"Set It and Forget It" // A Precast "Confection" // The Ins and Outs of Formliners

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SPRING 2020
ABOVE-GROUND
ISSUE

precast solutions

SPRING 2020

VOLUME 18 | NUMBER 2

ON THE COVER:

On the cover: A new tower in Brooklyn uses precast concrete to give the building a shimmering facade that mimics the look of sugar crystals.

Photo courtesy of COOKFOX.

Precast Solutions
(ISSN 1934-4066 print, ISSN 1934-4074 online)
is published quarterly by NPCA,
the association of the
manufactured concrete products industry.

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WHAT'S INSIDE

Photo courtesy of COOKFOX

Specifier Q&A

This issue, Precast Solutions hears from Steve Saville, AIA, LEED AP, with Davis Carter Scott Design in Tysons, Va.

Photos courtesy of Davis Carter Scott Design

What is your background and area of expertise?

Following a decade of work in the field of residential and commercial construction, I began my architectural career some 23 years ago. I have worked for Davis Carter Scott (DCS) for the past 20 years and have now become a project director, the firm's highest functioning level of architectural project management. My areas of expertise cover a broad spectrum of project types including office, residential, hospitality and parking garages for a variety of public and private clients.

What types of projects does your company focus on?

DCS has five principal areas of practice: master planning, base building architecture, interior architecture, sustainability and branding. We undertake a wide range of projects within those disciplines. Over the last several years, much of our work has been focused on urban, mixed-use developments with a strong residential component including an increasing amount of affordable and senior housing. We are also very active in private K-12, office (both new construction and repositioning existing assets) and hospitality.

Steve Saville

What are a couple of notable projects in which you have specified the use of precast concrete?

My most recent notable projects that incorporated precast concrete would be Lumen and Latitude. Lumen is a 32-story, 398-unit high-rise residential building in Tysons, Va. that also included 12,000 square feet of retail use at the ground level. That particular project utilized the Slenderwall precast concrete system. Latitude is a 12-story, 265-unit residential building in Arlington, Va., with approximately 6,000 square feet of retail at the ground level. Standard 6-inch-thick precast panels were utilized for this project.

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Why was precast chosen for those projects?

At our Lumen project, the Slenderwall system, which is comprised of a 2-inch-thick precast concrete exterior finish affixed to a 6-inch stud with insulation, was used to accelerate the construction schedule while minimizing the structural load of the building skin. The Latitude project used precast to achieve our design intent of a pure white facade that provided a durable and quality-controlled exterior material.

What benefits does precast concrete afford you?

Precast concrete provides us with the opportunity to deliver our clients a lasting and versatile exterior building material while offering unlimited finishes and textures. When combined with the tight tolerances afforded by an off-site manufactured product, precast concrete ensures a high-quality aesthetic with tremendous quality control.

How has the use of precast evolved?

We believe that while the stoic essence of precast concrete has remained constant through the years, the ability to test the boundaries of its use has evolved, presenting us with significant opportunities to further our design acumen. As we move into an age of increasing concern of security, particularly in our own Washington, D.C., metropolitan area, we believe precast concrete will be vital to our need to provide robust designs that meet our clients' needs. PS

The Lumen project (pictured right) and Latitude project (pictured above) both used precast concrete to speed up construction schedules while providing a high-quality facade.


LUMEN

Precast Allows Contractors to "Set It and Forget It"

Standing 38-feet-tall and MASH TL-4-compliant, a new precast retaining wall puts the finishing touches on the Capitol Square project in Atlanta.

By Bridget McCrea

Photos by Hannah Ian, courtesy of Earth Wall Products

Anyone familiar with Atlanta knows just how critical the I-75/I-85 Downtown Connector is to the region's transportation infrastructure. Where I-75 is a legacy of the old Dixie Highway (linking the Great Lakes and Florida), I-85 connects Virginia with Alabama. Situated on Atlanta's southwestern edge, the 12- to 14-lane connector also has an interchange with I-20.

The 7.5-mile-long connector carries more than 437,000 vehicles per day at its busiest point. When the city needed a retaining wall that would stand more than 38 feet tall, extend 283 feet in length, and comprise approximately 8,800 square feet of face area, it put precast concrete at the center of the conversation with Atlanta-based Piedmont Precast manufacturing approximately 270 elements for the retaining wall.

WORKING IN A SHOEBOX

Since the historic Georgia State Capitol dome was located near the job site, the project served two purposes. Not only would it help improve traffic flow, but it would also add aesthetics in front of the capitol building.

Astra Group Inc., the Georgia Building Authority's contractor for the project, explored its options for constructing the proposed retaining wall, including Earth Wall Products' Gravix gravity retaining wall system. With panels that are supported by an integrated stem that is backfilled, the Gravix system supports slot construction, making it easier to maneuver on tighter sites like the one in Atlanta.

Involved with numerous retaining wall projects over the years, Earth Wall Products worked with the contractor to develop a preliminary design that was presented to Piedmont Precast, a licensee of the Gravix product.

"My analogy is that it was kind of like working in a shoebox," said Jason Sailers, vice president of construction products at Piedmont Precast. "It was very confined. And I think that's one of the big reasons they chose the Gravix system, because you didn't have tiebacks, they had the room they needed to get the wall in."

Shawn Springston, senior project manager at Astra Group, said the design made the below-grade work on the project go faster. This was a key benefit for the installers who were working underground within shoring walls next to the heavily traveled interstate.

"We didn't want to be down low any longer than we had to, and the backfill material in this instance can be a mixture of different aggregate sizes," Springston said. "It's not so heavily constrained.

The broad range of backfill also enabled Astra to bring in recycled concrete to quickly bulk up the below-grade work, thus enabling them to beat its estimated construction time by about 33%.

The 38-foot-tall sections of the wall start with panels at the base with 22-foot-long stems extending into the earth behind the wall. The stem length of each row of panels decreases as

Crews in Atlanta were able to quickly install a retaining wall in a tight space by using precast concrete. The wall helps improve traffic flow in Atlanta while adding a visual setback to the historic capitol building.

the wall ascends, with the top row of panels having a stem length of only 8 feet.

Due to an abnormal 130-degree angle, Piedmont needed special blockouts to ensure the stems didn't run into one another behind the wall.

"Those stem lengths enabled us to build a tall, gravity wall with a barrier on top, and at a bit of an abnormal angle," Sailers said. "That was the unique aspect of the project from our perspective."

The face of the wall features an ashlar textured panel and includes a graffiti and weather seal, which makes it easy to erase graffiti and slows the weathering process.

Spillman Company developed the forms for the system in collaboration with Earth Wall. They also collaboratively designed a tilt table for the project, which enabled the precaster to cast precisely angled pieces with ease.

"You set the mold on a tilt table and then tilt it to the angle you need to pour, so the concrete reaches its level," said Thomas Rainey, president of Earth Wall Products, which licenses the Gravix system. "That's how you achieve the angled units."

Spillman also produced a form that included a traffic barrier

base on top and a combination form that incorporates both the standard and traffic barrier features.

"The mold tilts rather than the concrete having to be tilted," explained Ted Coons, Spillman's EVP of sales. The project's collaborative approach was unique for Spillman, which rarely sees the site drawings. The wall's height and the site constraints made the form developer's participation essential.

Rainey agreed and said the wall was a milestone for his company as it was the tallest one to date. He also noted the project's quicker construction with fewer crew members due to the system's modularity.

Once made, the wall and related pieces were delivered to the job site, where the contractor was able to "set it and forget it."

"All it took was an excavator, a crane and limited crew to get everything in place," Sailers said. "Precast helped them work within those tight confines without much impact to the general public."

MEETING REQUIREMENTS, DEADLINES

The project also entailed adding an extension roadway for employee access near the Georgia State Capitol. Meant to relieve traffic congestion, the extension road required a traffic barrier that was MASH-TL-4-compliant.

Coons said MASH requirements factor into all of the company's highway form work. The new MASH requirements went into effect on Dec. 31 and apply to permanent and temporary roadside barriers; longitudinal barriers, including those used on precast box culverts and 3-sided structures; and bridge rails.

"We're aware of the dynamic change in the FHWA requirements and continue to be proactive with our customers about it," Coons said.

Sailers said the project outcome was very positive with all timelines either met or reduced.

"The contractor pushed on us to get it built very quickly," he noted. "That was a big selling point for the precast concrete – the ability to get this wall built so quickly." **PS**

Bridget McCrea is a freelance writer who covers manufacturing, industry and technology. She is a winner of the Florida Magazine Association's Gold Award for best trade-technical feature statewide.

Photo courtesy of Gilbane Building Company

Precast Jail Provides Higher Security at Lower Cost

Many communities are turning to precast concrete as a way to create a safer correctional facility in a timely manner.

By Mark Crawford

When Herkimer County in New York decided to replace its jail, which was built in 1978, county officials had a lot of steps to take. First the county acquired the property for the new correctional facility in February 2018. Then, the New York State Commission of Correction approved plans for the jail that summer.

It was during the planning and design stages that precast concrete was selected as the building material for the cells and several other structures. Precast concrete jail cells are chosen for many correctional housing facilities because precast provides a higher level of security and design flexibility. Bunks, toilets and other amenities are fixed to the cells with tamperproof bolts, and the quality and design flexibility. The quality of construction can be closely monitored because cells are manufactured in a quality-controlled environment. They are also easy to install, which saves time and money.

Gilbane Building Company of Syracuse, N.Y., was selected as the general contractor and PennStress of Roaring Springs, Pa., was chosen as the precast manufacturer.

"Precast was chosen because of its uniformity, ease and quickness of construction, and lower cost," said Herkimer County Legislator Vincent J. Bono. "Precast was also recommended by the architect and other counties we contacted."

The speed of installation was also important as the new jail should be fully operational by September 2020.

"Precast is a preferred building material for correctional facilities," added Russell Dickson, vice president of engineering for PennStress. "One reason is that the consistent geometry between the pieces lends well to precast, but it also allows for more work to be completed outside of the secure prison area by the modular units arriving to the site, fully fitted out and ready to be hooked into the site utilities. Precast also decreases the time of construction and minimizes interruption at the facility."

PennStress manufactured 128 precast concrete jail cells. By using precast concrete and modular construction, crews were able to quickly build the correctional facility.

EASE OF INSTALLATION

Precast components for the jail included cell modules, balcony slabs and plenums. Cell modules are stacked forming a lower level and upper level, with balcony slabs in between. The ceilings of the lower cell modules serve as floor slabs for the upper cell modules.

"The plenums on top of the upper modules serve as attic spaces to provide mechanical, electrical and plumbing feeds to each individual cell," said Mark AuClair, project manager for Gilbane Building Company.

A total of 128 70-square-foot precast structures will be installed. Each structure is a two-cell unit, called a double module. Modules consist of external walls on all sides and a roof slab cast monolithically. Openings for cell doors, embeds and amenities were set at the time of casting. Exterior walls exposed to the weather were insulated. Electrical ducts, plumbing and other mechanical ducts were embedded in the concrete and placed through the triangular chases shared with the adjacent cells. The chase allows the utilities to reach the cells easily. Access to the chase is provided with a full-height door.

Balcony slabs placed between the upper and lower cell modules serve as corridors and places for lighting fixtures for the lower level. Railings installed on the slabs prevent inmates from falling and are typically tapered to reduce the structural weight.

This job provided a first for Dickson, building concrete furniture in the form of cell beds. The beds consist of a 4-inch-thick reinforced concrete slab extending from the common wall to the exterior wall and tying into the rear wall.

"The day after the module was removed from the form, we installed a pre-made wood form to cast the bunk and used a wheelbarrow to transport concrete into the cell and up a small ramp to be able to pour the concrete into the form," said Dickson. "Each bed took about six cubic feet of concrete. The forms were removed the next day and moved to the next module that just came out of the module form.

TRANSPORTATION AND ERECTION

Construction at the site has already started, and several modules have been delivered. All lower-level modules, which have a 5-foot balcony extending out over the front wall, are more than 15 feet wide and required an escort. The second-level modules were spun 90 degrees so they did not require an escort.

At the job site, construction cranes move the cell modules directly from the trucks to designated locations. The mat foundation is also used as the ground floor slab for the prison housing facility. Dowels inserted into pre-bored holes in the mat foundation fix the cell modules in place.

A WIN FOR ALL PARTIES

The project is proceeding on schedule and should be operational by fall of 2020. With the project well underway, all parties are pleased with the design.

"Precast concrete cells are gaining in popularity due to their security, structural durability, short construction period, quality and workmanship," said AuClair. "The structural design is not complicated and can be mastered in a short period. Modular precast construction is a good way to control material and labor costs and shorten build time."

Dickson agreed, noting the efficiencies of the manufacturing process.

"Precast modular construction is by far the best approach for correctional types of buildings, as long as symmetry and repetitive pieces are kept in check," added Dickson.

Another huge benefit of this type construction, noted Dickson, is the beneficial effect of concrete's thermal mass on the building's heating/cooling system. Precast concrete has a higher thermal mass because a lot of heat energy is required to change its temperature, allowing the material to keep the building's interior cool in the summer and warm in the winter. Thanks to its ability to store heat, precast flattens daily interior temperature differentials, reducing energy demands on a building's HVAC system.

"Once the building is up to temperature, it remains at that temperature due to this large mass," said Dickson. "This type of construction also allows for continuous insulation, which again helps with the efficiency of the overall building."

For other counties that are considering new correctional facilities, Bono highly recommends using precast concrete, due to cost savings, quicker construction time, easier maintenance and uniformity in the finished product. PS

Mark Crawford is a Madison, Wis.-based freelance writer who specializes in science, technology and manufacturing.

A Precast “Confection”

Photo courtesy of COOKFOX

Using innovative 3D-printing technology for molds, a glistening white precast concrete tower in Brooklyn pays homage to the waterfront's industrial history.

By Deborah Huso

A new 42-story commercial and residential tower along the East River waterfront in the Williamsburg neighborhood of Brooklyn is more than initially meets the eye. Thanks to an innovative collaboration involving large-scale 3D-printed molds, the tower pays homage to the recently restored Domino Sugar Factory building just down the street. The mixed-use structure at One South First opened for business fall 2019 and features a precast alabaster facade that glistens in the light like the sugar crystals once produced in the historic adjacent refinery.

The Domino Sugar Factory was once the world's largest and most productive sugar refinery and helped fuel industrialization of the Brooklyn waterfront. After employing workers from around the globe for 150 years, the factory and surrounding industrial site had been vacant for more than 15 years when Two Trees Management began to work on a major redevelopment of the abandoned waterfront site.

Crews work to install precast concrete panels for One South First in Brooklyn. The panels were designed to mimic sugar crystals as a tribute to the former Domino Sugar Refinery.

DESIGNING WITH A NOD TO HISTORY

Two Trees Management selected New York-based COOKFOX Architects, DPC, to help design the project. According to COOKFOX Senior Associate Arno Adkins, the firm sought to create a site-specific design that is referential to the history of the area while also focusing on sustainability. COOKFOX conducted research on the Domino Sugar Factory waterfront and decided to incorporate sugar's crystalline molecular structure into a contemporary facade to connect the new building with its past.

"We were able to design a performative facade and fine-tune [the building's] solar exposure," Adkins explained. "As you walk around the [completed] building today, it's subtle, but the shape of the facade changes due to solar orientation."

Those subtleties were achieved in large part because of the use of precast concrete.

"We knew we wanted a facade that was performance-based and shaped," Adkins said. "Other cladding options would have required more time, labor and material joints. Using precast resolved these issues and allowed us to achieve our design goals."

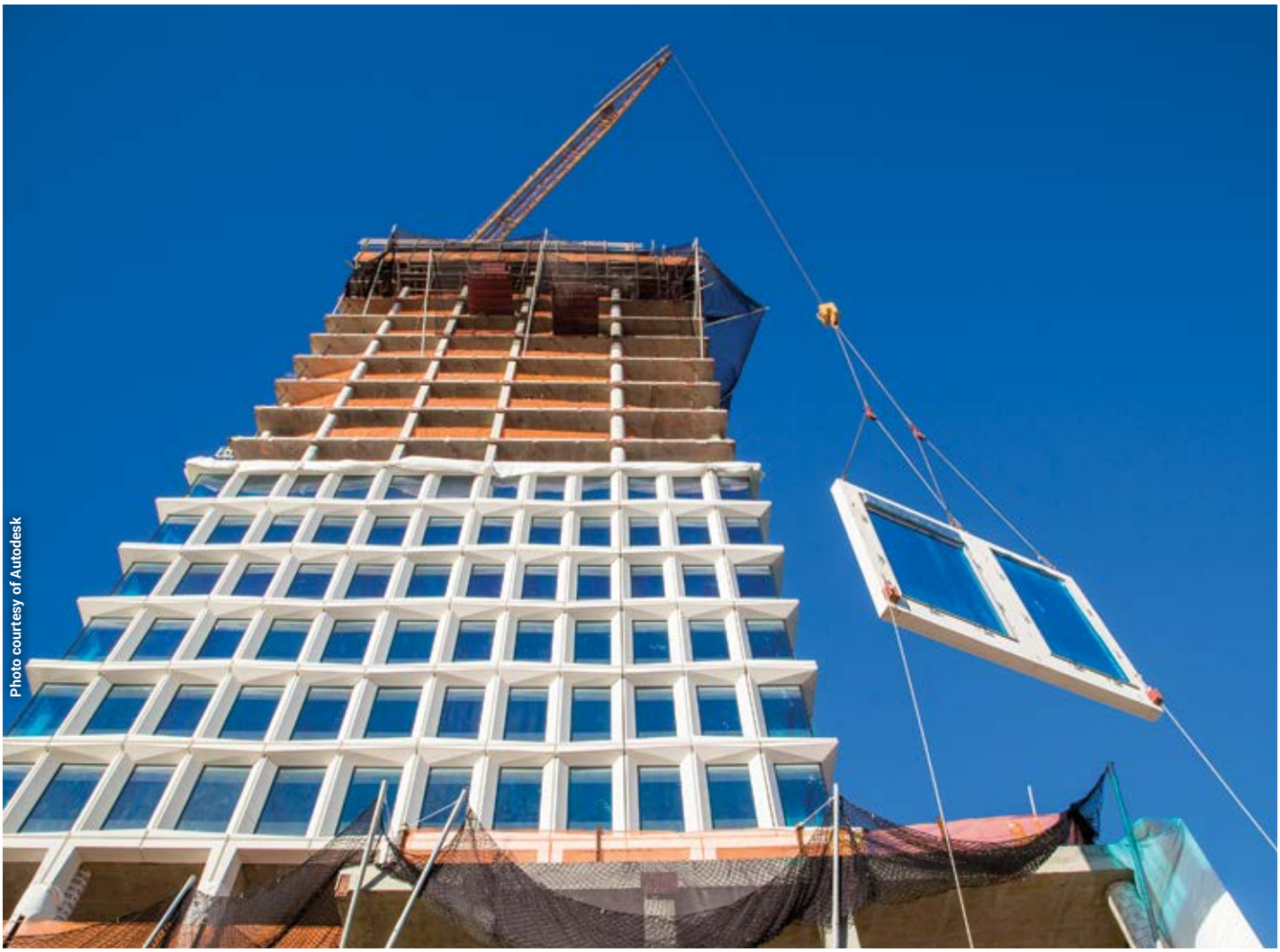


Photo courtesy of Autodesk

To save time, the windows were cast into the panels at Gate's plant.

To achieve the facade design, precast manufacturer Gate Precast Company selected a super white, sand-rich mix to mimic the size, shape and color of sugar crystals.

"The panels consisted of a polished finish on the proud surface of the panels and acid wash finish in the deep returns. The polished surface allows for the sun light to reflect and the acid-wash finish exposed the sand in panel, providing reflective and crisp looking panels, which gave the illusion that actual sugar crystals were attached to the precast facade," explained Travis Fox, vice president and operation manager for Gate Precast's northern division.

The mixed-use tower's unique construction method grew out of a collaboration between Gate Precast and the Department of Energy's Oak Ridge National Laboratory (ORNL). In one of the first large-scale uses of 3D-printing technology for construction, ORNL's Manufacturing Demonstration Facility successfully showed that Big Area Additive Manufacturing (BAAM) could manufacture strong and versatile molds for precast concrete construction.

With more than 1,500 window openings, some as high as 12 feet and as wide as eight feet, and the need for more than 120 molds, the high-rise tower was an ideal candidate for the efficiencies of 3D-printing technology. COOKFOX looked to design precast concrete window panels that would not only suggest the bright, crystalline look of sugar crystals but also offer some "self-shading" to help meet sustainability goals. Had the precast manufacturer employed traditional master carpenters to build wood molds, it likely would have taken 40-plus hours per mold.

"No one had really done the large-format printing on this scale," said Steve Schweitzer, vice president of operations at Gate. "But it would have taken longer to build the forms than the schedule allowed to produce the entire product."

3D-PRINTING ON A LARGE SCALE

According to Schweitzer, the amount of panel repetition and the large number of windows lent itself to the more efficient processes promised by 3D-printing. And with Gate's precast manufacturing facilities located in both Kentucky and North Carolina, the 3D-printing also accelerated a construction schedule that could have been hampered by the distance.

To create the design for the 3D printers, CAD models are essentially sliced into layers to create a toolhead that drives the printer. The printer uses the toolpaths to extrude molten polymer to form the mold. It takes eight to 11 hours to print each mold and then another eight hours to machine it to the needed finish.

ORNL researchers designed molds out of carbon fiber-reinforced acrylonitrile butadiene styrene (ABS), a fairly common thermoplastic combined with carbon fibers. It took about six months to go from experimentation into production, with Gate Precast casting about 30 single-window sample panels. In total, they printed about 35 molds and built numerous others from wood for floors that had varied heights. Eighty percent of the panels with glazing were created using 3D molds.

"Tolerances were very tight, but we didn't have the surface smoothness," Schweitzer said. "3D-printing has that corduroy look, and you could see that at first, so Oak Ridge had to thicken the bead to get a smoother edge."

Once ORNL established the molds' viability for commercial use, the lab worked with

Photo courtesy of Gate Precast

Photo courtesy of Gate Precast

Additive Engineering Solutions (AES) to print additional molds for the Domino Sugar project.

More rigorous than the wood molds they replaced, the 3D carbon fiber-based molds stood up to as many as 200 casts per mold, which was critical to maintaining the accelerated project schedule.

Adkins and Schweitzer said the team used the molds in multiple ways, too, by flipping them or turning them upside-down to get different-looking windows or taking a form out of one mold and putting it into another. The window molds on the east and west of the building were the same basic shapes. On the south elevation, the window molds had the horizontal elements projected, and on the north elevation, the vertical elements projected.

TIME-SAVING INSTALLATION

To save time, Gate Precast installed the windows into the precast punched window panels at its Kentucky and North Carolina plants. Schweitzer said the process presented challenges, particularly in terms of good weather for caulking since the panels were so large that window installations had to be completed outdoors. The caulking also had to cure for four days, so it was about a week's cycle for window installation for each panel.

Getting the precast panels to the job site required careful planning given the tight construction site, shipping the panels to a drop lot and shuttling them to the job site. Baltimore-based E.E. Marr Erectors installed the panels using a swivel crane, which eliminated the need for, and costs of, a second tailing crane.

The construction team worked floor by floor, and because the windows were already installed, each floor was completely enclosed as it was built after joints were caulked. Bolted connections secured the panels.

Photo courtesy of Gate Precast

The precast concrete facade also offers some self-shading due to the angles of the panels, reducing the building's solar exposure to meet sustainability goals.

Embeds extending above and below the floors accommodated all-thread rods at the back of the panels that allowed workers to slide windows into place and bolt them.

"Bolted connections led to 40% faster panel erection," explained Russ Vines, vice president of engineering for Gate Precast. Quicker panel erection reduced the schedule while saving crane, crane operator expense and earlier dry-in of the building. Additionally, bolted connections were the best option versus welded connections if only to protect the pre-glazing. Weld splatter can cause expensive damage to glass and frames.

"The erection went relatively smoothly given the height of the building. Wind was the main nemesis," Schweitzer said.

THE FUTURE OF 3D-PRINTING FOR PRECAST

Adkins said the outcome of the precast panels was sharp, crisp edges, which they were thankful for given it was the firm's first large-scale project using 3D-printing technology.

"We've used it for study models, but large-format, 3D-printing of precast molds has not been widely used on a commercial scale yet," he noted.

From the beginning of site excavation in early 2017 until receipt of the temporary certificate of occupancy was about two-and-a-half years. Schweitzer said the use of 3D-printing probably saved six months of construction time.

Precast, combined with the 3D-printing of molds, minimized construction waste, allowed Gate Precast to use skilled labor in different ways, and improved delivery and efficiency, according to Adkins. He's excited about the future of design and construction using this new technology.

"Part of what's fascinating is that now we're using BIM and can share our very detailed [Autodesk] Revit models back and forth with the manufacturer," he explained. "We're able to take the final model and go right into production. It's a seamless way of going from designer to contractor." PS

Deborah Huso is a freelance writer specializing in construction, real estate, finance and agriculture.

The Ins and Outs of Formliners

From textured finishes to embedded photos, formliners open up a world of creativity.

By Claude Goguen, P.E., LEED AP

A big city wants its new football stadium to have a brick finish to give it a classic Midwestern fieldhouse look. A national park wants its shelters and bathrooms to have a natural wood appearance. A university wants photos engraved onto the walls of its new building. Despite the differences in aesthetics, these three real-life examples have one thing in common: the owners wanted to use precast concrete for its strength, resiliency and ease of installation while achieving a specific aesthetic. Fortunately, formliner technology allows them to have their cake and eat it too.

Most people think of flat, gray surfaces such as driveways or sidewalks when they think of concrete, but it can also be made into amazing pieces of art. Originally, laborious handcrafting was needed to create a desired pattern or texture. Materials like wood, stone, and steel were used to place a pattern into a concrete surface, but this provided limited options. In the 1960s, elastomeric urethane formliners were introduced in Europe, and soon afterwards, designers used them to bring their visions to the surface. In the 1970s and 80s, the ribbed pattern was very popular on retaining and sound walls, as well as many industrial buildings. Next, the polyurethane formliner came along, and the finish options expanded substantially. The simple repetitive patterns gave way to more natural and ornate patterns.

Today, just about any pattern or texture can be achieved. It's not uncommon to see people walk up to a precast facade and touch it in order to believe it's actually concrete.

As more roadways are constructed and existing highways are being widened, communities are taking advantage of precast concrete sound walls and retaining walls to put their local pride on display. Some walls may be adorned with ornate symbols while others may contain the name or crest of the local community.

There are a wide variety of formliners available to designers. The choice mainly comes down to number of uses, and type of finish and texture.


NPCA file photo

FORMLINER TYPES

Formliners can be broken down into two types: single-use or multi-use. Single-use formliners are often made of styrene plastic and are less expensive and lightweight but may not offer the same degree of relief and texture depth. These can often be used as gaskets or holders for thin brick that are embedded into the precast wall panel. Liners hold the brick in place, providing consistency in the simulated brick mortar joints while the concrete is poured.

Styrofoam, which is often used for blockouts in precast concrete structures, can also be used to make single-use formliners. Polystyrene and acrylonitrile butadiene styrene (ABS) formliners will provide moderate relief and texture. These can be multi-use but are typically limited to 10 to 15 uses.

Elastomeric urethane (rubber) formliners are used to help attain more detailed relief and texture and can be used many times, more than 100 depending on the supplier. They are usually more expensive but can result in the best value when manufacturing products for larger projects that require more pattern and texture definition.


NPCA file photo

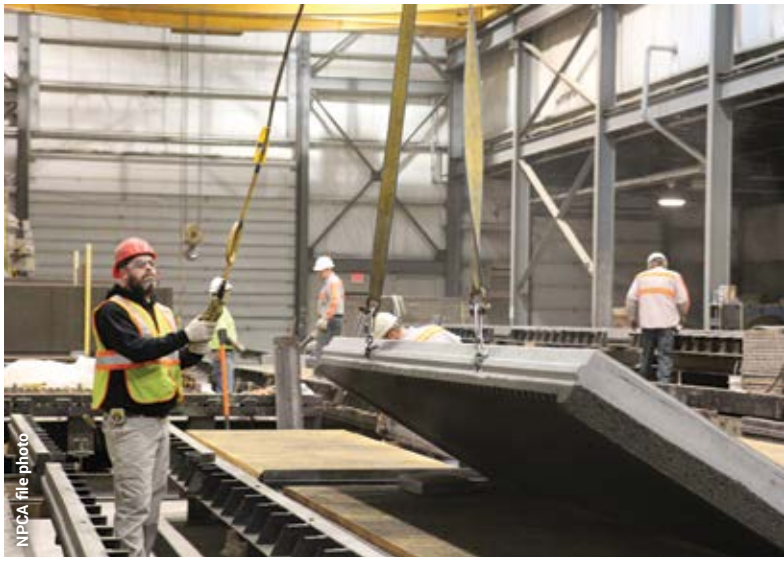
HOW THEY ARE MADE

Transforming concrete into a work of art involves many steps. However, it all starts with an idea. If the designer of a building wants the lower portion of the wall panel to have a pattern that resembles tall grass, conceptual drawings

would be created and approved. Sometimes, the formliner manufacturer may also generate a 3D mockup for approval.

Once the pattern is confirmed, it is often converted by computer numerical control (CNC) software onto a master mold surface. The surface is carefully checked for accuracy and quality, and then sealed if necessary. At that point, the liquid resin or rubber is poured onto the master mold. Once the material has cured, it is removed from the master mold and carefully checked again before sending it to the precast manufacturer.

Once the precaster has it, they can place it in their form and pour the concrete onto it. The formliner will typically be at the bottom so the forces of gravity will help enhance the intricate details. Once the concrete has cured, the precaster will strip the piece, clean it and apply any other necessary treatments.



NEW TECHNOLOGIES

The finish options attainable using formliners is endless – from very miniscule


NPCA file photo


NPCA file photo

textures to very deep reliefs. Imagine taking a photo and being able to transfer that image onto concrete through a formliner. That is what architects in Montreal, Canada, were able to do when they designed the Edison Residence.

An image captured by Thomas Edison of Montreal firefighters in 1901 was scanned into a computer which separated the color tones of the image. A machining file was created by the computer and fed to a CNC machine, which engraved the different grooves and textures on a master model. The formliner material was poured onto the master mold, and used to make the concrete panels. Once you stand back and look at the panel, Edison's image comes alive.[i] A similar process was used in Toulouse, France, for the Universite de Toulouse Paul Sabatier.

The concept of using a precast concrete facade to tell a story through images has spurred further innovations in formliner technology. US Formliner has a product called Artico Neo which is a plastic foil printed with an image or graphics and uses a concrete activator. This activator causes the concrete to set at different rates, like when using a surface applied retarder. This allows for a thin layer of paste to be partially removed as per the pattern of the activator. The contrast between the removed thin layers and smooth surfaces creates the image or graphic.

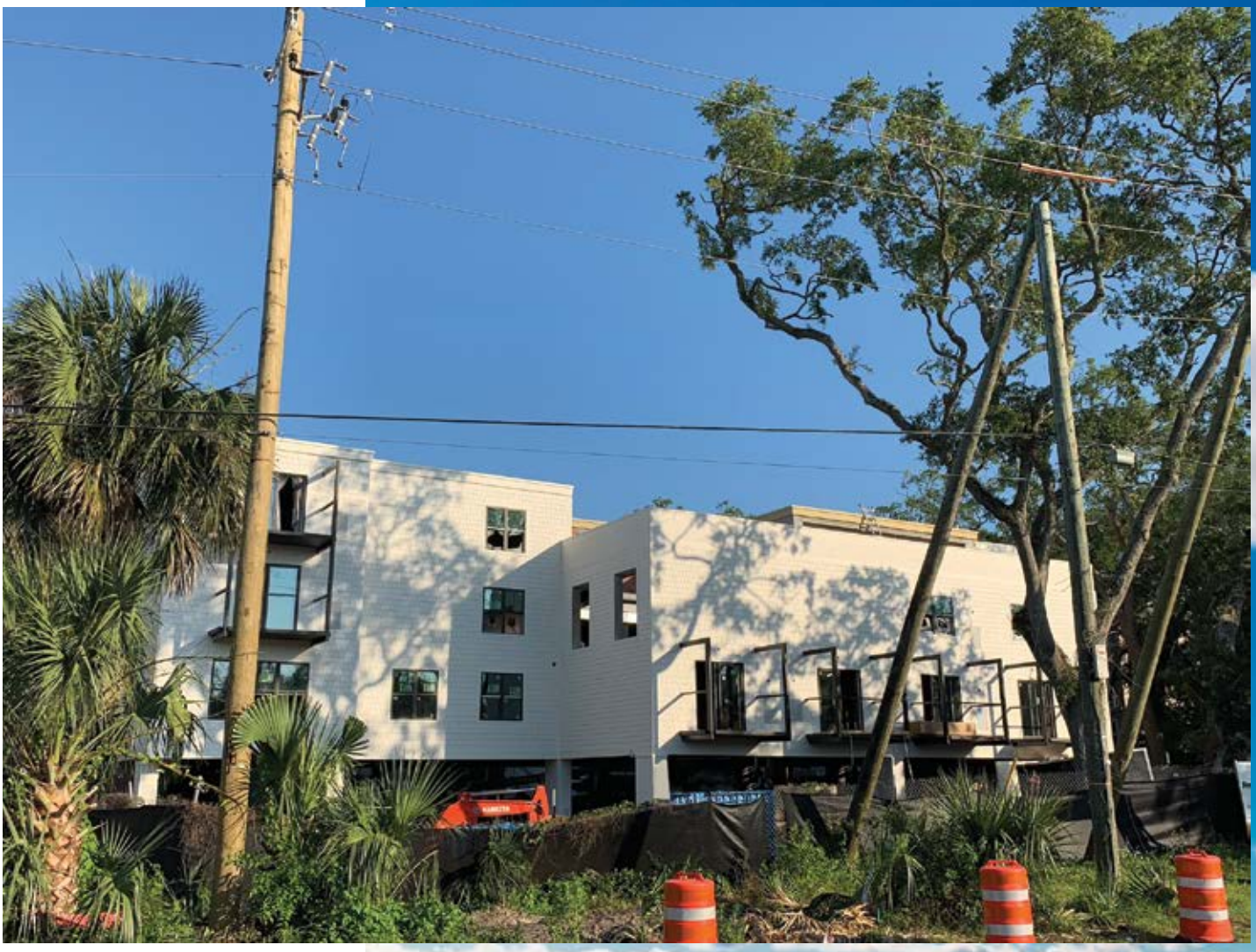
VALUE ADDED

The primary value of precast concrete for owners, developers and designers has always been its strength, durability, energy efficiency and low maintenance. The advent and evolution of formliners are now adding another important value: the ability to express creative visions and ideas. Whether it's to mimic a wood grain, add a medallion of the town's crest or to tell a story through photos, formliners are tools manufacturers can use to enhance precast concrete's versatility. PS

Claude Goguen, P.E., LEED AP, is NPCA's Director of Outreach and Technical Education.

Endnotes

[i] https://precast.org/2015/04/256-shades-of-gray/



Precast Concrete Brings Hotel Simon

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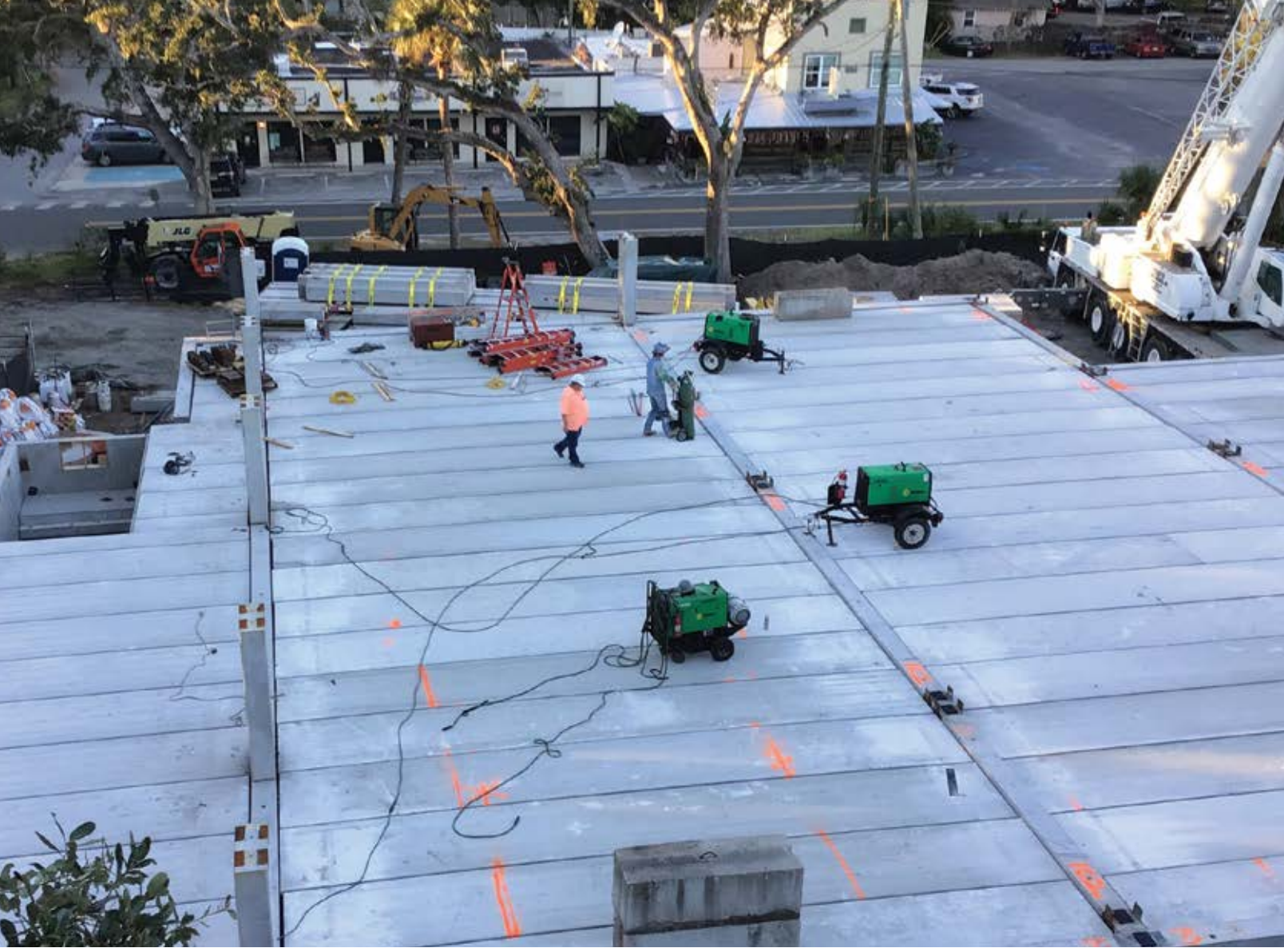

With a tight job site and timeline, precast concrete was a key component in a new luxury hotel in Georgia.

By Matt Werner
Photos courtesy of VANHOOSECO Precast

Tight constraints on job site, energy efficiency and quick installation are all reasons to choose precast concrete, and for the new Hotel Simone on St. Simons Island, Ga., all three came into play.

As one of Georgia's Golden Isles, St. Simons Island is a popular tourist spot. General Contractor Kelly Mahoney wanted to take advantage of the market by building and owning a boutique hotel located steps from the beach that catered exclusively to adults. He also wanted the facility to be built to the highest standards and have the look of "new Florida" modern with innovative construction methods. He chose precast concrete to achieve all his goals.

A FIRM BELIEVER

Prior to this hotel, Mahoney had primarily built multi-family developments, and that's where he crossed paths with NPCA member VANHOOSECO Precast. Mahoney's company, Value Added Concepts, had specified precast walls for a project in Knoxville, Tenn., featuring a slope that would have made cast-in-place very difficult.

With only a half-acre job site, precast concrete became the choice for Hotel Simone as crews were able to quickly and efficiently build the hotel. The project featured precast concrete walls, columns and beams and was completed in just eight months.

"I started sourcing them for other work that had similar problems with limited site access and tight schedules," Mahoney explained. "I wanted to try them on doing a whole building as opposed to just the foundation walls."

So, Mahoney and VANHOOSECO got to work on designing Hotel Simone. VANHOOSECO Engineering Manager Allen Trotter said their team helped shift the design away from traditional construction to make the building's entire shell out of precast. Trotter noted they produced columns, beams and the company's licensed Envirocast walls, which feature EPS insulation and metal drywall studs, to deliver an economic and energy efficient product.

"Everything is incorporated so it opens up the interior," Trotter said. "Once it's set, you can start immediately on the interior of your building."

Being able to get the project completed quickly was a big reason Mahoney wanted to use precast. Trotter estimated they started producing the pieces in September 2018 and completed their work on-site in February 2019.

"We all felt using precast could shave three months off the schedule," Mahoney explained. "Having used precast a few other times and seeing the time savings, I'm a firm believer in it."

Mahoney also noted the ease of strapping and bracing the panels together by using precast.

"Everything is tied together with their plates, so that saved a lot of time and headaches," he said. "Plus, the overall strength is superior to traditional stick frame buildings."

OVERCOMING OBSTACLES

Trotter said the production of the pieces wasn't anything out of the ordinary for VANHOOSECO, but there were logistical considerations that required a lot of planning. For one thing, it was more than 500 miles from their plant to the job site. For another, the job site itself was only about half an acre with houses and streets surrounding it. With nearly 500 total pieces and more than 2,000 tons of precast for the job, it required a coordinated effort from all parties to make sure the project went off without a hitch.

Trotter joked he had been on tougher job sites with elevation differences, but this was the closest proximity to other buildings he'd had to overcome.

"It's tight for getting just passenger vehicles around let alone a 250-ton crane," he said. "You could only fit the crane in one spot. If you're in the house, you can pretty much reach out and touch the hotel."

The VANHOOSECO team was able to make several trips to the job site prior to construction to game plan how they were going to make it work.

The restaurant next to the project was willing to allow crews to use the parking lot until mid-afternoon for staging. They also found an empty space about seven miles away they were able to use as a staging yard for all the precast pieces and equipment, making the challenge a little more manageable.

"We dedicated a driver for doing nothing but swapping loads in and out," Trotter said. "We spent a lot of time hauling trailers from the secondary staging yard. We had probably 100 loads between the planks and the beams, and we could only fit three on the site."

A design consideration they also had to take into account was the island's height restriction of 45 feet or four stories.

Fortunately, the use of precast for the flooring system helped save space there as well. Trotter said they had to take into consideration the hotel's pool, which was above the garage on the third floor of the building.

"We were using 8-inch planks for the flooring, but there we had to use 10-inch solid planks because of the weight of the pool with the water in it," he explained. "With the height restrictions, we had to increase the width and reinforcing of our beams because we couldn't do anything to the depth of them."

SUCCESSFUL PARTNERSHIP

Hotel Simone was ready to open in August 2019, just eight months after the project started.

"Using precast is definitely a good, quick way to do it," Mahoney said. "We're seeing some of the benefits operationally already. The performance of the building is better than a traditional building.

"It's for sure quieter than it would have been if we did a stick frame with regular insulation."

All parties consider the project successful.

"The issues we had were primarily logistics," Trotter said. "We're looking at doing more projects together, which is great." PS

Matt Werner is the managing editor of Precast Solutions magazine and is NPCA's communication manager.

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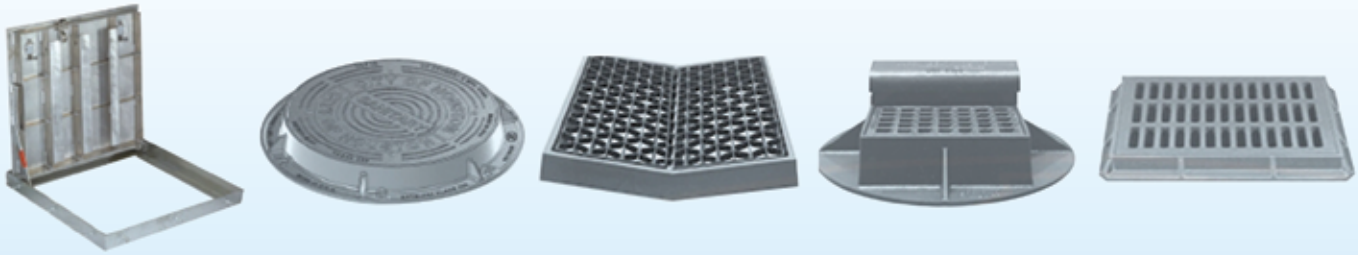

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Thursday, June 25, 2020

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This webinar, we will use actual case studies to discuss strategies to manage the unpredictable nature of stormwater runoff in urban environments. We will look at aspects of green infrastructure including low impact development.

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