises.

"The chimneys are functioning units, but they also hold toilet vents and other equipment," he explains. "We used precast concrete because it provided an envelope with a narrow thickness that gave us more room." Two separate pours were used for each side: the first pours provided a limestone-like color, for the exposed precast accents. The second, with embedded thin bricks, matched the reddish hue of the mortar in the hand-laid brick façades below.

ARCHITECTURAL HISTORY

Naprstek's interest in joining the profession took time to develop after he decided he didn't have "the killer instinct" to become a newspaper reporter. Instead, he used his experience at the school's radio station to help start an alternative-rock station in Rhode Island, which led to his falling in love with New England architecture.

He wound up in Boston, Mass., working as a typist for two years at the Harvard Graduate School of Design. In the first year, he worked under Henry N. Cobb (of Pei Cobb Freed & Partners), while in the second year, he worked for the GSD's Urban Design Program under Moshe Safdie (of Safdie Architects). "Hanging around the faculty, the guest critics, and the students made me want to be an architect, too." He received his Masters of Architecture from the University of Pennsylvania in 1987.

His early work included producing contract documents for projects by prominent architects, including stints at Tobey+Davis in Reston, Va., (now SmithGroupJJR in Washington, D.C.), where he worked on the National Museum of the American Indian Cultural Resource Center with Polshek & Partners and the U.S. Bureau of the Census Computer Center with Davis Brody Bond. He then moved to Gruzen Samton in New York, N.Y., where he spent 14 years working on the Queens Family Courthouse with Pei Cobb Freed and the Yale University School of Management with Foster + Partners.

He moved to RAMSA in 2011 to work on Yale's Residential Colleges. "I think it's going to make a big splash when it opens," he says. He also contributed to the design for the Schwarzman College at Tsinghua University in Beijing, known as the MIT of China. "It's a very interesting project. We get a lot of very interesting projects."

Like most leading international design firms, RAMSA sometimes relies on local firms to serve as architect of record, who execute working drawings and perform construction administration. But RAMSA also takes on full-service contracts, handling all architectural responsibilities. Those projects have included the George W. Bush Presidential Center, the Caspersen Student Center/Wasserstein Hall/Clinical Wing at Harvard Law School, and Yale's new residential colleges.

NEW POSITION CREATED

RAMSA also has taken a different approach to quality issues. In 2013, the partners approached Naprstek about creating a full-time position devoted to quality assurance and quality control. Since then, it has grown into the Department of Building Technology, with three full-time staff and numerous senior architects he "borrows" from studios on an as-needed basis to conduct reviews.

HIDDEN JOINTS
RAMSA's designs often look to disguise or hide joints in panels organically, as was done at Harvard Law's new building. Photo: Peter Aaron / OTTO.

Full-service projects are checked twice in the CD phase, but all projects are reviewed at the end of schematic design and design development. The department focuses on constructability and code compliance, but as seasoned architects who have done construction administration, they also strive to spot design elements that could be compromised without adequate documentation. "My goal is to inject a dose of reality into the design process. I also want to proactively provide insight into issues that could arise."

'My goal is to inject a dose of reality into the design process.'

From the beginning, he envisioned an educational component to the role, teaching in-house classes and developing guidance materials for staff. He also serves an informal role as messenger between project teams. "When you have more than 50 active projects going on in eight studios, quite often one team will be wrestling with a problem that has already been addressed by another. By being aware of what everybody is doing in every studio, my assistant, Marianna Monfeld, and I have been able to make connections that would have been missed otherwise."

Developing the position from scratch provided an interesting challenge. "Other firms have people in charge of QA/QC, but I don't think any of them structure it exactly as we do."

He provides a key aid to the contingent of young architects just out of school that RAMSA employs. "They know architecture and how to draw, but they don't know how the pieces fit together," he explains. "Schools figure everyone will learn that on the job. My role is to be their teacher for this."

COMPLEMENTARY DESIGNS
RAMSA has designed four major buildings at Marist College in Poughkeepsie, N.Y., along with several smaller ones. Several, including the North Campus Housing project, feature precast concrete panels faced in a random ashlar Champlain gray granite fieldstone. Photo: Robert A.M. Stern Architects.

The firm is trying to change the perception of QC, he notes. "The stereotypical QC guy is an old curmudgeon in the back of the office who yells at people for not dimensioning their window openings to a 4-inch brick module," he quips. "RAMSA wasn't looking for that kind of person. They wanted someone with a design orientation who can also teach people how to build."

Making designers consider constructability at all points creates challenges. "It's difficult to be both a designer and a technician. We like to think of ourselves as Renaissance men, but there is more to know than any one person's brain can hold. It's hard to be strong in all aspects at once."

PRECAST CONCRETE'S VERSATILITY

While RAMSA has designed many buildings in a Modernist vocabulary, it is the Modern Traditionalist buildings that have established the firm's reputation. It has designed brick- and stone-faced buildings in vocabularies that look back to a time when these materials formed the actual structure of the building.

"We have to reconcile our design vocabulary with the way buildings are constructed in the twenty-first century," he says. For the larger buildings, using precast concrete panels as a backing material for stone or brick has provided a format that RAMSA has often employed.

That approach can be seen on the campus of Marist College in Poughkeepsie, N.Y. RAMSA is nearing completion of its fourth major building (along with several smaller projects), all faced in a random ashlar Champlain gray granite fieldstone similar to that on the nearby campus of the U.S. Military Academy at West Point.

The first two buildings used CMU and metal-stud backup systems, but the two most recent buildings—the 789-bed North Campus Housing facility and the Natural Sciences & Allied Health Building—feature precast concrete panels. In both cases the approximate 1½-inch-thick stones (versus 4-inch-thick pieces in the earlier projects) were adhered to the panels. The panels emerge at the window surrounds, where they give the appearance of limestone.

Some stone pieces near the edges of panels were applied at the site, rather than in the plant, so they could straddle the joints between panels. L-shaped pieces were used at corners to give the stones the visual depth of traditional masonry. "The smaller size of the stone pieces allowed us to treat them like a brick rather than cut stone."

Embedded brick was used for North Hall and Library at Bronx Community College in the Bronx, a campus originally planned for New York University by Stanford White. The 98,600-square-foot building, which achieved LEED Silver certification, features precast concrete panels embedded with buff Roman brick and light gray cast-stone trim.

"We modeled its design on other distinctive libraries," he says. "Our goal was to emulate the look of hand-laid brick and limestone." Precast concrete aided the design by allowing for thin joints between the half-brick lines that were cast in. "Since they weren't actually being mortared into the wall, we could minimize the joints and better match the look of older neighboring buildings. We prefer to use half bricks whenever possible to create flexibility."

Condensing the brick and panelization with one supplier also moved the drawings along quickly while providing the desired historic look. "It's not a modern look at all, but it's been a big hit with the students."

Another example is the Harvard Law project, a 266,000-square-foot building that achieved LEED Gold certification. Variegated limestone anchored into precast concrete panels provided the envelope. "RAMSA takes the lead in locating panel joints on all of its projects, to ensure as many as possible can be obscured within changes of plane or material, or hidden behind external elements such as downspouts," he says. "Where the joints must be exposed, we try to stagger them rather than have a vertical line up the building's face."

The architects resisted the normal impulse to locate the joints in front of structural columns. "This necessitated a lot of supplemental steel to support the precast anchors, but we felt it was worth it." RAMSA again called for selected stones to be left out and hand-set in the field so they could straddle panel joints.

Turning corners presents a key issue, one he always reviews during QA/QC reviews. "Young designers often draw perfect elevations, but forget what happens when you turn the corner. Given the fact that modern stone is usually 2 inches thick at most, your stone will look like a piece of paper unless you take pains to detail it differently."

RAMSA has employed several strategies to increase the perceived depth of the stone, including calling for L-shaped pieces, binding two pieces with an imperceptibly thin epoxy joint, or developing details like the "RAMSA Corner," an articulated corner detail that has been used successfully at 15 Central Park West and Superior Ink in New York, N.Y., as well as in other projects RAMSA has designed.

To overcome those obstacles and create efficiencies, RAMSA involves the precaster at an early stage, often via a "design-

Embedded Brick

Embedded buff Roman brick and light gray cast-stone trim highlight the precast concrete panels on the façade of the North Hall and Library at Bronx Community College in the Bronx. Photo: Peter Aaron / OTTO.

assist" contract. "We try to benefit from the precaster's expertise when locating joints. They know such things as the maximum sizes the panels can achieve for transportation and the criteria for locating anchors. In some of these projects, achieving the look we provide at the budget available couldn't have been accomplished any other way."

RAMSA tries to exploit all of the capabilities that precast panels offer. "When we design with punched windows, the potential exists to install the windows at the precaster's plant, so that when the panels are erected, the building's exterior is nearly complete."

TEACHING EXTENSIONS

Naprstek has become the office's de facto expert on building codes. "I never took a class in building codes," he says. "I just got interested in trying to find the right passages to address a specific condition, and I eventually turned it into a sort of game." He created "cheat sheets" in Excel, listing the numerous code citations addressing each issue.

"They became a useful index, especially because the pre-2008 New York City Building Code was so poorly indexed and cross-referenced. As people in the office discovered that I could find the answers to their queries, they came to me with questions about things I didn't know, so I learned a little more." He also led the effort at his previous firm, Gruzen Samton, which was hired by the NYC Building Department to research the implications of transitioning to using the International Building Code (which it did in 2008).

A colleague at Gruzen Samton, who also taught at NYU's Schack Institute of Real Estate, invited him to teach an evening class on building codes, which he did for nearly 6 years. "I enjoyed preparing for class and finding ways to explain the code in a light-hearted way that avoided being boring. I built it up each year and got better each time." He also served on a technical advisory committee reviewing the 2014 update of the NYC code.

He's found another outlet for his teaching interests, using another of his former skills—that of college disk jockey. For the past 1½ years, Naprstek has posted an appreciation of a hit song from 1966 to 1968 to his Facebook page, putting it into the context of the times and showing how later songs were inspired by earlier ones. The pieces, which link to a YouTube version of the song, began as short pieces but now average 1,000 words.

"I found I enjoyed doing it and spent more time researching each entry," he says. "I focus on the music and its development rather than gossip about the bands. It gives me a lot of pleasure to write those on Saturday mornings. Most people know the songs, but they don't see how the trends developed over time."

His interest in teaching and creating a feeling of discovery will continue, he says. "This field is always growing and offers a great learning experience. I've been working at it for 30 years, and I find new areas of interest all the time. And I enjoy passing those along to others."

AN INTEGRATED SOLUTION FOR

Insulated Precast

Photos courtesy of U.S. Department of Energy

About Thermomass

We manufacture a complete line of insulation systems for use in precast concrete projects. Throughout our 35-year history, we have worked hand-in-hand with clients on thousands of projects to create buildings noted for their energy-efficiency, durability, and performance. We are the industry leader in high-performance concrete sandwich wall technology because we believe in offering three key advantages:

Innovative Products
From the smallest office to the largest stadiums and everything in between, Thermomass offers a complete selection of concrete insulation and advanced fiber-composite connectors.

Dedicated 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.

Concrete Results
Not only are we the global leaders in insulated concrete products, we helped found the industry. No company can match our track-record of success.

Learn more at **www.thermomass.com**

SPOTLIGHT

NREL Energy Systems Integration Facility

The Energy Systems Integration Facility (ESIF) at the U.S. Department of Energy's National Renewable Energy Laboratory (NREL) is a state-of-the-art facility for the research, development, and demonstration of advanced strategies and components in modern, clean energy technologies.

The ESIF's LEED™ Platinum certified design includes energy saving features like natural ventilation, enhanced daylighting, radiant heating and cooling, and Thermomass-insulated precast concrete panels.

Using edge-to-edge System NC insulation, Thermomass helped the ESIF project meets its goal of a 40 percent greater performance efficiency than the baseline ASHRAE 90.1 building standard. The integral insulation also provides for a strong, durable building envelope, ideal for use in areas where new, unproven, or potentially hazardous equipment and processes are under evaluation.

thermomass®

ASH SKYLINE PLAZA

LOCATION
Fort Wayne, Ind.

PROJECT TYPE
Mixed use (office, parking, plaza)

SIZE
631,541 square feet
(468,000 for parking, 163,541 for offices)

ARCHITECT/SPECIALTY PRECAST ENGINEER
Hoch & Associates, Fort Wayne, Ind.

OWNER
City of Fort Wayne, Fort Wayne, Ind.

STRUCTURAL ENGINEER
Woolpert Inc., Dayton, Ohio

CONSTRUCTION MANAGER
Weigand Construction Co., Fort Wayne, Ind.

PCI-CERTIFIED PRECASTER
Coreslab Structures (INDIANAPOLIS) Inc.
Indianapolis, Ind.

PRECAST COMPONENTS
1265 architectural and structural panels

Precast Delivers
DIVERSE BUILDING NEEDS

Designers find that precast concrete components meet challenges posed when having to integrate the various functions in mixed-use projects

— Craig A. Shutt

Mixed-use projects present unique challenges to designers and contractors. Blending the needs of several different and distinct functions requires solutions that create success for all stakeholders. In many cases, designers find that precast concrete architectural panels and structural systems provide the economy, flexibility, and aesthetic versatility to keep all functions successful.

Precast concrete's capabilities to create a structural frame quickly and economically gets projects off to a fast start, enclosing the shell so interior trades can begin working to install the specialized needs of the various tenants. Architectural panels not only can be erected quickly but they can combine multiple finishes, colors, and accent pieces to minimize installation time. Joining so many pieces into a single-source supplier aids communication and reduces worries and conflicts. For more on the benefits precast concrete can provide, see the sidebar.

Bringing the precaster onto the project early, especially in a design-assist capacity, can ensure that all issues and economic factors are considered and addressed early in the design phase. That input, which can address efficient panel sizes and finish techniques as well as casting, transportation, and erection issues, can minimize costs and boost installation speed, with smaller tolerances and few field adjustments.

The following projects are examples of how precast concrete components aid mixed-use projects of many types around the country.

ASH SKYLINE PLAZA

Combining a large, seven-story parking structure with a small amount of office space and some first-floor retail space created unusual challenges for designers at the Skyline Plaza in Fort Wayne, Ind. To mesh these distinct needs, they created a seven-story precast concrete parking structure topped by a four-level, steel-framed office building and public plaza. Providing smooth access from one section to another and providing load support for both the office columns and the rooftop plantings required close communication and some component customization.

Complicating the project was the public-private collaboration on the space, in which the city owned the parking levels while developers rented the first-floor retail space and the commercial spaces. Ash Brokerage occupies the three lower floors of the office, creating the Ash Skyline Plaza name.

"Because of the city's role in the building's ownership, the project went through a published bid, resulting in pressure on the construction manager to meet the tight budget and construction schedule while working with multiple owners," explains Corey Greika, vice president and sales manager at Coreslab Structures (INDIANAPOLIS) Inc., which fabricated the 1265 precast concrete architectural and structural components.

Adding complications was the plan to construct a condominium building adjacent to the structure at the same time, which ultimately was postponed. "It was part of the design process for that building to be underway simultaneously," he notes. To aid

MIXED USES
The new Ash Skyline Plaza combines a seven-story precast concrete parking structure with a four-level steel-framed office building on top and some first-floor retail space. Photo: Coreslab.

that, the west elevation features an architectural precast concrete fire-separation wall that was designed to be load bearing to accept tees when the project moves ahead.

Precast concrete was chosen for the structure for a variety of reasons, explains Jim Hoch, president of Hoch Associates, the architectural firm on the project. "Precast concrete gave us design flexibility in a big way and gave us a tremendous leg up on the schedule," he says. "It gave us great economy for the material and allowed us to add architectural features at the entry points and key locations without impacting the budget."

"Hoch & Associates has a great specialization in precast concrete and understands it well," says Greika. "They were able to do much of the specialty engineering on the design upfront, which really sped up the process."

'Precast concrete gave us design flexibility in a big way and gave us a tremendous leg up on the schedule.'

IN-HOUSE EXPERTISE HELPS

Hoch's engineers produced the erection drawings for the precast along with the initial bid set. "We had a very defined plan as we put out the plans for bid," Hoch explains. "It's atypical for an architect to be able to do that, but we had the expertise in-house, so we could complete a large portion of the drawings early. We were able to come out of the gate knowing what pieces we needed and how they could be engineered."

The drawings did not include hardware or connection details, he notes. "Fabricators have their own ways to make those elements efficient for their own production needs. By giving them the drawings to that point, we were very successful in speeding up the project's construction."

Creating the initial design took a series of adaptations, adds Steve Young, senior structural engineer at Woolpert Inc., the structural engineering firm on the project. "The project went through three design iterations as the city adapted their needs." The parking structure's size grew from 800 to 1000 to 1200 spaces as more footage was added.

A key element was the decision to exploit the basement. Poor soil conditions in the area created the need to excavate the site to add 1000 auger-cast piles beneath the foundation. "We decided to capture that space rather than give it up since we had to dig it out anyway," he says. That required construction of perimeter foundation walls around the piles—but the addition of a new level. The structure's ramp system also shifted to various locations around the building before the most efficient placement was finalized. "Even with these changes, the shop drawings went through very quickly, with no headaches, again speeding up delivery of the project."

The major areas of concern involved key loading areas, specifically at the ground level and at the parking structure's roof, where the plaza was created on top. The office facility takes up approximately 35,000 square feet of the 77,500-square-foot roof, leaving significant area for the creation of a green roof. The approximate one-acre plaza is one of the largest such green-roof designs in the state. Due to its location, it is not open to the public, providing an attractive tenant amenity.

"The plaza concept developed early in the design phase when we realized there would be significant space on the top level of parking adjacent to the office building," Hoch says. "We looked at options and created the ability for the office owner to create the garden design we have now."

The plaza includes planters with flowers and trees along with walking paths. Among the plantings was an ash tree (reflecting the brokerage's name) that weighed 1500

IN-HOUSE HELP
The architect's engineers produced the erection drawings for the precast along with the initial bid set. Photo: Hoch & Associates.

FIRE PROTECTION
The precast concrete provided inherent fire protection to meet the 2-hour, fire-code requirement for separating retail space, parking, and offices. Photo: Coreslab.

pounds. Ensuring that dead load, as well as the column loads from the office's steel frame transferred into the column paths of the precast concrete parking levels required close consideration.

DEEPER TEES CREATED

Approximately 80% of the office columns aligned with the parking columns, so to accommodate the remaining columns, transfer girders were installed to shift the loads. The roof level features deeper precast concrete double tees than are typical, and their flanges were reduced on the ends to provide more stem strength in the beams. The tees were 7'2" wide as opposed to the 12-foot width used on other levels. On all levels, the tees are 60 feet long, providing open spaces for design flexibility.

The transfer beams were designed 4'4" deep and weighed up to 88,000 pounds, Hoch says. "They were serious pieces, but their integration worked quite well," Hoch says.

The levels below were protected with a special waterproofing system, which also was used at the third level above the retail levels. "It was fairly typical of such systems, but it was more robust than most owing to the conditions that the garden produced," explains Mike Grutsch, the project architect for Hoch Associates. It included an elastomeric waterproof system as well as added topping. "We took a view of providing a long-term solution to protect the uninhabited spaces and retail spaces below to avoid any problems later on."

'We took a view of providing a long-term solution to protect the uninhabited spaces and retail spaces.'

At the street level, additional topping was provided over the tees to create a flat surface for the retail spaces, Young notes. An approximate 3-foot slope north to south in the site had to be evened out so all retail spaces were equally accessible. To achieve that, insulation was added between the tees and the topping. In some areas, the insulation was only 4 inches thick, while in others it was 16 to 20 inches thick.

The precast concrete also provided inherent fire protection to meet the 2-hour, fire-code requirement for separating retail space, parking, and offices. "That was a big savings, as we didn't need to expend time or money to meet that requirement," Grutsch says. Some exhaust venting was added on parking levels, although the open design meets most of the requirements.

DRIVE-THROUGH CREATED
A bank's drive-through lane was created on the first level with 15-foot clearance and a long open space. Photo: Coreslab.

DRIVE-THROUGH PROVIDED

Another loading issue arose on the first level, where a bank client required auto access to incorporate a drive-through window in their space. "They needed a 15-foot clear space and a long open space, which also had to support the dead load of cars on the floors above," says Hoch. "Providing that clearance also opened the space to create a great deal of flexibility for deliveries."

Double tees were customized to provide the needed loading, using a smaller module. In this case, the tees were cast 7½ feet wide, again providing more stem support for a narrower tee.

The interior sides of the drive aisle cross-over bays weren't used as shear-wall locations for the structure, Young adds. "That's an atypical approach, but we wanted

QUADRANT ERECTION
The building was erected in quadrants, with the two supporting the office building finished first, allowing that construction to begin. Photo: Hoch & Associates.

to open up visibility throughout the space while still meeting our loading requirements." Perimeter shear walls took most of the load, using splice sleeves to connect them. "It was easy to construct them but challenging to coordinate all of the loads for lateral resistance."

Using steel framing for the office portion helped meet the load needs, Hoch adds. "The steel framing allowed us to reduce the structural dead loads over the concrete levels." An elevator core in the parking levels rises through a penetration in the roof to continue into the office levels, providing easy access between functions.

The precast panels were cast with a gray color and a light sandblasted finish to add texture. Stair and elevator towers at the corners were cast with a dark black, charcoal-colored mix with an undulating pattern.

The schedule for casting and erecting was challenging, Greika notes. "There was a lot of work involved in aligning all of the loads between functions, and the foundation package already had been bid when we got involved. We had to expedite the precast engineering with Hoch and get into production on components quickly. The schedule was a big driver for how the project progressed."

Components were staged at a drop lot nearby and brought into the busy downtown location as needed. A shuttle-trailer system was used, which ultimately backed up into the property next door as the building was finished on the lot.

Access for cranes was available only within the footprint, so the building was constructed in quadrants. The quadrants supporting the office building were finished first, so that construction could commence while the other parking quadrants were built.

"The footprint took up an entire city block, so it was a very user-friendly site, with room to position the crane as work progressed," Young notes. The project was erected in about 4 months, through the end of winter into spring. "We got some pretty cold weather, but it didn't interfere with construction. It was a very smooth process."

'We engaged the precaster early to get their ideas on issues.'

Having the precaster on board early ensured that remained true throughout the process. "We engaged the precaster early to get their ideas on issues with elevation designs, drive aisles, transfer beams, and other areas of concern," Young says. "They provided guidance before bidding and construction began to avoid any issues or surprises. Having feedback and insight early and often really helped the construction process when we began detailing. I can't imagine doing a project of this size without that involvement."

The building has been a big hit in downtown Fort Wayne. Mayor Tom Henry called the building "a tremendous asset" that would bring more investment to the downtown area, which the city was already seeing. Larry Weigand, CEO of Weigand Construction, the general contractor on the project, agreed, calling it an "iconic" building. "This is no ordinary building. Every detail, every feature, exudes quality, innovation, and creativity."

GOOD NEIGHBOR
The design was planned to create a building with personality while still fitting into the residential neighborhood. Photo: Spancrete.

SWEDISH COVENANT HOSPITAL

To expand its facilities at Swedish Covenant Hospital on the north side of Chicago, Ill., on the tight footprint that was available, administrators needed to create a multi-use project combining doctors' offices and a surgery center on the upper three floors and parking on the lower five levels. To deal with challenges presented by the tight space, fast construction schedule, and aesthetic needs, designers specified a total precast concrete structure and architectural precast concrete panels.

"The development of the Center for Ambulatory Surgery at Swedish Covenant reflects the growth of the hospital's surgical program," says CEO Mark Newton. "Swedish Covenant is seeing growth in robotic, vascular, orthopedic, cardiac, women's health, and neurosurgery surgical volumes. The additional three operating suites will allow us to continue providing advanced surgical care to our community."

The design provides additional space on the eighth floor that can be converted into a fourth operating room, if needed in the future. A pharmacy, optical office, and restaurant are located at street level. The 238,000-square-foot facility includes spaces for 260 cars.

The project was undertaken under a design-build format, with BSA Lifestructures providing architectural services while Power Construction Co. served as general contractor. Thornton Tomasetti served as the structural engineer.

'Precast allowed us to build quickly and efficiently.'

"Precast allowed us to build quickly and efficiently," says Alan Antoniewicz, president/COO of Spancrete, the precaster on the project. The team collaborated to ensure the precast design was optimized for casting, delivery, and erection, with 3D/BIM analysis provided.

Precast's design flexibility made it possible to create a building with personality, he adds. The hospital wanted the facility to fit in well with neighboring retail establishments as well as the residential neighborhood. Hospital, city, and neighborhood representatives worked together to express their desires to the building team to ensure a design could be created to complement the neighborhood.

TOTAL PRECAST STRUCTURE

The total-precast concrete structure provided a number of benefits, including providing a strong foundation for the medical center levels. Precast concrete systems reduce vibration and decrease noise transmission, so the soothing environments created on the top three floors will not be disrupted with noise or vibrations from the parking structure below.

A connecting, enclosed walkway joins the new medical building with the existing professional plaza that houses physician offices as well as x-ray and related laboratory services. The new building boasts colors that complement the Swedish Covenant campus and details that were inspired by the surrounding neighborhoods.

"The ease of constructing with precast concrete allowed us to complete the framing of the building and construction of the parking structure in just 7½ weeks," says Antoniewicz. "And the long-term savings experienced by the hospital will be enjoyed for years to come."

FUNCTIONS COMBINED
The new Swedish Covenant Hospital addition combines doctors' offices and a surgery center on the upper three floors and parking on the lower five levels. Photo: Spancrete.

SWEDISH COVENANT PARKING AND MEDICAL COMMONS

LOCATION
Chicago, Ill.

PROJECT TYPE
Mixed use (medical offices, surgery center, parking)

SIZE
106,000 square feet

COST
$38 million

DESIGNER
BSA Lifestructures, Indianapolis, Ind.

OWNER
Swedish Covenant Hospital, Chicago, Ill.

STRUCTURAL ENGINEER
Thornton Tomasetti, Chicago, Ill.

CONTRACTOR
Power Construction Co., Chicago Ill.

PCI-CERTIFIED PRECASTER
Spancrete, Waukesha, Wis.

PRECAST COMPONENTS
Double tees, columns, beams, spandrels, vertical walls, Spancrete wall panels, stairs and landings, and Spancrete hollow-core slabs

Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

POLSINELLI HQ AND HOTEL SORELLA AT PLAZA VISTA

LOCATION
Kansas City, Mo.

PROJECT TYPE
Mixed use (parking, retail, restaurant, office, hotel)

SIZE
400,461 square feet (286,461 for office, 114,000 for hotel)

DESIGNER (POLSINELLI HQ)
HOK (formerly 360 Architecture), Kansas City, Mo.

DESIGNER (HOTEL SORELLA)
Gould Evans, Kansas City, Mo., with Draw Architecture, Kansas City, Mo.

OWNER
VanTrust Real Estate LLC, Kansas City, Mo.

STRUCTURAL ENGINEER
Opus A&E/Bob D Campbell and Associates, Kansas City, Mo.

CONTRACTOR
JE Dunn Construction Co., Kansas City, Mo.

PCI-CERTIFIED PRECASTER
Enterprise Precast Concrete Inc., Omaha, Neb.

PCI-CERTIFIED ERECTOR
J.E. Dunn Construction Co., Kansas City, Mo.

PRECAST COMPONENTS
1275 architectural panels (625 9- and 12-inch-thick panels for the hotel, 650 6-inch-thick panels for the office)

PLAZA VISTA

The project that became the Plaza Vista mixed-use development in downtown Kansas City, Mo., became a victim of a legal dispute halfway through its construction, causing the work to stop. Fortunately, a new developer stepped in to rebrand and reinvigorate the plan. Unfortunately, little of the previous construction could be saved, causing much of it to be demolished. In both phases, however, precast concrete architectural panels were used to clad the building.

"Precast concrete was the material of choice from day one," says Dirk McClure, regional director of business development for Enterprise Precast Concrete, which fabricated the precast concrete components for both stages. "When the project was faced with major challenges and changes well into construction, the modular flexibility and adaptability of a precast concrete cladding solution helped tremendously."

'Precast concrete was the material of choice from day one.'

Started in 2006, the original project was envisioned as a multi-use complex with office and hotel space along with retail and parking. Both buildings were planned to be clad with precast concrete panels on a cast-in-place concrete frame. But disputes arose and construction was halted.

Ultimately, VanTrust Real Estate stepped in to restart the project, changing its name to Plaza Vista. After evaluating the site and opportunities, they decided to start from scratch, replacing the existing construction on the office portion with a steel frame and new precast concrete panels. The development was revamped to feature a 10-story, 253,000-square-foot headquarters building alongside the already-started, 130-room boutique hotel, along with 17,500 square feet of retail space, all built atop an existing six-level, cast-in-place concrete parking structure with space for 940 cars.

"We came to the project late, with some of the building already constructed," says Sandy Price, vice president and senior project designer at HOK (which absorbed the project's original designer, 360 Architecture). Part of their design process ultimately involved removing the existing panels, grinding them up, and repurposing them.

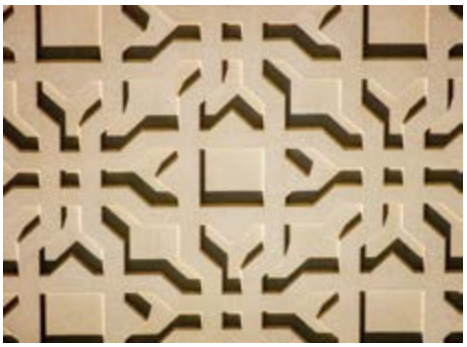
"The hotel portion had been nearly completed, and it featured precast concrete panels, which helped influence our decision to continue that specification for the offices," he says. "But we also factored in precast's efficiency, speed of erection, and economics."

OFFICE PANELS
The office building's panels feature white cement with an acid-wash finish, which brought out each panel's color and made strategic use of aggregates. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

HISTORIC SETTING

A key element was the project's location on Kansas City's historic plaza, which is dominated by older, masonry buildings. "If you want to add contemporary office and retail space into that environment, precast concrete makes much more sense for a 10-story building than masonry," Price says. "It provided the mass and solidity we wanted while adding a sense of permanence that is inherent in the legacy buildings around it."

The new tenant, the Polsinelli law firm, required less specialized spaces, allowing designers to plan flexible floor plans that could benefit the developer long term. "We went through multiple studies to repurpose the existing space, but it just wasn't practical," says Jeremy Tinkler, project architect at HOK. "The original project was designed specifically for that tenant and wasn't practical for other uses. Our goal was to create space that was efficient and flexible for a variety of tenants."



DETAIL TOUCH
Accents with a Spanish Moorish influence were cast into panels below windows. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

The building's interior was completely revamped. "The original design included a massive atrium at its core, so the interior looked inward from the plaza," Tinkler explains. "We wanted to reverse that and take advantage of the views." That created a more compact design and added more perimeter offices. Outdoor terraces and a patio were added to further emphasize the connection to the plaza.

Designers faced two challenges with casting the precast concrete panels. They had to match the panels already erected on the adjacent hotel while creating a complementary look for the office/retail space. "Through special care and detailing, the precast concrete match on the hotel was incredible," McClure says. "That's especially true considering the Phase 1 pieces had been installed and were in place for years prior to final completion."

'Through special care and detailing, the precast concrete match on the hotel was incredible.'

For the office building, a new concept was created. The original panels had a red, almost pink cast, and the designers wanted something closer to a limestone finish. They

DEVELOPMENT RESTARTED
The two-building development was revived at Plaza Vista when VanTrust Real Estate took over and scrapped construction already completed. It features a 130-room hotel, 10-story office building and parking. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

COMPLEMENTARY DESIGN
Designers wanted to create a look that stayed within the spirit of the location while providing a complementary look to the hotel. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

specified white cement with an acid-wash finish, which brought out each panel's color and made strategic use of aggregates. "Our goal wasn't to match the hotel's look but to find a design that stayed within the spirit of the location while providing a complementary look," says Price.

A formliner with an intricate infill pattern was used on some panels, with a design created by Price. "I researched designs that would hint at the Spanish Moorish influences in the area," he explains. The accent was used between window levels. "It offered an opportunity to use shadows in a creative way to add detail that changed through the day."

The precast panels played a key role as the framing elements for balconies that provide scenic views of the area. Panels also hide from view penthouse equipment at the building's top. To support the precast and glass aesthetic that embodies the overall massing of the building, the design team maintained a similar rhythm of precast concrete columns separated with a metal-grate infill to subtly hide the large equipment.

PANELS' LIGHT WEIGHT HELPS

The lighter weight of the precast panels compared to masonry was a benefit, as the building's frame was threaded into the six-story, cast-in-place concrete underground parking structure's foundation beneath it, making weight a primary concern. "Using precast definitely lightened the load," McClure says. Price agrees. "The panel attachments and columns had to coordinate with the existing columns from the parking structure. Precast was a great solution for this, it worked out quite well."

'Using precast definitely lightened the load.'

Precast Helps Meet Varied Goals

Precast concrete can help mixed-use projects meet a variety of challenges and achieve a range of goals for owners, building users, and the construction team. These include:

1. Create a distinctive character that projects an upscale image while allowing each function within the building to maintain its own functional design.

   The plasticity of precast concrete components and the variety of finishes that can be applied ensure that designs blend with any surroundings and project any needed corporate image while also allowing for diversity.

2. Ensure parking levels do not overwhelm other functions in the building and fit with the surrounding neighborhood.

   Precast concrete designs can feature inset brick, granite, and punched-window effects that replicate housing or other types of surrounding architecture.

3. Ensure code requirements for fire separation between parking and other functions is met.

   Precast concrete hollow-core slabs and double tees provide the necessary separation between parking and other functional areas of the mixed-use facility.

4. Design open interior spaces to maximize parking layout and provide secure environment.

   Double tees can span long distances to eliminate columns and provide unobstructed views through the levels.

   Moment frames, K frames, litewalls and other unique structural supports can open interiors and smooth traffic flow.

5. Provide structural support for many small rooms above open, column-free ballrooms and conference areas.

   Hollow-core slab spans long distances while providing structural support, minimizing columns on lower floors.

6. Create high fire resistance.

   Precast concrete's noncombustible composition minimizes fire spread, while modular design techniques provide time for detection, evacuation, and suppression.

7. Use durable materials that won't show dents and other misuse.

   The density of the material minimizes chances for damage to interior walls or ceilings by guests.

8. Meet the area's seismic requirements.

   Precast systems using proven connection technology allow precast concrete components to be used in all seismic zones.

9. Speed construction to provide faster return on investment and meet scheduling commitments.

   A total-precast concrete system speeds construction, minimizes component pieces by combining structural and architectural elements, and provides single-source responsibility.

Component casting begins when the shop drawings are complete, ensuring erection begins when the site is prepared. Year-round, all-weather construction ensures schedules are met.

BLENDING MATERIALS
Glass panels contrast with the white precast panels on the building, with large openings adding a feeling of openness to the building. Photo: Courtesy of Enterprise Precast Concrete Inc. and Jacia Phillips Photography.

The designers' use of precast concrete panels tied into their plan to create the building for long-term durability. That plan was put to the test during construction following a major gas-leak explosion across the street (unrelated to the project). "It put the building to a serious test of blast and fire resistance," says McClure. "While this event was obviously not planned or foreseen, the precast held up very well, which is a tremendous testimony."

Delivery of materials posed no challenges, Price says. "It's always challenging to work in the downtown area, but deliveries worked great with our precast partners." The plant was a 3-hour drive away, allowing quick responses for sequencing deliveries and ensuring no backup of components to be erected.

'It was a tight site, but the contractor worked diligently to ensure delivery, staging, and erection wouldn't interfere with traffic.'

"It was a tight site, but the contractor worked diligently to ensure delivery, staging, and erection wouldn't interfere with traffic." The designers went through a round of design to optimize panel sizes to find the most efficient sizes to transport and erect. "The contractor and precaster were both experienced at working in tight sites, and they did a great job in a short period of time."

The 650 panels for the office and remaining 625 pieces for the hotel, encompassing 113,300 square feet of vertical precast, included both 9- and 12-inch thicknesses for the hotel and 6-inch-thick panels for the office. The project has received LEED certification, to which the precast panels contributed through their use of regional content and local manufacture, the use of recycled content, and their ability to be recycled—which was proven when the original panels were removed and repurposed.

The new design shows how projects can be reinvigorated even when stalled. "Our overall goal for the project was to create a timeless piece of architecture," says Tinkler. "We didn't want it to be overstated, but we did want it to provide an elegant backdrop to the plaza that fit with its historic neighbors. Precast concrete was absolutely the ideal material to provide the exterior look we wanted to achieve our goals."

THIN AND EFFICIENT JUST MADE A DEAL WITH STRENGTH.

THiN-Wall is the next evolution in pre-cast insulated wall panel building systems. It offers load-bearing capability and energy efficiency while being thin enough to impact interior square footage. THiN-Wall licensees deliver design flexibility with a wide variety of exterior and interior finishes, so your aesthetic is never limited. It's one of the few times you can use less and truly gain more.

View the full spectrum of capabilities at **thin-wall.com**.

THiN-Wall

It's all in one.

MIXED-USE DEMANDS ENCOURAGE PARKING EXPANSION

Owners' need to fit more amenities into smaller footprints has led many to include parking and take advantage of precast concrete's benefits to achieve efficient designs

— Craig A. Shutt

Mixed-use projects create unique and significant challenges for blending multiple functions in the proper mix. In many cases, these projects are including parking as a key element as developers seek to provide attractive amenities to entice tenants and visitors. But small sites, often in the downtown area, add complexity for designers and contractors. Many turn to precast concrete structural and architectural components to help meet these needs while providing aesthetic appeal, economical designs, and efficient construction.

"As land values rise, more mixed-use properties are adding parking to take better advantage of the structure," says Dave Vander Wal, senior vice president at Walker Parking Consultants based in New York, N.Y. "They no longer have the ability to put it on the side." That trend follows those already established in Europe and the Middle East and North Africa, he notes, where land costs have been at a premium for some time. "They've learned to consolidate parking within the footprint of the building."

'As land values rise, more mixed-use properties are adding parking to take better advantage of the structure.'

NORRISTOWN GATEWAY
Designers at TimHaahs created a mixed-use parking structure for the Montgomery County Redevelopment Authority in Norristown, Pa., to include retail frontage. This was considered critical to making the precast concrete structure a gateway to the downtown district. The architecture was designed to emulate the materials, scale, and proportions of neighboring buildings. Photo: Nathan Cox.

That's especially true in high-density areas, such as downtown urban locations in gateway and coastal locations, he adds. "In many parts of the U.S., people are moving back into the city from the suburbs, so owners are looking at combining more functions into the building to make them more attractive and add services and amenities. It's routine in India to combine five functions in larger buildings. We don't see that density here, but it's the norm there."

Torrey Thompson, managing principal of the Chicago, Ill., office of Carl Walker Parking, agrees that the growth of mixed-use projects in urban areas creates challenges. "In many instances, providing stand-alone parking is not feasible and requires parking to be integrated into the residential building," he wrote on the company's website. "Integrating parking into a high-rise residential development requires an understanding of many design and construction issues."

PLACING PARKING LEVELS

A key issue is whether parking will be below grade, on the first few levels, or even above other functions. "Underground parking structures have become more commonplace as land values in urban areas rise and city planners push for mixed-use developments to incorporate parking," Thompson wrote. "Though more costly, underground parking provides many long-term benefits, such as preserving prime real estate, offering convenient and centrally located parking, and removing parking from street frontage."

'Though more costly, underground parking provides many long-term benefits.'

"The location can vary by what's most efficient for that specific project," says Vander Wal. "Retailers want parking to be directly below or above their space to encourage visits. Shoppers usually start at the closest level to where they enter. Developers often want parking to be low, but the first level is too valuable, so it's sometimes put above the retail level."

ATLANTIC CITY WAVE
Known as "The Wave," the new 1,180-space mixed-use parking structure in Atlantic City, N.J., serves as a gateway to the city and required a dramatic appearance. Designed by TimHaas, the precast concrete structure features solar panels, metal screening with colored lighting, and an LED digital billboard. Retail space and a parking office are located on the first floor. Photo: Steve Wolfe.

Developers frequently are open to adding levels of parking into the project, notes Mike Martindill, principal and regional vice president at TimHaahs in Miami, Fla. "The benefit of adding levels of parking into a project is that it pushes offices or residences higher up, which creates better views."

To balance the needs while creating efficient space, more owners are performing shared-parking analyses, made popular by the Urban Land Institute's methodology. Offices, for example, require parking only during the day, while theaters mostly require it at night. "Developers want to avoid having each function need its own parking space," explains Martindill. "The goal is to maximize daytime-nighttime sharing by 'rightsizing' the parking square footage."

Residential- and office-space needs varies, because tenants often want their own unique spaces, sometimes security protected. With more amenities in the building and more public transportation in urban areas, tenants also use their cars less, so they stay put. "Shared parking typically can reduce the total number of spaces by 5% to 15%," says a designer who goes by the name Tune at TimHaahs who addressed the issue on the firm's website FAQ. "In some cases, it may reduce the total parking needed by as much as 25%."

'The goal is to maximize daytime-nighttime sharing by 'rightsizing' the parking square footage.'

WELLNESS PLAZA
The 1,200-space Wellness Plaza parking garage in New Brunswick, N.J., features a Fresh Grocer grocery store on the first floor and the Robert Wood Johnson Fitness Center on the second floor. The precast concrete structure, designed by TimHaahs, features a corner tower with stairs and four elevators that connect to the adjacent train station's platform. Photo: Steve Wolfe.

RETAIL SPACE GROWING

Retail has become a more prominent part of mixed-use projects, including on the ground floor of parking structures to generate more revenue. But more ambitious programs are growing. "We're seeing more projects integrate larger grocery stores, such as Whole Foods and Trader Joe's," says Vander Wal. "Supermarkets are amenable to coming into larger projects with smaller-sized stores, and they're also entering urban locations with parking incorporated into their building."

"Any kind of grocery element aids a mixed-use property today," adds Martindill. "It's a popular addition as more people look to move into downtown areas and need more food options."

Segregating each function to meet building-code requirements creates challenges. "Most projects separate functions by level, with retail and entertainment on lower levels and residential and office space above to provide better views and more control of noise," says Vander Wal. "That way, people can just go downstairs to go to lunch or dinner."

Fire protection and waterproofing are key concerns, followed by noise and vibration control. "Developing a high-rise complex with parking necessitates an understanding of many code and zoning requirements, ranging from property setbacks and entrance locations to parking-space layouts and clearance requirements," wrote Thompson. "Fire separation between uses and code-compliant means of egress must be considered during design and construction."

Moisture penetration from cars arriving from inclement weather creates a significant issue. "When the parking is above retail or other functions, separating those areas becomes a critical concern," says Vander Wal. "We typically use a protective membrane and waterproofing system, then cover it with a floating slab so the cars don't wear out the membrane."

'When the parking is above retail or other functions, separating those areas becomes a critical concern.'

IDENTIFYING ENTRIES

Creating specialized entries also becomes more challenging as functions are added, with parking, retail, offices, and residences requiring distinct appearances. "Identifying each entry can be a challenge," says Vander Wal. "Office and residential entries can be off the beaten path, as those users are familiar with their entrances, but retail requires a prominent entry to direct first-time users."

That's especially true when visitors enter through the parking levels and need to find their destinations. "Entries for shopping or offices are typically placed on the corners where they can be a focal point," says Martindill. "But when the entry is through parking, it's important to have entry signage and ramping create a smooth entry and easy direction to elevators and stairs. The biggest challenge we face in mixed-use projects is ensuring the interiors function well and that ramping and circulation are easy to follow. Some are easier to do than others."

Parking aesthetics have risen significantly as owners come to realize this space provides the first and last impression that visitors encounter. "Parking is about more than just parking the car today," says Martindill. "It's the first destination and sets the tone. Parking is at the center of many mixed-use buildings and is the one shared-use element they have in common."

Photo: Steve Wolfe.

BAYLOR UNIVERSITY
The Dutton Avenue facility for Baylor University features 1195 parking spaces and 30,000 square feet of air-conditioned space for offices and restaurants, including the university's Information Technology Services offices, a Starbucks and Chili's. It features a total-precast concrete structural system to help mimic an existing early-twentieth-century campus building. Carl Walker served as architect, structural engineer, and parking consultant.
Photo: Carl Walker Inc.

Megan Leinart, a designer at TimHaahs, agrees. "The buildings we design impact not only the people who enter them, but also the passersby and the neighborhood or context around it," she wrote at the site's FAQ. "We often provide retail and other uses at grade to activate the streetscape and serve related and auxiliary needs to the parking structure itself. The complementary nature of this mixed-use is indicative in our complex society and changing needs."

That means parking levels must be as open as possible, with good sight lines, easy maneuverability, strong lighting, and easily understood wayfinding systems. "It's critical how we direct visitors after they get out of the car," Martindill says. "We have to help them get where they're going efficiently. Graphics, signage, clear views are super-critical."

Typically, designers use 60-foot bays for two-way traffic and 56-foot bays for one-way traffic. "We love open spaces," he says. "They offer visibility and security. We love long spans to work with the basic formatting of parking and create flexibility for layouts."

'We love open spaces. They offer visibility and security.'

Added clearance often is needed on the first level for retail services and for residences or offices higher up, Thompson wrote. "Generally, that results in the need for a speed ramp to access the parking above. Vertical connections between the lobby and residential units often require additional, and sometimes separate, elevators and stairs, resulting in a larger core that passes through the parking area, impacting layout and flow."

PRECAST CONCRETE MEETS CHALLENGES

Many of these challenges can be met with precast concrete designs. "We like precast concrete because it works well with any functions and offers flexibility to develop whatever needs are required," says Martindill. "We use it for any category where parking is needed: single-family, multifamily, office, university, etc."

The benefits cover many aspects. "It works well structurally and functionally and offers low maintenance, easy operation, and ways to incorporate the latest technology controls. We typically use it by default in urban settings because of the lessened impact on traffic and the lack of available space to work in."

The key, he notes, is precast's ability to provide flexibility to meet customized needs at an economical cost. "Designs have to be done affordably while meeting all the goals. We want to use the longest spans we can to create more efficiency whenever possible. We can do that most often with precast concrete."

Its aesthetic versatility not only allows any design style to be created but helps with cost and speed, Martindill adds. "Precast provides both structural and architectural elements in one piece. It looks great on the outside and works functionally on the inside. That's why it's so popular."

'Precast provides both structural and architectural elements in one piece.'

Its durability also provides benefits, in part because of the variety of functions blended into one building, wrote Thompson. "A significant investment in durability is required. The parking-structure design will require many state-of-the-art features, such as high-strength concrete, low water-cement ratios, corrosion inhibitors, and protected reinforcing steel. Attention to durability in material selection and structural detailing, combined with a good maintenance program, will reduce long-term maintenance costs and improve the long-term performance of the facility."

Precast can be erected quickly with efficient use of site space. "Even when parking is underground, a two- or three-level parking structure can be built with precast concrete," says Vander Wal. "We can situate the crane in the basement and still have enough daylight and room to maneuver to work up to grade level. It's a cost-competitive system even with the crane going into the excavation."

MIXING MATERIALS

Even when other functions feature different types of structural systems, designers are looking to precast concrete for the parking levels. "Precast concrete provides a strong base for the building that we can build on with other materials to create the spaces needed above for offices or retail," says Vander Wal. In most cases, the precast concrete levels are below while other framing systems rest on it.

"In some situations, we use a total-precast concrete structural system if the column sizes and utilities work efficiently," he says. "Its flexibility allows us to use it where it provides the most benefits."

Precast's aesthetic versatility means that architectural panels often are used to clad both parking and other portions. "Parking often looks functional and other needs want a more architectural appearance," says Martindill. "We're enormous fans of integrating architectural into the entire structure, including the parking, so it blends with the neighborhood, fits its purpose, and is a place that people want to visit."

Precast concrete's capabilities for providing a range of aesthetic options ensures all parts are complementary. "The days of gray boxes are over," Martindill says. "We are using precast concrete façades along with screening, vegetation, brick insets, and all kinds of techniques to dress up parking levels. Precast concrete can help us meet all of the needs and balance architectural desires with functional and economical needs."

Vander Wal agrees. "Precast concrete works especially well as projects become larger, owing to the economy of scale in being able to use repetitive components," he says. "We can pop up a frame and erect the skin very quickly in large pieces. Large mixed-use projects benefit from that scale and speed. We do many mid- and high-rise towers with precast concrete to provide long, clear spans from the core out."

Structural Considerations

Determining the best structural system for a mixed-use project involves many factors. The best system may differ for the parking and other functions, making the choice more complicated as designers factor in the benefits of having one supplier provide the entire structure.

Finding the best system "can require an analysis to determine what works best with the mixed-use facility," wrote Torrey Thompson of Carl Walker Parking in his firm's online FAQ.

Among the key ingredients for the selection are:

- Balancing initial costs with long-term economy.
- Coordinating the structural grid between parking and other functions.
- Matching durability needs to the owner's long-term plans.
- Integrating the structural system with security needs.
- Creating user comfort and function in an efficient way.
- Providing optimal floor-to-floor clearances.
- Detailing so that volume-change restraints are reduced.

"Ultimately, the structural-system selection will be based on owner preference, construction cost, and schedule, efficiency, durability, and maintenance requirements," he wrote. Early involvement by a local precaster can ensure all of these needs are met at an efficient and cost-effective level."

MIAMI DESIGN
This mixed-use parking project in the new Miami Design District features a combination of retail, office, and parking space. Designers at TimHaahs planned the total-precast concrete structure to connect between parking and other functions with vibrant façades, dramatic lighting, and ground-floor retail to engage pedestrians. Photo: Robin Hill.

Typically, designers can place shear walls at the core and columns at the perimeter to create open interiors. "Precast concrete provides nice, long spans," Vander Wal says. "The required functions vary with each project, and we use the best materials for each area, but quite often precast concrete can meet those needs."

RESILIENT DESIGN ENCOURAGED

'Structured parking is, by nature, sustainable, as it is a more efficient use of land.'

"Structured parking is, by nature, sustainable, as it is a more efficient use of land," argues Tim Haahs, principal at TimHaahs in his website's FAQ. "There are many opportunities to incorporate sustainable design, construction, and operations practices into the development of parking and mixed-use facilities."

Precast plants are typically close to the site and minimize construction waste by providing prefabricated components. Additional sustainable-design concepts include creating priority parking for low-emitting and fuel-efficient vehicles and recharging stations for electric vehicles. The use of energy-efficient electrical and mechanical systems also provides benefits.

Owners also are realizing the impact of providing regular maintenance to increase the building's life cycle, especially to the parking levels. "The good news is that owners are adjusting their expectations and putting more emphasis on maintenance," says Martindill. "The bad news is that it may have taken a bad experience to make them realize its importance. It's not something they often give as much attention to as they should. Today, they're more in tune with the need to set aside some budget to maintain the parking levels of the building."

As more projects incorporate parking as a key function and amenity, more owners and designers will turn to precast concrete to help them meet challenges. "Integrating parking with high-rise residential buildings can prove challenging," Thompson wrote. "Having an understanding of the many design issues and requirements makes for a successful project and a great selling point for the development."

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

HOUSE FOR ENERGY

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

HIGH CONCRETE GROUP LLC

An Affiliate of High Industries Inc.

HIGH CONCRETE GROUP LLC ■ CONCRETE INNOVATIONS AND ANSWERS® ■ CALL US AT 800-PRECAST ■ WWW.HIGHCONCRETE.COM

SHORT Learning Curve

Designers on a second mixed-use building in project value-engineer initial structural system to feature more precast concrete components, adding cost savings and aesthetics

— Craig A. Shutt

Zaragon West in Ann Arbor, Mich., was designed as the second of two buildings developers created to implement the city's goal of adding high-density housing, structured parking, and ground-level retail space under new zoning regulations. To achieve its goals as cost-efficiently and in as aesthetically pleasing of a manner as possible, designers value-engineered the first building's design to add load-bearing precast concrete walls to the planned hollow-core slab.

The U-shaped building, planned to serve as student housing for the nearby University of Michigan, followed the construction of Zaragon Place. Built on a smaller footprint, that facility was constructed with load-bearing masonry walls above the base to support hollow-core slab. "It took a long time to get the shell erected and to fully enclose the building," says Scott Bonney, project architect at Neumann/Smith Architecture. "Then we had to lay the brick and install the windows, which turned into a lengthy process."

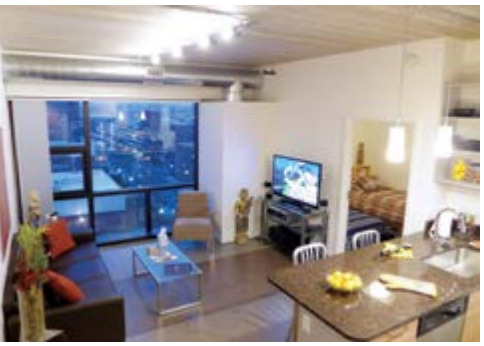
Before beginning the second project, the designers considered options that could overcome the plan's weaknesses and add efficiency.

Before beginning the second project, the designers considered options that could overcome the plan's weaknesses and add efficiency. "We had the bright idea that if we used precast concrete for the load-bearing walls in addition to the flooring, they could be built at the same time," he says. "The walls and floors could act as an erector set of pieces. In that form, they went up extremely quickly, probably twice as fast the original masonry did."

Student housing usually requires a schedule that ensures opening before the new school year begins. In this case, the developers had planned the schedule so the building could open in mid-year if possible, ahead of the drop-dead date. The construction team met that earlier schedule, providing plenty of time to get it ready for the new school year. "The developer was willing to open ahead of schedule if that could be achieved, and that's what we did," Bonney says.

The two buildings were planned to offer "an alternative lifestyle for residents seeking dramatic and flexible living spaces in a state-of-the-art building," explains Bonney. "Safety, security, a central location, and high-tech amenities are a few features that establish Zaragon West as a premier address."

TIMELESS APPEARANCE
Precast concrete helped the building project a timeless appearance that offered high durability. Photo: www.jmaconochie.com.



STUDENT HOUSING
The precast concrete walls aid both noise suppression and durability in the residences, which were designed to be student housing for the nearby university. Photo: NeumannSmith.

The 14-story building features 80 loft apartments on levels 4 to 14, entered from a ground-floor lobby. Retail space is located on the first floor, including a fitness center and pizzeria with seasonal outdoor dining space. "It adds to the vibrant street frontage along this important urban intersection," Bonney explains. Two levels of parking for 40 cars are available on floors 2 and 3.

DURABLE AND TIMELESS

The design concept for the two Zaragon buildings was to use "highly durable and timeless building materials," Bonney notes. Designers wanted to complement the historic State Street

ZARAGON WEST

LOCATION
Ann Arbor, Mich.

PROJECT TYPE
Mixed use (parking, retail, residential)

SIZE
133,862 square feet

COST
$25 million

DESIGNER
Neumann/Smith Architecture, Southfield, Mich.

OWNER
Zaragon, Chicago, Ill.

STRUCTURAL ENGINEER
Desai/Nasr Consulting Engineers, West Bloomfield, Mich.

CONTRACTOR
O'Neal Construction, Ann Arbor, Mich.

PCI-CERTIFIED PRECASTER
Kerkstra Precast Inc., Grandville, Mich.

PCI-CERTIFIED ERECTOR
Assemblers Precast & Steel Service Inc., Saline, Mich.

PRECAST COMPONENTS
10-inch hollow-core slabs, 8-inch solid panels, 10- and 12-inch solid slabs, rectangular beams, specially sized beams, and stairs.

neighborhood and create an iconic appearance. The exterior shell features cast-in-place concrete on the lower three levels of retail and parking with load-bearing precast concrete walls and floors above.

Portions of the top stories feature a dramatic two-story glass curtain wall, allowing larger living rooms and bedroom windows on six special two-bedroom units. The building is capped with a cantilevered anodized aluminum sun-shade system, providing a modern "crown."

"The architectural style combines traditional urban high-rise residential typology, with classic forms of a base of cast-in-place concrete, a central area of brick-faced precast concrete, and a top part with glass," Bonney explains. The brick facing was laid up onto the precast concrete walls once they were erected. To meet zoning requirements, the building steps back 5 feet at the fourth-story street frontages, where the precast panels begin, defining a three-story-high streetscape.

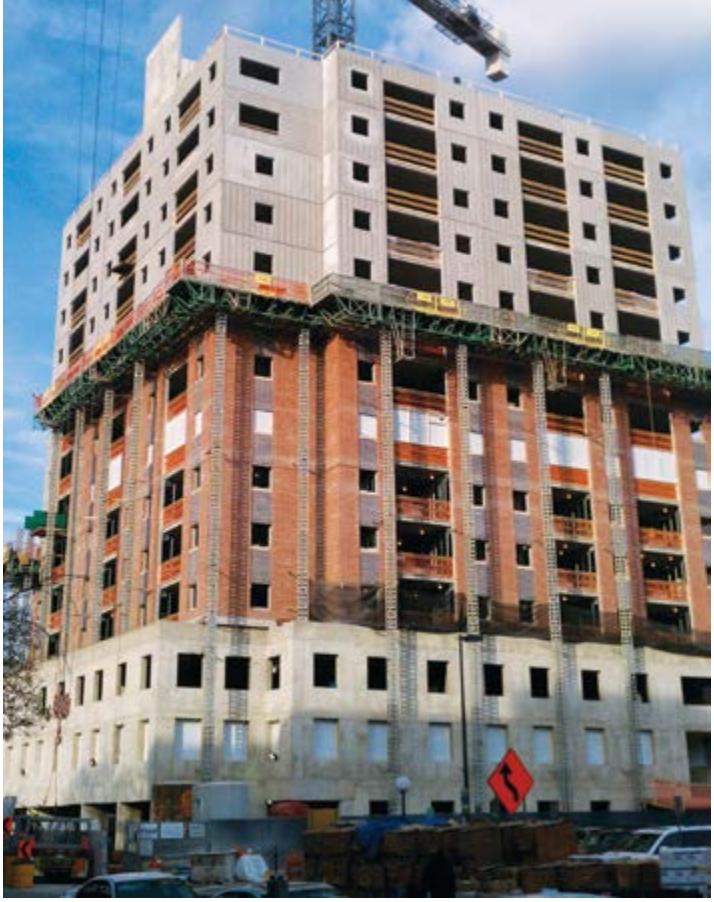
Developers wanted to ensure high levels of sound attenuation and durability for the residential units. Precast concrete panels were used throughout the project, in some cases as demising walls but also as structural supports between units.

"As student housing, the residences require quiet for those studying, and they also needed to be durable, as they can get beat up easily," Bonney explains. "Precast concrete helped achieve both of those goals." The layouts alternate bedrooms against living rooms, helping to reduce noise from competing spaces between units, he notes. In some cases, those walls are load bearing to provide additional interior support, although most are demising walls.

PANELS REDUCE MAINTENANCE

The precast walls also will reduce long-term maintenance needs, a goal the owner requested. "Zaragon Place features painted masonry walls on the interior side, and that's going to cost significantly more over time to maintain," he says. For Zaragon West, the panels were cast with a smooth, highly finished side to lay up the brick against, while the interior side features a finish nearly as smooth that could be painted easily. "It created an extremely flat surface that provides a nice aesthetic touch."

The panels were cast with brick tie-channels for the dovetail anchors to secure the hand-laid brick into the panels quickly and easily. A layer of insulation was applied between the panels and bricks to increase energy efficiency. "It was extremely easy to tie the brick veneer and the insulation to the precast concrete because we planned the panels so brick could be attached after the fact."



BRICK FACING
The façade's brick facing was laid up onto the precast concrete walls once the load-bearing panels were erected. Photo: www.jmaconochie.com.

'It was extremely easy to tie the brick veneer and the insulation to the precast concrete.'

The key challenge for the precast concrete walls came in coordinating the load path from the panels down through the cast-in-place podium base, explains Steve Haskill, estimator and project engineer with Kerkstra Precast Inc. "We had to work closely with the cast-in-place concrete supplier to coordinate the accuracy of placing the precast panels on the base, as those load paths were critical. Our early communication with them allowed it to move smoothly once the panels began to be erected."

A transfer structure was created between the two layers to ensure the loads from the precast panels followed the proper paths to the ground. Segregating the retail spaces from the parking didn't present an issue due to the small amount of retail. "We needed a fire-separation wall between the parking and the housing levels, but the concrete base and hollow-core slabs provided that inherently," Bonney says.

SECOND TIME WORKS
The shell was erected quickly thanks to replacing the masonry-wall design from an earlier similar building with load-bearing precast concrete panels. Photo: Kerkstra Precast.

The panels were cast with haunches that provided a wide, secure support for the hollow-core plank. "The haunches provided a nice additional benefit to using precast panels," says Bonney. "They gave us 12 inches of bearing plate to rest on, which reduced the precision needed to set the slabs. We could create efficient layouts with few added connections." The framing produced 9'8" ceilings for each unit.

Conduit running into each unit was connected to the hollow-core and left exposed. The bottoms of the slabs were left exposed in their natural gray color. "I wanted to express concrete's rugged and honest aesthetic," he says. "With the smooth concrete finish available, I didn't want to hide it behind drywall. I wanted to celebrate the material's engineering, and this was an ideal application of that concept."

'The haunches provided a nice additional benefit.'

The 4-foot-wide plank module was reflected in the 4-foot pattern of two colors of recycled rubber flooring used with a topping on the flooring side. "There was no reason to hide such a handsome material."

The long, 10-inch-deep hollow-core slabs allowed layouts to feature bedrooms flanking a large great room. "That helps to accommodate flexible lifestyles and add more leasing options while eliminating long corridors within units," Bonney explains.

Sunscreens were attached to the window-wall system to provide sun protection for the glass curtain wall at the top, providing projections that added dimension at the building's top.

COMBINING FUNCTIONS

Delivery of components was hampered by the zero-lot line, which provided no opportunity to stage materials at the site. Just-in-time delivery was used, with some traffic lanes closed for short periods on occasion. "We staged the precast off-site, had it delivered to the site, and picked it for immediate erection," says Bonney. "It was quite the choreographic process to see it happen."

Trucks were scheduled to arrive as needed, one after another, adds Haskill. "We had two or three on the road at once from the staging site, arriving and having the pieces picked and then returning, with the next truck moving up into place." The precaster's plant was a 2-hour drive away, so coordinating all the way back to the plant posed no challenges.

The panels were erected at a speed of approximately one floor per week, with all 11 floors finished in 12 weeks. "It went significantly faster than the first project had gone up," says Bonney. "That ensured we could put the roof on quickly and then set loose the trades to do plumbing, wiring, and finishes."

The first building's masonry and brick approach provided a more finished façade as the materials went up the floors, he notes, but that wasn't critical. "It took forever to get to the top. This time, getting the precast walls in place was important because we could cap the building and make it watertight. Then we could take our time to finish the brick-wall system while trades were working inside. Once we got the brick out of the critical path, we didn't have to worry about weather conditions or how soon we could get inside."

The second and third levels were clad with cast-stone veneer to shield views into the parking levels. Punched rectangular openings in the façade allow the deck to be naturally ventilated without exhaust fans.

Being watertight was a significant benefit, he adds. "For the first project, we had to deal with a lot of rain, drying out the interiors and channeling the water so it wouldn't leak into elevator and duct shafts. Getting the walls up quickly on the second project all the way to the roof minimized any water infiltration that can be hard to clean up."

The construction was timed so the precast concrete could be erected in mild weather, he notes. "By the time harsher weather hit, most of the work was being done inside." A tower crane was used to erect the panels and hollow-core. "Knowing that going into the design, we could plan on that format to maximize panel sizes to fit the crane's capacity," notes Haskill.

"Especially for such a narrow site, with little room to work, the precast walls and floors went up incredibly quickly," Bonney says. "An additional benefit was that, since both products were provided by the same supplier, there was smooth communication between the two elements to ensure they fit together well. Combining those activities provided a huge savings and eliminated any finger-pointing by trades that blame the other when interfaces don't work and schedules slow down."

Value-engineering the system resulted in an efficient design that met all the goals on time and budget. "This project went so much faster than the previous one," says Greg Kerkstra, president of Kerkstra Precast, which provided the hollow-core for that building too. "The learning curve from that project was applied very well to this one."

Adds Bonney, "We recommend this system to many of our clients. It saves so much time, which can really make a significant difference in cost and time savings, as well as long-term maintenance."

'By the time harsher weather hit, most of the work was being done inside.'

ACTIVE RETAIL
First-floor retail space adds activity along the street frontage at a key urban intersection. Photo: www.jmaconochie.com.


BRAMAN
BRAMAN
Rolls-Royce Motor Cars

auto SHOWCASE

A creative precast concrete design was used to construct a new car showroom and car-storage facility for luxury vehicles

— Craig A. Shutt

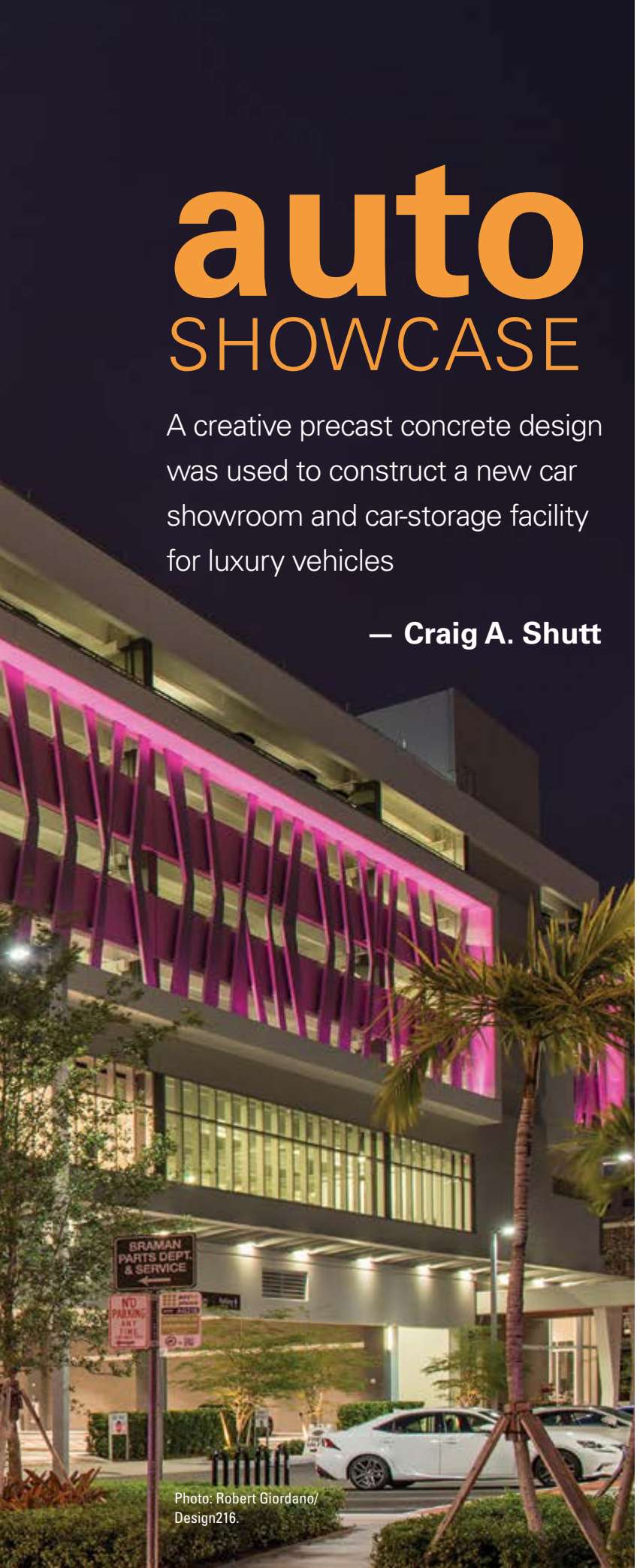


Photo: Robert Giordano/ Design216.

TIGHT FOOTPRINT
Although most of the erection was accomplished with the crane positioned within the footprint, for the last 3 weeks, the crane was positioned in the access road to install the final pieces. Photo: Aerial Photography Inc.

The Braman Auto complex in downtown Miami, Fla., encompasses 9 acres of contiguous space that includes a variety of luxury-car manufacturers, including Rolls Royce, Bentley, Bugatti, BMW, and Cadillac. It also has dealerships on the campus for Mini, Hyundai, and Kia. The company is said to rank in the top tier in sales for many of its brands worldwide, and its dealerships receive high marks for its service and quality. The campus is so extensive that it boasts its own Shell gas station.

To establish a greater presence and set the tone for this interconnected campus, Braman officials wanted to create a 90,000-square-foot luxury showroom with high-end customer amenities and topped by 1600 spaces for car storage and executive suites. The firm retained KVC Constructors Inc. as its construction manager and architect Wolfberg Alvarez & Partners to create a design that could encompass showroom, parking, and offices.

OPERATING THROUGH CONSTRUCTION

A key challenge was that the site houses all of the Braman operation, including sales operations, customer parking, and corporate headquarters. As such, it had to remain operational during construction despite the new construction encompassing about two-thirds of the entire site. The design also had to complement the surrounding neighborhood, which included the historic Bacardi buildings adjacent to the north.

To satisfy these diverse and challenging goals, Wolfberg Alvarez developed a concept for the seven-story, 500,000-square-foot building which features a precast concrete structural system as well as precast spandrel panels with metal ornamental elements that were randomly configured to contrast with the concrete façade. The ornaments are attached within a "picture frame" of precast concrete framing on the upper parking levels, creating a sense of design sophistication while providing required visual screening for the cars.

PANEL DISGUISES
The decorative panels attached inside a precast concrete framing device help disguise the parking levels, an element required by a recent code addition. Photo: Robert Giordano/Design216.

The screening was necessary due to the city's recently adopted Miami 21 Zoning Code, which dictated that parking structures conceal their function from the street in the downtown area, explains Vick Crespin, vice president and co-owner at KVC. "We needed to create a liner that wrapped around the outside of the building to disguise the parking levels without seeming out of place."

The picture-frame design wraps the upper three levels of the building, with the cornice along the top of the building that hides roof-top parking. Wide precast columns at key locations break through the framing, with precast columns at the corners serving as supports. The framing features a gray finish, which contrasts with the white cornice and darker gray horizontal framing pieces and columns at the base. The gradient coloring provides visual enhancement as the building rises.

BRAMAN AUTO SHOWROOM

LOCATION
Miami, Fla.

PROJECT TYPE
Auto showroom and parking structure

SIZE
492,220 square feet (including 90,000-square-foot showroom)

COST
$35.5 million

DESIGNER
Wolfberg Alvarez & Partners, Miami, Fla.

OWNER
Braman Motors, Miami, Fla.

STRUCTURAL ENGINEER
Hershell Gill Consulting Engineers, Coral Gables, Fla.

CONSTRUCTION MANAGER
KVC Constructors Inc., Miami Shores, Fla.

PCI-CERTIFIED PRECASTER
Coreslab Structures (MIAMI) Inc., Miami, Fla.

PCI-CERTIFIED ERECTOR
Coreslab Structures (MIAMI) Inc., Miami, Fla.

PRECAST COMPONENTS
1567 pieces, comprising columns, beams, double tees, spandrels, wall panels, and trellis components

PRECAST STRUCTURAL SYSTEM

The structural system consists of precast concrete columns, beams, double tees, spandrels, wall panels, and trellis components. The tees were field-topped to provide more cohesive interaction for the car loads on each floor, Crespin explains. "We didn't want the tees to flex due to the length we were using and the loading they supported. The structural system provides a more substantial feel for customers."

Creating the design for the tees and connections for the first-floor showroom roof took more consideration, he added. Designers had to create a high-performance waterproofing system to ensure no moisture penetration into the showrooms below. "With the heavier topping and waterproofing, we used a deeper tee on that level to provide the support."

Both the second and third floors also received the high-performance waterproofing, which consisted of the field topping followed by the waterproof membrane, topped with approximately 5 inches of topping that resulted in a flat surface that offset any camber.

After the membrane was installed, each portion was dammed off and filled with water.

The effectiveness of the waterproofing system was critical, resulting in it being actively tested. After the membrane was installed, each portion was dammed off and filled with water. After 48 hours, it was checked for any leakage or weak spots, then it was drained and the topping was

applied. This was done for each area of the floor. "It limited access around ramps during the test, which required more coordination," he says. "But we had to ensure the waterproofing was perfect."

A dedicated speed ramp connects the auto parking area and storage to the ground floor to ensure no disruption to the showroom space. Customer parking likewise is segregated from the storage facility and was created in a horseshoe-shaped configuration, with elaborate detailing and finishes.

HIGH-QUALITY AESTHETICS

The aesthetic design of the façade, including the framing structure, posed its own challenges. "The key challenge was keeping the quality of the façade consistent and ensuring that it projected the state-of-the-art vehicles it represented over the life of the building," Crespin said. It also had to blend into the neighborhood's look. The design team considered a steel frame, as well as plywood and stucco finishes, he notes. "Ultimately, we decided the precast concrete design provided a more attractive and efficient appearance."

Operating costs also were a consideration, he adds. "This building will be used for the next 50 years, and the owners wanted to minimize long-term maintenance costs as much as possible. Precast concrete provides that with its large piece sizes and its durable consistency."

'The owners wanted to minimize long-term maintenance costs as much as possible.'

"The aesthetic goal for the precast was to help reduce the visual mass of what is a relatively large building and to provide a high-quality, dominating presence," says Allen Witt, sales manager for Coreslab Structures (MIAMI) Inc., which fabricated and erected the precast concrete components.

STRATEGIC ERECTION
Two cranes were used at some strategic times to speed erection through key points as space on the site became constrained near completion. Photo: Robert Giordano/Design216.

The picture framing helps visually separate the upper parking levels from the showroom space without drawing attention to its function, allowing the showroom portion to have its own architectural identity. "The configuration of these elements was incorporated into other parts of the campus," Witt notes. These included column supports for a porte-cochere, which unites the building elements and provides cohesion to other buildings on the site.

The design for the parking levels allows the spandrels to act as collision rails while providing low-maintenance finishes. "The design is pretty impressive for the number of functions that could be incorporated, including providing a distinct architectural appearance," says Crespin.

The key part of the disguise consists of aluminum-finished, boomerang-shaped vertical panels angled in either direction that attach to the top and bottom of the precast concrete frame. The panels are highly visible from all vantage points both day and night thanks to illumination from programmable LED fixtures. They change the lighting's intensity and color as desired. Colors often are used in concert with special events, such as Breast Cancer Awareness Month, Independence Day, and to celebrate local sports teams.

COLORFUL DISPLAY
The building's metal panels can be illuminated with programmable LED fixtures that can change the lighting's intensity and color as desired. Photo: Robert Giordano/Design216.

Erection of the structure encountered no issues, progressing from east to west along the site. "The work moved very quickly," Crespin says. Although the site was large, it was active throughout construction, so components were stored at the nearby plant and delivered on a just-in-time basis.

Two cranes were used at strategic times to speed erection through key points as space on the site became constrained near completion, he adds. Although most of the erection was accomplished with the crane positioned within the footprint, for the last 3 weeks, the crane was positioned in the access road to install the final pieces.

FLEXIBLE SPACES
The long double tees used in the building provided open spans that aided layout flexibility on the car levels. Photo: Robert Giordano/ Design216.

DETAILED INTERIORS

Once the frame was in place, interior work could begin. A key element of that was a monumental steel staircase with a stainless-steel and glass finish, which serves as a focal point. "We had to frame the opening for the staircase in the precast concrete floor and ensure it matched up precisely," Crespin says. "It's a very cool element that gives the interior a unique appearance. It's an impressive construction."

The showroom floor is finished with an intricate pattern in porcelain tile that relates to the full-height tiled walls. To accentuate the main entrance to the customer lounge, the ceiling has a series of changes in elevation that draw the visitor to the entrance, which is further enhanced by an entry portico with the Braman brand name in stainless-steel letters. Excess cool air from the showroom is discharged into the arrival area to provide better ambience.

The site offered an elevation difference of approximately 3 feet, dropping off to the west. This posed a challenge due to the city's requirement that access be provided to retail space (in this case, the showroom) every 75 feet. It also required significant landscaping requirements to enhance the pedestrian experience.

To resolve these issues, the designers introduced an elevated pedestrian walkway to transition between the sidewalk changes in elevation and the consistent elevation of the showroom. Strategically positioned stairs and ramps satisfied ADA requirements, with planter boxes integrated throughout the design to provide a cohesive look.

"The raised showroom floor resulted in a vantage point from the street that gives the appearance that the automobiles are on a display platform," Witt notes.

The showroom and parking design received unanimous support from the city's planning and zoning board and the endorsement of the National YoungArts Foundation. The group, which works with art students in the city, has contributed large fabric murals that were integrated into the precast concrete framing between the showroom level and upper parking levels. The murals will be rotated as new student designs are created, helping connect the building to the local arts community.

ADDED RIGIDITY
The double tees were field-topped to provide more rigidity for the car loads on each floor. Photo: Robert Giordano/Design216.

The showroom has been visited by executives from many luxury-automobile manufacturers, and it plays host to a number of major automobile unveilings for car makers. It's also scheduled to be the venue for numerous upcoming events both auto and non-auto related.

The owner was pleased with the design, saying the facility "exemplifies efficiency in storage as well as energy consumption. It is designed to enhance the vehicle-user experience as well as be an asset to the surrounding community."

Witt agrees that the design shows off the beauty and functionality of precast concrete to the best advantage. "The showroom responds to the neighborhood buildings and provides the contemporary image the owner was looking for." Industry peers agree. The project received the 2015 Florida Parking Association Award of Merit for Architecture and the Award of Excellence for Structure.

Building A Concrete Future™

dependability | design/build | innovation | people | performance

products | relationships

M. D. Anderson Cancer Research Center
Houston, Texas

CORESLAB® STRUCTURES

Visit us online at
www.coreslab.com

ARIZONA
Phoenix 602.237.3875

ARKANSAS
Conway 501.329.3763

CALIFORNIA
Los Angeles 951.943.9119

CONNECTICUT
Thomaston 860.283.8281

FLORIDA
Miami 305.823.8950
Orlando 407.855.3191
Tampa 813.626.1141

GEORGIA
Atlanta 770.471.1150

INDIANA
Indianapolis 317.353.2118

KANSAS
Kansas City 913.287.5725

MISSOURI
Marshall 660.886.3306

NEBRASKA
Omaha 402.291.0733

NEW MEXICO
Albuquerque 505.247.3725

OKLAHOMA
Oklahoma City 405.632.4944
Oklahoma City 405.672.2325
Tulsa 918.438.0230

TEXAS
Austin 512.250.0755

ONTARIO, CANADA
Dundas 905.689.3993
Stoney Creek 905.643.0220

40 Building A Concrete Future® Since 1975 CORESLAB®

PRECAST'S FLEXIBILITY BOOSTS

MEDICAL Office Building

Total precast concrete structural system allows designers to efficiently combine offices, medical facilities, and parking on a tight site

— Craig A. Shutt

Photo: Blakeslee Prestress.

STAMFORD INTEGRATED CARE PAVILION/MEDICAL OFFICE BUILDING

LOCATION
Stamford, Conn.

PROJECT TYPE
Mixed use (office, medical center, parking)

SIZE
247,046 square feet

DESIGNER
WHR Architects Inc., Houston, Tex.

OWNER
Stamford Physicians LLC, Stamford, Conn.

STRUCTURAL ENGINEER
Walter P. Moore, Houston, Tex.

CONSTRUCTION MANAGER
Suffolk Construction Co., Boston, Mass.

PCI-CERTIFIED PRECASTER
Blakeslee Prestress Inc., Branford, Conn.

PCI-CERTIFIED ERECTOR
Blakeslee Prestress, Branford, Conn.

PRECAST COMPONENTS
Double tees, girders, columns, shear walls, spandrels, stairs, slabs, wall panels

Planners working on the design for a new physicians' center in Stamford, Conn., needed to provide a number of services, including parking, on a tight footprint. To achieve all the programming for space, economy, and scheduling, designers created an integrated plan that took full advantage of a precast concrete structural framing system. The project features five levels of parking with three levels of medical offices above them.

"The significant advantage that precast concrete provided was that it offered a consistent and uniform structure and appearance throughout the medical and parking levels," says Robert Koenig, senior project manager at Suffolk Construction, the construction manager on the project.

'The significant advantage that precast concrete provided was that it offered a consistent and uniform structure and appearance.'

The new Stamford Integrated Care Pavilion/Medical Office Building is located adjacent to the Stamford Hospital and will provide ambulatory and specialty-care services that create a coordinated health service, officials say. The facility contains 247,046 square feet of offices and parking on a 120- x 300-square-foot footprint. "The hospital campus space was very tight. Rather than create a low-rise medical building with separate parking alongside, we decided to build both facilities in the same system."

Such a design is being considered more often as owners look to provide their own parking within their buildings but must do so on small footprints, especially in downtown areas. Being able to use the same structural material for several levels of parking and continue into the remaining building functions offers significant benefits. Precast concrete aids that plan in additional ways, by offering long-span capability and the ability to create any signature look desired.

The design-assist format aided the fast erection, which took less than 4 months to complete in early 2016.

DESIGN-ASSIST FORMAT USED

Blakeslee Prestress was brought in on a design-assist basis, with the precaster's engineers providing input during the design phase to plan the most efficient sizes and panelization options. The company fabricated 912 components for the project, comprising double tees, girders, columns, shear walls, spandrels, stairs, slabs, and wall panels.

"We looked at cast-in-place concrete and steel, as well as hybrid systems," before deciding on the precast concrete system, Koenig says. "None of them provided the benefits of the precast concrete system. It offered the most effective system and could be erected quickly to keep us on schedule."

The design features embedded thin brick in the panels at the office levels along with curtain wall at the entrance to create a distinctive welcoming design. Parking levels feature tall spandrels that reflect the design of the ribbon windows used on the office levels above. "The look is differentiated between the functions, but it has a similar language and is complementary," Koenig explains.

The structure features a long-span prestressed concrete double-tee framing system, offering 60-foot clear spans with minimal floor construction depth. A topping was used on the floors of the office levels to provide fire separation from the parking levels, and they were outfitted with interior corridor walls and an elevator core.

"Long-span construction along with inherent durability and fire resistance are key common advantages for both parking and office uses," notes Chris Zarba, director of sales and project development at Blakeslee.

Erection moved quickly on the congested site, with the contractor coordinating with local traffic officials and police to smooth access for the delivery of the precast concrete components. "There were a high number of trailers carrying precast elements coming through, but everything moved quickly and efficiently," Koenig says. Each piece was delivered in the proper sequence required, picked from the back of the truck, and set, with no staging area required.

COMPLEMENTARY SPANDRELS
Parking levels feature tall spandrels that reflect the design of the ribbon windows used on the office levels above. Photo: Blakeslee Prestress.

The erection took less than 4 months to complete in early 2016. Blakeslee provided all aspects of the precast concrete design, manufacturing, and field operations, creating a single point of contact to keep the process efficient.

Blakeslee worked with the owner's design team to develop a unique lateral-bracing system that addressed the functional and operational needs for the two occupancy uses. On the parking levels, the lateral design utilized precast litewalls, which are shear walls cast with openings in them to aid visual continuity and allow daylight to enter further into the space. Used in key locations on each level, they integrated with the sloping, ramped, floors needed for vehicular circulation.

The litewalls would have been a hindrance in the office space, so Blakeslee suggested a precast moment-frame system for these upper levels to provide large open floor plates with minimal columns and no shear walls.

On the office levels, the insulated, loadbearing spandrel exterior panels provided multiple cost efficiencies. The components combined all of the elements of a conventional 'built-up' exterior system, with separate structure, insulation and exterior finish components.

"That resulted in a huge reduction and compression overall of the project schedule," says Zarba.

'The precast system provides an excellent choice for many projects.'

The precast concrete structural solution achieves the objectives of lowest cost and fast schedule, which can be attributed to making use of its inherent 'off-site construction' techniques, he notes.

"When coupled with the advantages of integrated mixed-use occupancies not readily attainable by other construction methods, the precast system provides an excellent choice for many projects."

Koenig agrees the design offers benefits that other projects can use. "There aren't a lot of these types of projects done these days, in which the parking and office space are combined," he says. "But it's a system that works very well, and I expect it will catch on."

Looking to the Future

AT UNIVERSITY OF TEXAS AT ARLINGTON'S PRECAST PROGRAM

— **Marty McIntyre**
PCI Foundation

Students at the University of Texas at Arlington (UTA), working with associate professor Bradley Bell, have taken advantage of opportunities to work with local precasters in order to use their time to advance precast concrete material technology and material innovation. The innovation begins with a trip to Gate Precast's plant in Hillsboro, Tex., where students see today's state-of-the-art fabrication methods. From there, they use new technologies and digital fabrication methods to research new materials and methods that might in years to come change the way precast is fabricated.

Performative Precast is a 3-year program of integrated design and seminar courses for upper- and graduate-level students now in its last year. The design studio course is taught in the fall and the seminar course takes place in spring. These courses concentrate on a specific area of precast application (façade, structure, and infrastructure) and together provide a unique opportunity to conduct in-depth design and research into digitally fabricated precast concrete components.

Manifold Concrete Systems is a graduate design studio course focusing on the implementation of applied research methods as a means to explore new developments in performative architectural components. Specifically, these components, regardless of scale and functional application, synthesize the interaction of the material properties, geometry and contextual forces. Furthermore, these components leverage the use of precast concrete means and methods to conduct research.

Students undertake a demanding semester-long project following specific research methodology that will result in quantifiable results for the purpose of application and future development. The course makes use of strategic industry partnerships to construct and test prototype components to understand limits, viability, detailing, and assembly. Industry partners have committed to assist in the production, research, and interactive learning environment created through working with an approach of simulation. The students use CAD/CAM techniques to explore the research projects and seek out innovative solutions via these methodologies.

Like all PCI Foundation programs, the UTA program takes place over several years. Each program sponsored by the PCI Foundation is different depending on the curriculum needs of the university and the expertise of the professor. At UTA, the focus is on research and digital fabrication, which works well with its partner organization, Gate Precast.

"The students go on a plant tour each semester to see the workings of the plant and understand how the plant produces large scale architectural precast panels," says Bell. "Conrad Filo, Gate Precast quality control manager, has been a great asset. He discusses what is happening on the outer edge of precast and helps students understand not just the basics of the parameters of designing with precast, but also how to leverage the decision-making process to expand options. When the students start to work in an office after they graduate, how do they make an argument for what would make sense with precast? How do they expand the paradigm?"

Visiting the precast production facility allows the students to move

from the designing and drawing to seeing the full impact of what they draw. By spending time in the plant, the students understand the material from a solution side as well as from an architectural side. Additionally, students have had the opportunity to work with concrete insulation supplier Thermomass to explore possibilities for new insulated concrete products.

"Having the students in the plant has been a very good experience. It amazes me that there are people who have been in the construction industry for 10 or 15 years and have never seen a precast plant. Through this partnership, we are able to give students this experience before they enter the working world," says Michael Trosset, southwest regional sales and marketing manager at Gate Precast Company.

"The plant tour is an eye-opening experience about what precasters do and how they do it," says Trosset. "When the students go back to the classroom, it helps them make a lot more sense of the testing and designing they take on.

"We are very intentional in terms of how we ramp up," says Bell. "One of the things that has been beneficial is the part of the learning curve that brings out important questions as we start to create bigger and bigger things. We discuss how we move them around, and what we do with them after we've made them. Those become important questions.

"The dean seems to come through every semester and ask me 'why is it you are working with this really, really heavy stuff?' The students have a certain type of tactile relationship with it that is so immediate and relatable that it has been pretty remarkable."

In addition to working with industry partners, Bell has formed a good relationship with the civil engineering department at UTA. Of great interest to both departments is the use of high-performance, high-strength concrete. "It has opened up a new way of doing partnerships within our school," says Bell.

Filo has traveled to the university to help with classroom experiences specifically working with ultra-high-strength concrete and insulated products. The ultra-high-performance concrete was developed in house. Strength-wise it is comparable to ductal, but it is a slightly different material in terms of its process and the way heat actually comes from the process. The architecture/engineering conversations around high-strength, high-performance materials, along with some other grants, led research to look at some architectural applications. As that presented itself, Bell saw forging a relationship over time would help the research sharpen the set of questions they asked and how they were using engineering.

The program continues to look at different ways that mold making and production can change the way architects think about precast concrete. One exciting prospect is a reconfigurable form. The reconfigurable mold is probably the most sophisticated in terms of what it could do although it is still rather speculative. The size of the form is one of the stalling points. "We are seeing our limits as far as how much we can scale up. The range is 18 inch by 18 inch currently," says Bell. "What now may be possible is to look back at ultra-high-performance concrete which would eliminate reinforcing and open up other opportunities for our research."

Students working on semi-rigid form work to allow more 3D shapes and new design applications.

Dean Gwin, president, COO of Gate Precast and chairman of the PCI Foundation, is excited to watch the research at UTA that has uncovered real world applications for forming techniques that could materially move the fabrication of precast concrete forward. "Imagine if a BIM model and ticket could feed mold information to a system, where at the push of a button, you could change the shape of the mold, incorporate waves, bullnoses, or whatever is envisioned," says Gwin. "You cast the precast piece, the form flattens, and you build the next piece, as opposed to five mold builders constructing a fiberglass form over the course of 3 weeks."

"The research the university and Gate has conducted with fiber-reinforced, high-strength concrete will allow the design community and the precast concrete industry to design and build more projects with thin architectural precast cladding which is a game-changer development," Gwin adds.

The experience between the school and the plant is not just a one-way street. Trosset notes having a relationship with the school has allowed Gate to use the school to test new products such as lifting devices.

The 3-year funding of the precast studio allows the program to be an incubator for future precast concrete education at the university. Once the PCI Foundation funding is completed, the partnerships usually stay in place. "I'd like to still be involved after the program is officially finished, says Bell. "Anytime we have a chance to influence architects early on is exciting. I like knowing that a big architecture school is getting this kind of precast experience. For us, it is priceless."

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 International Code Council (ICC). 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

March 28 and March 30, 2017, "Total Precast Structures-Mid-rise Multifamily-Case Studies"

> 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.

Quality Control Schools

Level I/II

LAS VEGAS, NV

Monday, January 16-Thursday, January 19, 2017

Level I/II

MISSISSAUGA, ONTARIO, CANADA

Tuesday, February 14-Wednesday, February 15, 2017

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

> 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.

BRINGING EDUCATION RIGHT TO YOU
PCI conducts lunch and learn presentations and seminars on an on-going basis.

Photo: Scott Shigley.

PRECAST/PRESTRESSED CONCRETE

Design Resources

PCI develops, maintains, and disseminates the Body of Knowledge for designing, fabricating, and constructing precast concrete structures and systems. It is from this Body of Knowledge that buildings codes, design guides, education, and certification programs are derived. Please visit www.pci.org for all of these design resources and more.

Architectural Precast Concrete Color and Texture Selection Guide, 2nd Edition - (CTG-10)

The "Architectural Precast Concrete—Color and Texture Selection Guide" has been reprinted with 12 new color and texture pages, plus identification pages with mix designs. This includes nine new color pages with two new colors per page, two pages of new formliners, and one page of new clay brick-faced precast. The numbers in the guide have not been changed, so that there is no confusion with the old and the new versions. A visual guide to assist architects in the initial selection of color and texture for architectural precast concrete. The guide is an extension of the information included in the architect-oriented Architectural Precast Concrete Manual (MNL-122), illustrating more than 500 colors and textures for enhancing the aesthetic quality of precast concrete panels. Cements, pigments, coarse and fine aggregates, and texture or surface finish with various depths of exposure were considered in creating the 287 6.75- by 11-inch color plates, the majority of which display two finishes on the same sample. The materials used to produce the samples are identified in the back of the guide for handy reference. Three-ring binder with removable inserts.

Architectural Precast Concrete, 3rd Edition - (MNL-122)

This fully revised edition includes new sections on sustainability, condensation control, and blast resistance. You'll get extensive updates in the areas of color, texture, finishes, weather, tolerances, connections, and windows, along with detailed specifications to meet today's construction needs. Includes full-color photographs and a bonus DVD.

Designers' Notebooks-Free

The PCI Designer's Notebooks provide detailed, in-depth information on precast concrete relevant to specific design topics, such as acoustics, mold and sustainability.

Precast Prestressed Concrete Parking Structure Recommended Practice for Design & Construction, 3rd Edition - (MNL-129-15 e-pub)

Decades of research have proven that precast, prestressed concrete is a cost effective, durable solution for parking structures. Over 140 pages of the latest concepts in design and construction including 16 pages of full color photography, and many details and design examples. The most comprehensive publication of its kind.

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

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.

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 nonload-bearing wall panels, spandrels, beams, mullions, columns, column covers, and miscellaneous shapes. This category includes Category AT.

> GROUP B – BRIDGES

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.

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 A1, C4, C4A
Monroeville, (251) 575-2803

Forterra Building Products, (Pelham Prestress) B4, C4
Pelham, (205) 663-4681

> ARIZONA

Coreslab Structures, (ARIZ) Inc. A1, B4, C4, C4A
Phoenix, (602) 237-3875

Green Fuel Technologies LLC dba Royden Precast B4
Phoenix, (602) 484-0028

Stinger Bridge & Iron B4
Coolidge, (520) 723-5383

Tpac, An EnCon Company A1, B4, C4, C4A
Phoenix, (602) 262-1360

> ARKANSAS

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

> CALIFORNIA

Bethlehem Construction, Inc. C3, C3A
Wasco, (661) 391-9704

Clark Pacific A1, C3, C3A, G
Fontana, (909) 823-1433

Clark Pacific C4A
Irwindale, (626) 962-8751

Clark Pacific A1, C3, C3A
West Sacramento, (916) 371-0305

Clark Pacific A1, B3, C4, C4A, G
Woodland, (530) 207-4100

Con-Fab California Corporation B4, C4
Lathrop, (209) 249-4700

Con-Fab California Corporation B4, C4
Shafter, (661) 630-7162

Coreslab Structures, (L.A.) Inc. A1, B4, C4, C4A
Perris, (951) 943-9119

KIE-CON, Inc. B4, C3
Antioch, (925) 754-9494

Mid-State Precast, L.P. A1, C3, C3A
Corcoran, (559) 992-8180

Oldcastle Precast, Inc. B4, B4A, C2, C2A
Perris, (951) 657-6093

Oldcastle Precast Inc. C2
Stockton, (209) 466-4215

Precast Concrete Technology dba CTU Precast A1, C3, C3A
Olivehurst, (530) 749-6501

StructureCast A1, B3, C3, C3A
Bakersfield, (661) 833-4490

Universal Precast Concrete, Inc. A1, B1, C1
Redding, (530) 243-6477

Walters & Wolf Precast A1, G
Fremont, (510) 226-9800

Willis Construction Co., Inc. A1, C1
Hollister, (831) 623-2900

Willis Construction Co., Inc. A1, C1, G
San Juan Bautista, (831) 623-2900

> COLORADO

EnCon Colorado B4, C2
Denver, (303) 287-4312

Plum Creek Structures B4, C3, C3A
Littleton, (303) 471-1569

Rocky Mountain Prestress LLC, Architectural Plant A1, C3, C3A
Denver, (303) 480-1111

Rocky Mountain Prestress LLC, Structural Plant B4, C4
Denver, (303) 480-1111

Rocla Concrete Tie, Inc. C2
Pueblo, (303) 296-3500

Stresscon Corporation A1, B4, B4A, C4, C4A
Colorado Springs, (719) 390-5041

> CONNECTICUT

Blakeslee Prestress Inc. A1, B4, C4, C4A
Branford, (203) 481-5306

Coreslab Structures, (CONN) Inc. A1, B1, C1
Thomaston, (860) 283-8281

Oldcastle Precast B2, C2, C2A
Avon, (860) 673-3291

United Concrete Products, Inc. B3, C3
Yalesville, (203) 269-3119

> DELAWARE

Concrete Building Systems of Delaware, Inc. B3, C4
Delmar, (302) 846-3645

Rocla Concrete Tie, Inc. C2
Bear, (302) 836-5304

> FLORIDA

Cement Industries, Inc. B3, C3
Fort Myers, (800) 332-1440

Colonial Construction, Concrete, Precast, LLC, C2
Placida, (941) 698-4180

Coreslab Structures, (MIAMI) Inc., A1, C4, C4A
Medley, (305) 823-8950

Coreslab Structures, (ORLANDO) Inc. C2
Orlando, (407) 855-3190

Coreslab Structures, (TAMPA) Inc., A1, B3, C3, C3A
Tampa, (813) 626-1141

Dura-Stress, Inc. A1, B4, B4A, C4, C4A
Leesburg, (352) 787-1422

Finfrock Industries, Inc. A1, C3
Apopka, (407) 293-4000

Gate Precast Company A1, B4, C3, C3A
Jacksonville, (904) 757-0860

Gate Precast Company A1, C3
Kissimmee, (407) 847-5285

International Casting Corporation C4
Miami Lakes, (305) 558-3515

Metromont Corporation A1, C3, C3A
Bartow, (863) 440-5400

Precast Specialties LLC C4
Pompano Beach, (954) 781-4040

Spancrete C2
Sebring, (863) 655-1515

Stabil Concrete Products, LLC A1
St. Petersburg, (727) 321-6000

Standard Concrete Products, Inc. B4, C3
Tampa, (813) 831-9520

Structural Prestressed Industries C4
Medley, (305) 556-6699

> GEORGIA

Atlanta Structural Concrete Co. C4, C4A
Buchanan, (770) 646-1888

Coreslab Structures, (ATLANTA) Inc. C2
Jonesboro, (770) 471-1150

Metromont Corporation A1, C4, C4A
Hiram, (770) 943-8688

Spancrete C2
Newnan, (770) 252-8944

Standard Concrete Products, Inc. B4
Atlanta, (404) 792-1600

Standard Concrete Products, Inc. B4, C4
Savannah, (912) 233-8263

Tindall Corporation, Georgia Division C4, C4A
Conley, (404) 366-6270

> HAWAII

GPRM Prestress, LLC A1, B4, C4
Honolulu, (808) 682-6000

> IDAHO

Forterra Structural Precast A1, B4, C4
Caldwell, (208) 454-8116

Teton Prestress Concrete, LLC. B4, C3
Idaho Falls, (208) 522-6606

> ILLINOIS

ATMI Precast A1, C3, C3A
Aurora, (630) 896-4679

AVAN Precast Concrete Products A1, C3
Lynwood, (708) 757-6200

County Materials Corporation B3, B3-IL
Champaign, (217) 352-4181

County Materials Corporation A1, B4, B4-IL, C4
Salem, (618) 548-1190

Dukane Precast, Inc. A1, B3, B3-IL, C3, C3A
Aurora, (630) 355-8118

Dukane Precast, Inc. A1, B3, B3-IL, C3, C3A
Naperville, (630) 355-8118

Dukane Precast, Inc. C3
Plainfield, (815) 230-4760

ICCI Illini Concrete, LLC B3, B3-IL
Tremont, (309) 925-2376

Illini Precast, LLC B4, B4-IL, C3
Marseilles, (815) 795-6161

Lombard Architectural Precast Products Co. A1, C2, C2A
Alsip, (708) 389-1060

Mid-States Concrete Industries A1, B3, B3-IL, C3, C3A
South Beloit, (815) 389-2277

St. Louis Prestress, Inc. B3, B3-IL, C3
Glen Carbon, (618) 656-8934

Utility Concrete Products, LLC B1, B1A, C1, C1A
Morris, (815) 416-1000

> INDIANA

ATMI Indy, LLC A1, C2, C2A
Greenfield, (317) 891-6280

Coreslab Structures, (INDIANAPOLIS) Inc. A1, C4, C4A
Indianapolis, (317) 353-2118

Hoosier Precast LLC B3, C1, C1A
Salem, (815) 459-4545

Precast, LLC dba Precast Specialties A1, B1
Monroeville, (260) 623-6131

Prestress Services Industries LLC B4, B4-IL, C4, C4A
Decatur, (260) 724-7117

StresCore, Inc. C2
South Bend, (574) 233-1117

> IOWA

Advanced Precast Co. A1, C1, C1A
Farley, (563) 744-3909

Forterra Building Products A1, B4, B4-IL, C4, C4A
Iowa Falls, (641) 648-2579

MPC Enterprises, Inc. A1, C3, C3A
Mount Pleasant, (319) 986-2226

PDM Precast, Inc. A1, C3, C3A
Des Moines, (515) 243-5118

> KANSAS

Coreslab Structures, (KANSAS) Inc. B4, C4
Kansas City, (913) 287-5725

Crossland Prefab LLC C1
Columbus , (620) 249-1414

Fabcon Precast, LLC C3, C3A
Pleasanton, (913) 937-3021

Prestressed Concrete Construction, LLC A1, B4, C4, C4A
Newton, (316) 283-2277

Stress-Cast, Inc. C3, C3A
Assaria, (785) 667-3905

> KENTUCKY

Bristol Group, Inc. A1, B3, B3A, C3, C3A
Lexington, (859) 233-9050

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

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

> LOUISIANA

Atlantic Metrocast, Inc. C2
New Orleans, (504) 941-3152
Boykin Brothers, Inc./
Louisiana Concrete A1, B4, C3, C3A
Baton Rouge, (225) 753-8722
dp Concrete Products, LLC, B2, C2
Vinton, (337) 433-3900
F-S Prestress, LLC B4, C4
Princeton, (318) 949-2444
Fibrebond Corporation A1, C1, C1A
Minden, (318) 377-1030

> MAINE

Superior Concrete, LLC B2, C1
Auburn, (207) 784-1388

> MARYLAND

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

> MASSACHUSETTS

Oldcastle Precast, Inc. B4, C3
Rehoboth, (508) 336-7600
Precast Specialties Corp. A1
Abington, (781) 878-7220
Unistress Corporation A1, B4, C4, C4A
Pittsfield, (413) 629-2039
Vynorius Prestress, Inc. B3, C2
Salisbury, (978) 462-7765

> MICHIGAN

International Precast Solutions, LLC A1, B3, C3, C3A
River Rouge, (313) 843-0073
Kerkstra Precast Inc. A1, B3, C3, C3A
Grandville, (616) 224-6176
M.E.G.A. Precast, Inc. A1, C3, C3A
Shelby Township (586) 294-6430
Nucon–Stress-Con Industries, Inc. A1, B4, C3, C3A
Kalamazoo, (269) 381-1550
Peninsula Prestress Company B4, C1
Grand Rapids, (517) 206-4775
Stress-Con Industries, Inc. B3A, C3
Saginaw, (989) 755-4348

> MINNESOTA

Crest Precast, Inc. B3, B3A, C3, C3A
La Crescent, (800) 658-9045
Forterra Building Products B4, C2
Elk River, (763) 441-2124
Fabcon Precast, LLC A1, B1, C3, C3A
Savage, (952) 890-4444
Molin Concrete Products Co. C3, C3A
Lino Lakes, (651) 786-7722
Molin Concrete Products A1, C1, C1A
Ramsey, (651) 786-7722
Taracon Precast, C3A
Hawley, (218) 216-8260
Wells Concrete A1, C3, C3A
Albany, (320) 845-2299
Wells Concrete A1, C4, C4A
Wells, (800) 658-7049

> MISSISSIPPI

F-S Prestress, LLC B4, C4
Hattiesburg, (601) 268-2006
Gulf Coast Pre-Stress, Inc. B4, C4
Pass Christian, (228) 452-9486
J.J. Ferguson Prestress-Precast Company, Inc. B4
Greenwood, (662) 453-5451
Jackson Precast, Inc. A1, C2, C2A
Jackson, (601) 321-8787
Tindall Corporation A1, C4, C4A
Moss Point, (228) 246-0800

> MISSOURI

Coreslab Structures, (MISSOURI) Inc. A1, B4, C4, C4A
Marshall, (573) 358-2773
County Materials Corporation B4
Bonne Terre, (573) 358-2773
Mid America Precast, Inc. A1, B1, C1
Fulton, (573) 642-6400
Prestressed Casting Co. C4
Ozark, (417) 581-7009
Prestressed Casting Co. A1, C3, C3A
Springfield, (417) 869-7350

> MONTANA

BC Concrete, Inc. dba Missoula
Concrete Construction, A1, B3, C3, C3A
Missoula, (406) 549-9682
Forterra Pipe & Precast B4, C3
Billings, (406) 656-1601
Forterra Building Products B4
Montana City, (406) 442-6503

> NEBRASKA

American Concrete Products Co. B1, B1A, C1, C1A
Omaha, (402) 331-5775
Concrete Industries, Inc. B4, C4, C4A
Lincoln, (402) 434-1800
Coreslab Structures, (OMAHA) Inc. A1, B4, C4, C4A
Bellevue, (402) 291-0733
Enterprise Precast Concrete, Inc. A1, C2, C2A
Omaha, (402) 895-3848

> NEVADA

Western Pacific Precast B4, C2
Sloan, (702) 623-4484

> NEW HAMPSHIRE

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

> NEW JERSEY

Boccella Precast LLC C2
Berlin, (856) 767-3861
Jersey Precast B4, C4
Hamilton, (609) 689-3700
Northeast Precast A1, B3, C3, C3A
Millville, (856) 765-9088
Precast Systems, Inc. B4, C4
Allentown, (609) 208-1987

> NEW MEXICO

Castillo Prestress B4, C4
Belen, (505) 864-0238
Coreslab Structures,
(ALBUQUERQUE) Inc. A1, B4, C4, C4A
Albuquerque, (505) 247-3725
Ferreri Concrete Structures Inc. A1, C4, C4A
Albuquerque, (505) 344-8823

> NEW YORK

David Kucera Inc. A1, G
Gardiner, (845) 255-1044
Lakelands Concrete Products, Inc. A1, B3, B3A, C3, C3A
Lima, (585) 624-1990
Oldcastle Precast B3, C3, C3A
Selkirk, (518) 767-2116
The Fort Miller Company, Inc. B3, B3A, C1
Schuylerville, (518) 695-5000
The L.C. Whitford Materials Co., Inc. B4, C3
Wellsville, (585) 593-2741

> NORTH CAROLINA

Coastal Precast Systems, LLC B2, C2
Wilmington, (910) 604-2249
Gate Precast Company A1, C2
Oxford, (919) 603-1633
Metromont Corporation A1, C3, C3A
Charlotte, (704) 372-1080
Prestress of the Carolinas B4, C4
Pineville, (704) 587-4273
Utility Precast, Inc. B3, B3A
Concord, (704) 721-0106

> NORTH DAKOTA

Wells Concrete C4, C4A
Grand Forks, (701) 772-6687

> OHIO

DBS Prestress of Ohio C3
Huber Heights, (937) 878-8232
Fabcon Precast, LLC A1, C3, C3A
Grove City, (952) 890-4444
High Concrete Group LLC A1, C3, C3A
Springboro, (937) 748-2412
Mack Industries, Inc. C3
Valley City, (330) 483-3111
Mack Industries, Inc. B3A,C3
Vienna, (330)638-7680
Prestress Services Industries of Ohio, LLC,
(I-Beam) A1, B4, C3
Mt. Vernon, (800) 366-8740
Prestress Services Industries of Ohio, LLC,
(Box Beam) B3, C3
Mt. Vernon, (740) 393-1121
Rocla Concrete Tie, Inc. C2
Sciotoville, (740) 776-3238
Sidley Precast A1, C4, C4A
Thompson, (440) 298-3232

> OKLAHOMA

Arrowhead Precast, LLC A1, C3, C3A
Broken Arrow, (918) 995-2227
Coreslab Structures, (OKLA) Inc.,
(Plant No.1) A1, C4, C4A
Oklahoma City, (405) 632-4944
Coreslab Structures, (OKLA) Inc.,
(Plant No.2) B4, C3
Oklahoma City, (405) 672-2325
Coreslab Structures, (TULSA) Inc. B4, C4
Tulsa, (918) 438-0230

> OREGON

Knife River Corporation A1, B4, C4, C4A
Harrisburg, (541) 995-6327
R.B. Johnson Co. B4, C3
McMinnville, (503) 472-2430

> PENNSYLVANIA

Architectural Precast Innovations, Inc. A1, C3, C3A
Middleburg, (570) 837-1774
Brayman Precast, LLC B1, C1
Saxonburg, (724) 352-5600
Concrete Safety Systems, LLC A1, B3, B3A, C3, C3A
Bethel, (717) 933-4107
Conewago Precast Building Systems A1, C3,C3A
Hanover, (717) 632-7722
Dutchland, Inc. C3
Gap, (717) 442-8282
Fabcon Precast, LLC A1, B1, B1A, C3, C3A
Mahanoy City, (952) 890-4444
High Concrete Group LLC A1, B3, C3, C3A
Denver, (717) 336-9300

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

J & R Slaw, Inc. A1, B4, C3, C3A
Lehighton, (610) 852-2020

Nitterhouse Concrete Products, Inc. A1, C4, C4A
Chambersburg, (717) 267-4505

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

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

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

Sidley Precast C3
Youngwood, (724) 755-0205

Universal Concrete Products Corporation A1, C3, C3A
Stowe, (610) 323-0700

> SOUTH CAROLINA

Florence Concrete Products, Inc. B4, C3, C3A
Sumter, (803) 775-4372

Metromont Corporation A1, C4, C4A
Greenville, (864) 605-5000

Metromont Corporation C3
Spartanburg, (864)605-5063

Tekna Corporation B3, C3
Charleston, (843) 853-9118

Tindall Corporation A1, C4, C4A
Spartanburg, (864) 576-3230

> SOUTH DAKOTA

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

> TENNESSEE

Construction Products, Inc. of Tennessee B4, C4
Jackson, (731) 668-7305

Gate Precast Company A1, C3, C3A
Ashland City, (615) 792-7608

Mid South Prestress, LLC C3
Pleasant View, (615) 746-6606

Ross Prestressed Concrete, Inc. B4, C3
Bristol, (423) 323-1777

Ross Prestressed Concrete, Inc. B4, C4
Knoxville, (865) 524-1485

> TEXAS

Coreslab Structures, (TEXAS) Inc. A1, C4, C4A
Cedar Park, (512) 250-0755

CXT, Inc. B1, B1A, C1, C1A
Hillsboro, (254) 580-9100

East Texas Precast A1, C4, C4A
Hempstead, (281) 463-0654

Enterprise Concrete Products, LLC B3, C3
Dallas, (214) 631-7006

Enterprise Precast Concrete of Texas, LLC A1, C1
Corsicana, (903) 875-1077

Gate Precast Company A1, C1, C1A
Hillsboro, (254) 582-7200

Gate Precast Company C2
Pearland, (281) 485-3273

GFRC Cladding Systems, LLC G
Garland, (972) 494-9000

Heldenfels Enterprises, Inc. B4, C4
Corpus Christi, (361) 883-9334

Heldenfels Enterprises, Inc. B4, C4
San Marcos, (512) 396-2376

Legacy Precast, LLC C4, C4A
Brookshire, (281) 375-2050

Lowe Precast, Inc. A1, C3, C3A
Waco, (254) 776-9690

Manco Structures, Ltd. C4, C4A
Schertz, (210) 690-1705

NAPCO PRECAST, LLC A1, C4, C4A
San Antonio, (210) 509-9100

Rocla Concrete Tie, Inc. C2
Amarillo, (806) 383-7071

Texas Concrete Partners, LP B4, C4
Elm Mott, (254) 822-1351

Texas Concrete Partners, LP B4, C4
Victoria, (361) 573-9145

Tindall Corporation A1, C3, C3A
San Antonio, (210) 248-2345

Valley Prestressed Products, Inc. B2
Houston, (713) 455-6098

Valley Prestress Products Inc. B4
Eagle Lake, (979) 234-7899

> UTAH

Forterra Structural Precast A1, B4, C4, C4A, G
Salt Lake City, (801) 966-1060

Granite Construction Company B1
Salt Lake City, (801) 526-6000

Harper Precast B2, C1
Salt Lake City, (801) 326-1016

Olympus Precast A1, B3, B3A, C3, C3A
Sandy, (801) 571-5041

> VERMONT

J. P. Carrara & Sons, Inc. A1, B4, B4A, C3, C3A
Middlebury, (802) 388-6363

S.D. Ireland Concrete Construction Corp. A1, B1, C1
Williston, (802) 863-6222

William E. Dailey Precast, LLC A1, B4, B4A, C4, C4A
Shaftsbury, (802) 442-4418

> VIRGINIA

Atlantic Metrocast, Inc. B4, C4
Portsmouth, (757) 397-2317

Bayshore Concrete Products Corporation B4, C4
Cape Charles, (757) 331-2300

Skanska USA Civil, SE B4, C3
Chesapeake, (757) 545-5215

Coastal Precast Systems, LLC A1, B4, C3
Chesapeake, (757) 331-2300

Faddis Concrete Products B2, C2
King George, (540) 775-4546

Metromont Corporation A1, C3, C3A
Richmond, (804) 665-1300

Rockingham Precast B4
Harrisonburg, (540) 433-8282

The Shockey Precast Group A1, C4, C4A
Winchester, (540) 667-7700

Tindall Corporation A1, C4, C4A
Petersburg, (804) 861-8447

> WASHINGTON

Bellingham Marine Industries, Inc. B3, C2
Ferndale, (360) 380-2142

Bethlehem Construction, Inc. B1, C3, C3A
Cashmere, (509) 782-1001

Concrete Technology Corporation B4, C4
Tacoma, (253) 383-3545

CXT, Inc., Precast Division B1, C1, C1A
Spokane, (509) 921-8766

CXT, Inc., Rail Division C2
Spokane, (509) 921-7878

EnCon Northwest, LLC B1, B1A
Camas, (360) 834-3459

EnCon Washington, LLC B1, B1A, C2, C2A
Puyallup, (253) 846-2774

Oldcastle Precast, Inc. A1, B4, C4
Spokane, Spokane Valley, (509) 536-3300

Wilbert Precast, Inc. B3, C3, C3A
Yakima, (509) 325-4573

> WEST VIRGINIA

Carr Concrete a division of CXT Inc. B4, C3
Waverly, (304) 464-4441

Eastern Vault Company, Inc. B3, C3
Princeton, (304) 425-8955

> WISCONSIN

County Materials Corporation B4, B4-IL
Janesville, (608) 373-0950

County Materials Corporation B4, C3
Roberts, (800) 426-1126

International Concrete Products, Inc. A1, C1
Germantown, (262) 242-7840

KW Precast LLC B4, B4-IL, C4
Westchester, (708) 562-7770

wwMidCon Products, Inc. A1, C1
Hortonville, (920) 779-4032

Spancrete A1, B4, C3, C3A
Valders, (920) 775-4121

Stonecast Products, Inc. A1, C1
Germantown, (262) 253-6600

Wausau Tile Inc. AT
Wausau, (715) 359-3121

> WYOMING

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

> MEXICO

PRETECSA, S.A. DE C.V. A1, G
Estado de Mexico 52, (555) 077-0071

Willis De Mexico S.A. de C.V. A1, C1, G
Tecate 52, (665) 655-2222

> CANADA

BRITISH COLUMBIA

APS Architectural Precast Structures LTD A1, B4, C3, C3A
Langley, (604) 888-1968

Armtec Limited Partnership A1, B4, C3
Richmond, (604) 214-3243

NEW BRUNSWICK

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

NOVA SCOTIA

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

ONTARIO

Artex Systems Inc. A1
Concord, (905) 669-1425

Global Precast Inc. A1
Maple, (905) 832-4307

Prestressed Systems, Inc. B4, C4
Windsor, (519) 737-1216

QUEBEC

Betons Prefabriques Trans. Canada Inc. A1, B4, C3, C3A
St. Eugene De Grantham, (819) 396-2624

Bombadier, Alma A1, C2

Papeterie, Alma A1, C3, C3A, G

Prefab de Beauce Inc. A1, C3
Alma, (418) 387-7152

> UAE

Arabian Profile Company Limited G
Sharjah, 971(6) 5432624

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

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. S2
Phoenix,, (602) 237-3875

RJC Contracting, Inc. A, S2
Mesa,, (480) 357-0868

Steel Girder LLC dba Stinger Bridge & Iron S1
Coolidge, (502) 723-5383

Tpac, An EnCon Company A, S2
Phoenix,, (602) 262-1360

> CALIFORNIA

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

> COLORADO

EnCon Field Services, LLC A, S2
Denver,, (303) 287-4312

Gibbons Erectors Inc. A, S2
Englewood,, (303) 841-0457

Rocky Mountain Prestress,LLC A, S2
Denver, (303) 480-1111

> CONNECTICUT

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

> FLORIDA

Concrete Erectors, Inc. A, S2
Altamonte Springs, (407) 862-7100

Coreslab Structures (MIAMI) Inc. A, S2
Medley, (305) 823-8950

Florida Builders Group, Inc. S2
Miami Gardens, (305) 278-0098

Jacob Erecting & Construction, LLC A, S2
Jupiter, (561) 741-1818

James Toffoli Construction Company, Inc. S2
Fort Myers, (239) 479-5100

Pre-Con Construction, Inc. A, S2
Lakeland, (813) 626-2545

Prestressed Contractors Inc. S2
West Palm Beach, (561) 741-4369

Specialty Concrete Services, Inc. A, S2
Umatilla, (352) 669-8888

W.W. Gay Mechanical Contractor, Inc. S2
Jacksonville, (904) 388-2696

> GEORGIA

Bass Precast Erecting, Inc. S1
Cleveland, (706) 809-2718

Jack Stevens Welding LLP S2
Murrayville, (770) 534-3809

Precision Stone Setting Co., Inc. A, S2
Hiram, (770) 439-1068

Rutledge & Sons, Inc. S2
Canton, (770) 592-0380

Southeastern Precast Erectors Inc. (SPE Inc.) A
Roswell, (770) 722-9212

> IDAHO

Precision Precast Erectors LLC A, S2
Post Falls, (208) 981-0060

> ILLINOIS

Area Erectors, Inc. A, S2
Rochelle, (815) 562-4000

Creative Erectors, LLC A, S2
Rockford, (815) 229-8303

Mid-States Concrete Industries S2
South Beloit, (815) 389-2277

> IOWA

Cedar Valley Steel Inc. A, S2
Cedar Rapids, (319) 373-0291

Industrial Steel Erectors A, S1
Davenport, (563) 355-7202

Northwest Steel Erection, Inc. A, S2
Grimes, (515) 986-0380

US Erectors, Inc. S2
Des Moines, (515) 243-8450

> KANSAS

Carl Harris Co., Inc. A, S2
Wichita, (316) 267-8700

Crossland Construction Company, Inc. S2
Columbus, (620) 442-1414

> MARYLAND

DLM Contractors, LLC A, S2
Cheltenham, (301) 877-0000

E & B Erectors, Inc. A, S2
Elkridge, (410) 360-7800

E.E. Marr Erectors, Inc. A, S2
Baltimore, (410) 837-1641

L.R. Willson & Sons, Inc. A, S2
Gambrills, (410) 987-5414

> MASSACHUSETTS

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

> MICHIGAN

Assemblers Precast & Steel Services, Inc. A, S2
Saline, (734) 368-6147

Devon Contracting, Inc. S2
Detroit, (313) 221-1550

G2 Inc. A, S2
Cedar Springs, (616) 696-9581

Midwest Steel, Inc. A, S2
Detroit, (313) 873-2220

Pioneer Construction Inc. A, S2
Grand Rapids, (616) 247-6966

> MINNESOTA

Amerect Inc. S2
Newport, (651) 459-9909

Fabcon Precast, LLC S2
Savage, (952) 890-4444

Molin Concrete Products Company A, S2
Lino Lakes, (651) 786-7722

Wells Concrete A, S2
Maple Grove, (800) 658-7049

> MISSISSIPPI

Bracken Construction Company A, S2
Ridgeland, (601) 922-8413

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

> MISSOURI

JE Dunn Construction A, S2
Kansas City, (816) 292-8762

Prestressed Casting Co. A, S2
Springfield, (417) 869-7350

> NEBRASKA

Structural Enterprises Inc. S2
Lincoln, (402) 423-3469

Topping Out Inc. dba Davis Erection–Omaha A, S2
Omaha, (402)731-7484

> NEW HAMPSHIRE

American Steel & Precast Erectors S2
Greenfield, (603) 547-6311

Newstress, Inc. S2
Epsom, (603) 736-9000

> NEW JERSEY

CRV Precast Construction LLC S1
Eastampton, (609) 261-7325

J. L. Erectors, Inc. A, S2
Blackwood, (856) 232-9400

JEMCO-Erectors, Inc. S2
Shamong, (609) 268-0332

Jonasz Precast, Inc. A, S2
Westville, (856) 456-7788

> NEW YORK

Koehler Masonry Corp. S2
Farmingdale, (631) 694-4720

Oldcastle Building Systems Div./Project Services A, S2
Selkirk, (518) 767-2116

Tutor Perini Corporation Civil S1
New Rochelle, (914)739-1905

> NORTH DAKOTA

Magnum Contracting, Inc. S2
Fargo, (701) 235-5285

Midwest Precast Services A, S2
Fargo, ND (701) 893-0188

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

> OHIO

Precast Services, Inc. A, S2
Twinsburg, (330) 425-2880

Sidley Precast Group, A Division of R.W. Sidley, Inc. S2
Thompson, (440) 298-3232

> OKLAHOMA

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

> PENNSYLVANIA

Century Steel Erectors A, S2
Kittanning, (724) 545-3444

Conewago Precast Building Systems S2
Hanover, (717) 632-7722

High Structural Erectors, LLC A, S2
Lancaster, (717) 390-4203

Kinsley Construction Inc. t/a Kinsley Manufacturing S1
York, (717) 757-8761

Maccabee Industrial, Inc. A, S2
Belle Vernon, (724) 930-7557

Nitterhouse Concrete Products, Inc. A, S2
Chambersburg, (717) 267-4505

> SOUTH CAROLINA

Davis Erecting & Finishing, Inc. A, S2
Greenville, (864) 220-0490

Florence Concrete Products, Inc. S2
Florence, (843) 662-2549

Steel Clad Inc. A, S2
Greenville, (864) 246-8132

Tindall Corporation A, S2
Spartanburg, (864) 576-3230

> SOUTH DAKOTA

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

> TENNESSEE

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

> TEXAS

Coreslab Structures (TEXAS) Inc. A, S2
Cedar Park, (512) 250-0755

Derr and Isbell Construction, LLC A, S2
Euless, (817) 571-4044

Gulf Coast Precast Erectors LLC S2
Hempstead, (832) 451-4395

Precast Erectors, Inc. A, S2
Hurst, (817) 684-9080

> UTAH

Forterra Structural Precast A, S2
Salt Lake City, (801) 966-1060

IMS Masonry A
Lindon, (801) 796-8420

OutWest C & E Inc. A, S2
Bluffdale, (801) 446-5673

> VERMONT

CCS Constructors Inc. A, S2
Morrisville, (802) 888-7701

> VIRGINIA

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

> WISCONSIN

J. P. Cullen & Sons, Inc. A
Janesville, (608) 754-6601

Miron Construction Co., Inc. A, S2
Neenah, (920) 969-7000

Spancrete A, S2
Valders, (920) 775-4121

The Boldt Company A, S2
Appleton, (920) 225-6212

SPECIFY PCI CERTIFICATION

THERE IS NO EQUIVALENT

Photo courtesy of USC/Gus Ruelas.

PCI
Precast/Prestressed Concrete Institute

The Precast/Prestressed Concrete Institute's (PCI) certification is the industry's most proven, comprehensive, trusted, and specified certification program. The PCI Plant Certification program is now accredited by the International Accreditation Service (IAS) which provides objective evidence that an organization operates at the highest level of ethical, legal, and technical standards. This accreditation demonstrates compliance to ISO/IEC 17021-1.

PCI certification offers a complete regimen covering personnel, plant, and field operations. This assures owners, specifiers, and designers that precast concrete products are manufactured and installed by companies who subscribe to nationally accepted standards and are audited to ensure compliance.

IAS ACCREDITED
Management Systems Certification Body

To learn more about PCI Certification, please visit

www.pci.org/certification

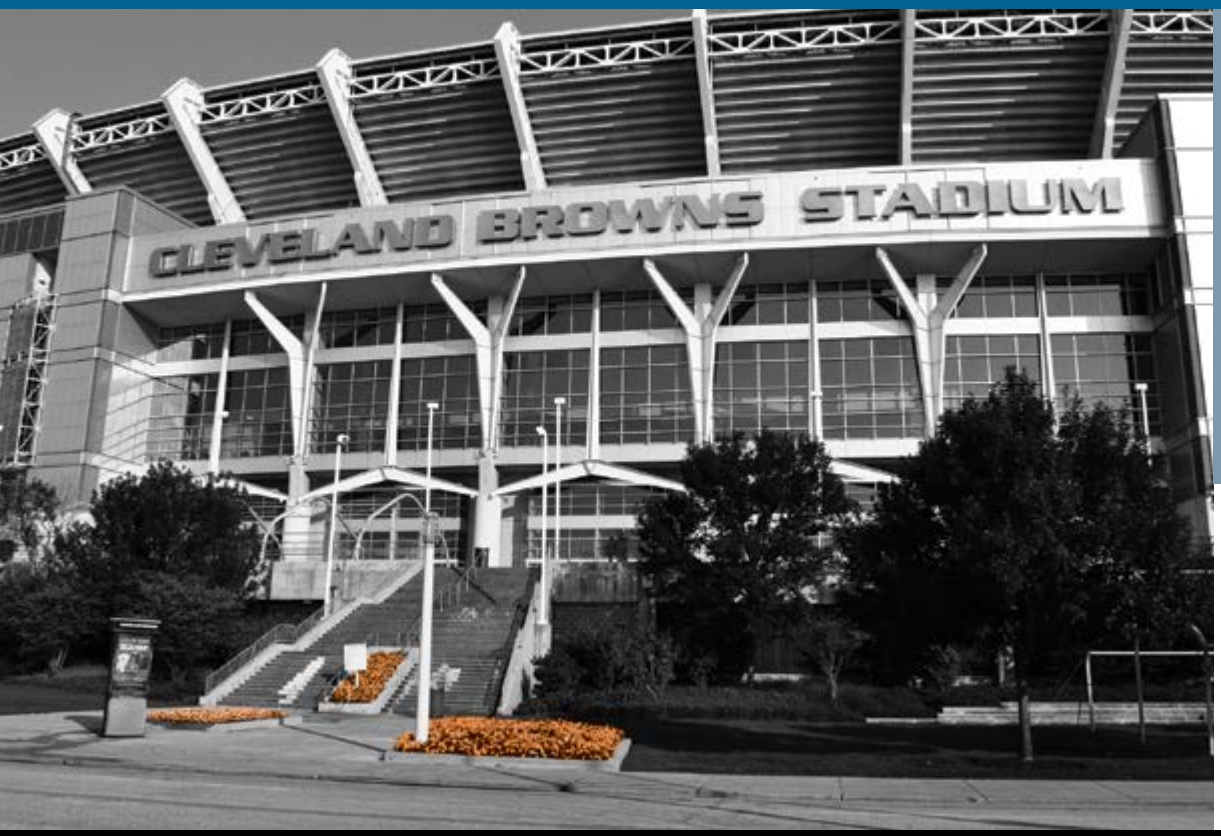
HIGH PERFORMANCE TOTAL PRECAST SYSTEMS AND ENCLOSURES

EnCon owns and operates nine entities dedicated to the construction industry, and serves customers in over 20 states through its manufacturing locations in Atlanta, Colorado Springs, Denver, Phoenix, Portland and Seattle. As a certified member of the Precast/Prestressed Concrete Institute, and a member of AltusGroup®, EnCon is recognized among the leading precast companies in the United States.

asc
ATLANTA STRUCTURAL CONCRETE
An *EnCon* Company
Phone: 770.646.1888
Email: sales@Atlanta-Structural.net
www.Atlanta-Structural.net

PCI CONVENTION & NATIONAL BRIDGE CONFERENCE

CLE 2017

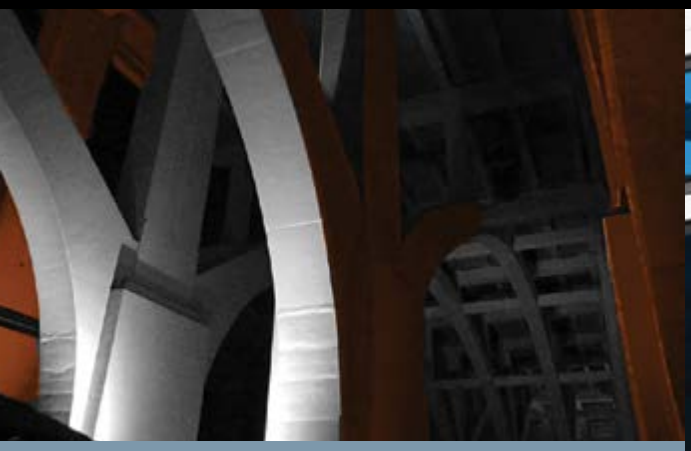


BE A PART OF IT.

In Partnership with

THE PRECAST SHOW

HUNTINGTON CONVENTION CENTER • CLEVELAND, OHIO
FEBRUARY 28–MARCH 4, 2017 • WWW.PCI.ORG/CONVENTION



Bridges for LIFE™

National Bridge Conference
Co-Sponsored by

NCBC

U.S. Department of Transportation
Federal Highway Administration

PCI™
Precast/Prestressed Concrete Institute

HIGH PERFORMANCE TOTAL PRECAST SYSTEMS AND ENCLOSURES

EnCon owns and operates nine entities dedicated to the construction industry, and serves customers in over 20 states through its manufacturing locations in Atlanta, Colorado Springs, Denver, Phoenix, Portland and Seattle. As a certified member of the Precast/Prestressed Concrete Institute, and a member of AltusGroup®, EnCon is recognized among the leading precast companies in the United States.

Tpac

Architectural and Structural Precast Concrete

An ***EnCon*** Company

Phone: 602.262.1391
Email: sales@TpacAZ.com
www.TpacAZ.com

2017 IPI Conference & Expo
May 21-24 | New Orleans, La.

LEARN

From Parking Experts and Thought Leaders

Attend diverse and varied education sessions on the most important topics facing today's parking landscape. With more than 50 education sessions and pre-conference workshops, you'll leave with actionable insights and valuable new connections.

Join more than 250 exhibitors in 170,000+ square feet full of cutting-edge products and solutions!

Register now and SAVE!
Early-bird registration ends January 31, 2017.
IPIConference.parking.org

2017 IPI Conference & Expo
May 21-24 | New Orleans, La.

NETWORK

With More Than 3,000 Peers

Limitless opportunities to engage with colleagues from around the world. Pick from more than 30 hours of networking opportunities, including adventure activities and facility tours to help you break the ice. Expand your network, increase your influence, and grow your contact list.

Don't miss out on 250 exhibitors in 170,000+ square feet full of cutting-edge products and solutions!

Register by April 30 and SAVE $300!
IPIConference.parking.org

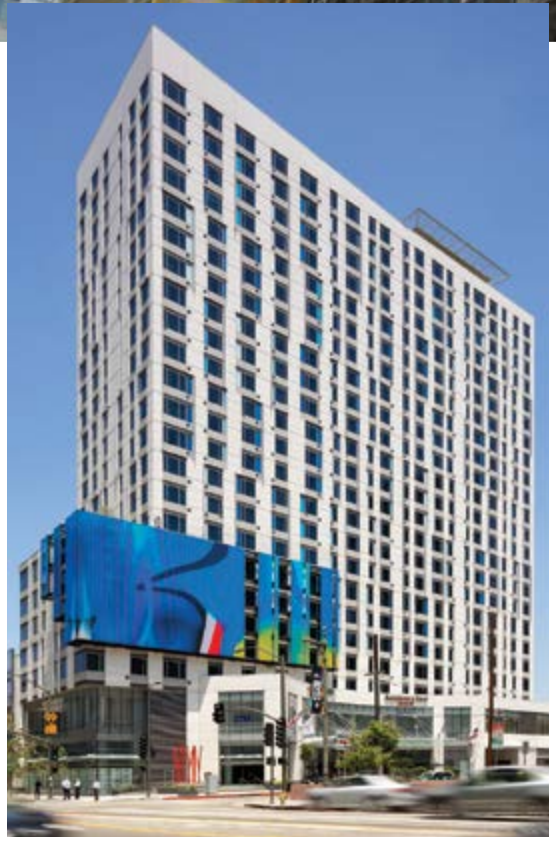
2017 IPI Conference & Expo
May 21-24 | New Orleans, La.

INNOVATE

Cutting edge solutions to streamline your operations.

Learning doesn't end in the classroom. Vendors bring the most exciting products, solutions, and technology to the IPI Expo, including the latest in enforcement, design and building materials, vehicles, communications, on- and off-street necessities, green parking resources, and much more!

Register Today! Advanced registration rates end April 30.
IPIConference.parking.org



L.A. Live Marriott | Los Angeles, CA

2015 PCI Design Award Honoree

INTEGRATED AND PRE-FABRICATED SYSTEMS
PROVIDING TRUE OWNER VALUE.

The developer of the Courtyard and Residence Inn Marriott prioritized prefabricated systems for its new property in the heart of L.A.'s booming L.A. Live District. Clark Pacific's innovative envelope platform called C-CAPP (Clark Composite Architectural Precast Panels) provided the design-build team a great solution for the building enclosure. Pre-assembled at Clark Pacific's Fontana plant (complete with glazing, insulation, return air vents, and electrical fixtures), they were shipped to the jobsite as single modular units. Pre-assembly allowed for a safer site and a significantly enhanced construction schedule, providing true owner value.

Contact Clark Pacific to explore how design-build prefabricated systems can help you and the whole project team on your next project.

clarkpacific.com

CLARK PACIFIC
Design + Manufacture + Build