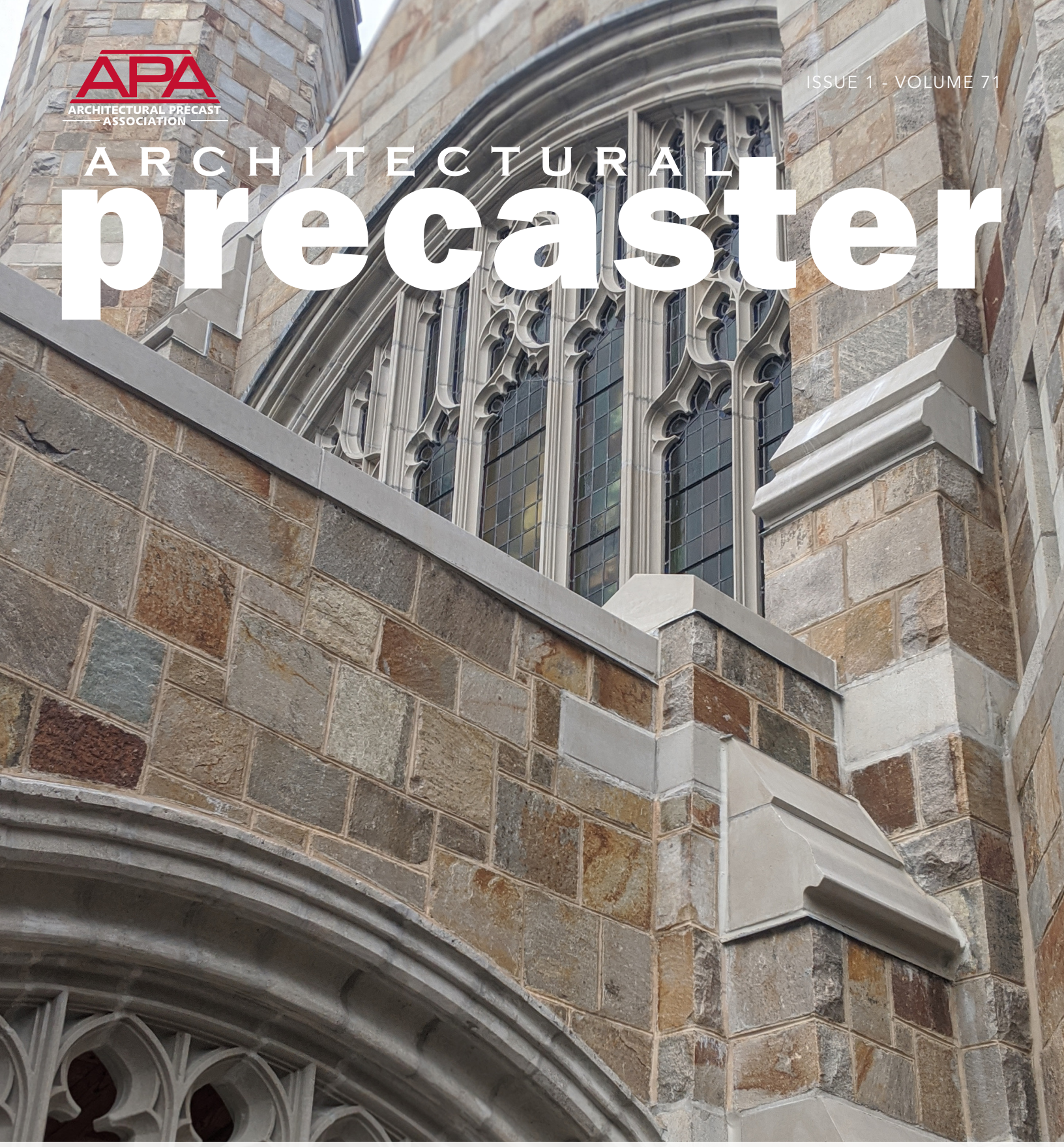
APA
ARCHITECTURAL PRECAST ASSOCIATION

ISSUE 1 - VOLUME 71

# ARCHITECTURAL precaster



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ARCHITECTURAL
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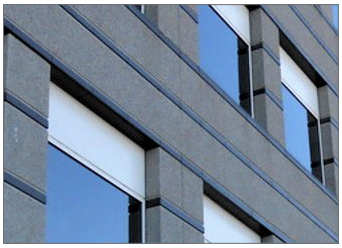
## In-Depth Look
Design & Manufacturing Award Winner

Peter J. Gomes Chapel – Bates College | Northern Design





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## DEPARTMENTS

# PRESIDENT'S MESSAGE

*Nick Carosi IV, Arban & Carosi, Inc.*

Greetings to all fellow producers, associates and professional members:

We were thankful to those that attended and sponsored the APA Spring Workshop in Alexandria, Virginia. Kiley Marcoe from Metro Precast & Stone Services conducted a great patching and finishing workshop. Make sure you check out the pictures from the Spring Workshop in this edition of The Precaster or online. You should also make sure you save the date for 2023's Spring Workshop in Opelika, Alabama from March 31st to April 3rd, 2023.

For the Annual Convention, our Education Committee has come up with some great motivational and educational programming, fun activities and plant tours. Please register. We will see you October 14 – 17, 2022 at The Westin Long Beach, California.

I am pleased to inform you that the APA is now an approved continuing education (CE) provider for the American Society of Landscape Architects (ASLA). Our first approved course is Plant Tours, so you may now offer CE credit for any plant tours conducted for landscape architects. See the Designers tab on the APA website for details.

I hope that you, your families and employees are still doing well and I very much look forward to seeing you this fall in California!

Nick Carosi IV

**REGISTRATION IS OPEN!**

**Visit www.archprecast.org for more information**

**2022 APA ANNUAL CONVENTION**

**OCTOBER 14-17**

**The Westin, Long Beach, California**

Peter J. Gomes Chapel – Bates College | Northern Design

# An In-Depth Look at an APA Award Winning Project

## PETER J. GOMES CHAPEL – BATES COLLEGE
## NORTHERN DESIGN
## APA 2021 DESIGN AND MANUFACTURING AWARD WINNER

### Overview

The Peter J. Gomes Chapel, built in 1913, is the centerpiece of the prestigious Bates College campus. The building's façade of the building is granite veneer with concrete belt courses, window surrounds, tracery assemblies, door trim, treads, landings, a decorative date stone, buttress stones, and various cap and coping profiles. The design intent on this historical restoration was to replace about 50% of the concrete trim and all the tracery window stones. Consequently, not all the trim in the accompanying pictures is new. The fact that it's hard to distinguish is telling, since the goal was to deliver a final product that is consistent, attractive and maintains the chapel's historical appearance.

Northern Design (ND) produced more than 900 pieces of precast for this project, almost half of which were decorative tracery stones that required two-day, composite pours. The project yielded an incredible 340 different molds. Of these, slightly less than 300 were CNC-c.c. Styrofoam for both the interior and exterior portions of each tracery stone (two molds per piece type).

There was some repetition between window assemblies on the façade. Overall, 17 tracery openings were replaced and there were nine different assembly types. The ND team was able to get three or four pours on some of those decorative molds but many of the special molds were single pours.

This project is a wonderful example of how new age technology can bridge backward, helping to replicate the past as 3D scanning, modeling and CNC molding were all critical aspects of the process. Even more so, the ND team's skill and effort was the ultimate key to success. They managed the information, executed the process with accuracy and delivered an attractive product to the site in a timely manner. That level of care and attention is paramount on a restoration project of this magnitude.

### Design Excellence

This chapel's precast trim defines all the windows, doors, roofline and bump-outs. It's a classic church design and the team was diligent about matching the stone "in-kind" while incorporating new back-up, anchoring and flashing details to eliminate the water issues that riddled the structure for decades. Not only does the trim work accent the entire façade, but it defines the shapes and

*continued on next page*

lines of the glass traceries within each of the decorative window assemblies. The belt coursing's lateral layers help tie everything together, creating a perfect balance of decorative profiles and simple shapes that exemplifies the versatility of architectural precast.

## Compatibility with Natural Surroundings

Situated in the center of campus, the chapel is surrounded by lawn, trees and green space. Inside and out, there's a calm serenity to the building. The rest of the campus's architecture varies in style. However, there's no denying the chapel manifests an aged, "made of stone" aura that reminds students and visitors alike that the school is built on a foundation of faith, strength and longevity.

## Concept Excellence

Precast creates incredible symmetry and elegance to all the tracery window openings. This brings both a sense of awe and a functional way to hold and highlight the stained glass within each of the smaller openings that the stones create. The window and door surrounds create nice accents within the strong granite veneer. The buttress caps create step-back transitions for the veneer. They also transition into adjacent bands, tying the trim together, both from ground level to rooftop and from one elevation to the next. Originally, the treads and landings were slated to be cast in place. However, to maintain consistency and ensure a pleasing appearance throughout, the design team elected to go with precast.

## It's All in the Detailing

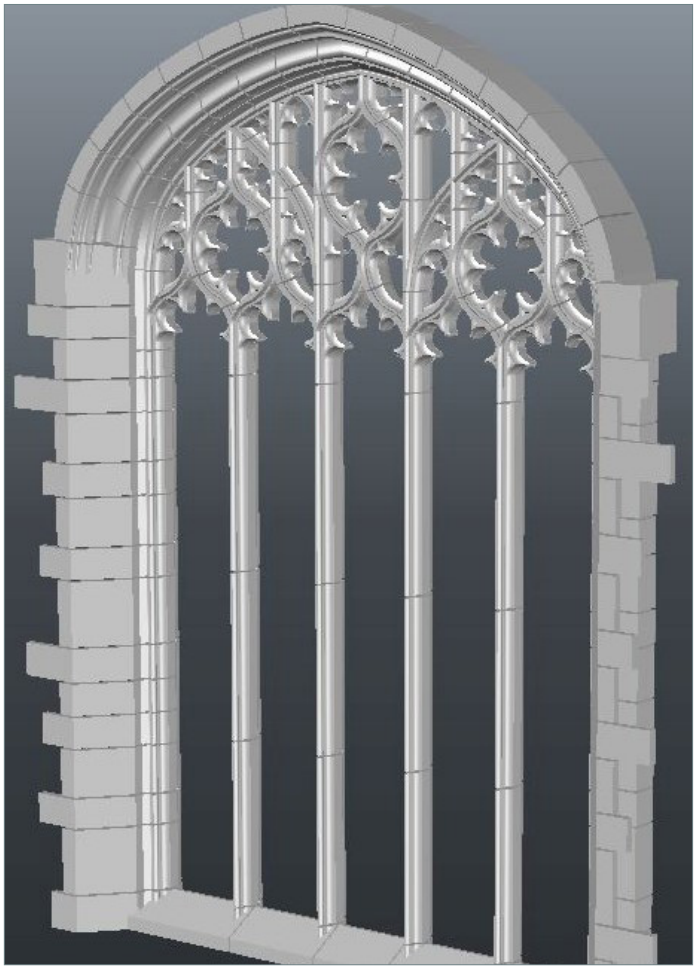
"We are only as good as our shops" is a popular statement in the Northern Design plant. The entire project relied on the drafting and technology team's hard work, attention to detail and accurate execution. The entire building was laser scanned to create a 3D point cloud file. The tracery profile at the interior is different than the exterior, so the ND team scanned inside and outside. Subsequently, they removed removing glass in certain areas to develop reference points so the files could be linked together after the fact. They then combined those point cloud files and converted them into CAD so their draftsmen could start digesting the quirks of every assembly.

Given the limitations of scanning (not knowing what was inside the walls), the ND team did not rely on the scan data for the simpler precast elements. They collaborated with the contractor to demo certain areas and remove necessary stones so they could compare findings to the scan and create a high level of confidence. To identify any discrepancies, they also field measured all the masonry openings for the tracery assemblies.

Due to the age of the chapel and construction methods used to build the original structure, there were many imperfections with the original tracery stones and how they were installed. Consequently, drawing (and later molding and producing) off the scan data was not an option. The ND team knew they had to iron out the wrinkles so they began by determining the masonry openings for each window type. They then modeled the traceries from scratch, maintaining the existing overall design of the existing and using the predetermined masonry openings.

"Installations of this magnitude are always difficult but trying to finagle a piece into place that aligns with three or four adjacent stones is almost like trying to solve one those one-color jigsaw puzzles," said Jesse Thompson, president of Northern Design. Modeling it all from scratch was a time-consuming process that started with the overall masonry openings and then held glass openings and maintained the section profile and thickness. From there they matched the existing joint lines and evened them out throughout. In the end, ND developed a new model that incorporated the original tracery layouts per the 3D scanning, the existing masonry openings from the field and the depth and details of what was inside the wall, from retained stones that were later demolished.

Once completed, the team pulled out individual pieces and catalogued them in ND's production shop drawings.



This resulted in 140 pages of elevations, layouts, sections and piece details. Updating the shop drawings was a weekly challenge as pieces were added or eliminated as the project progressed.

The tracery stones' details were very involved since the team fed the CAD info directly into the CNC. The ND

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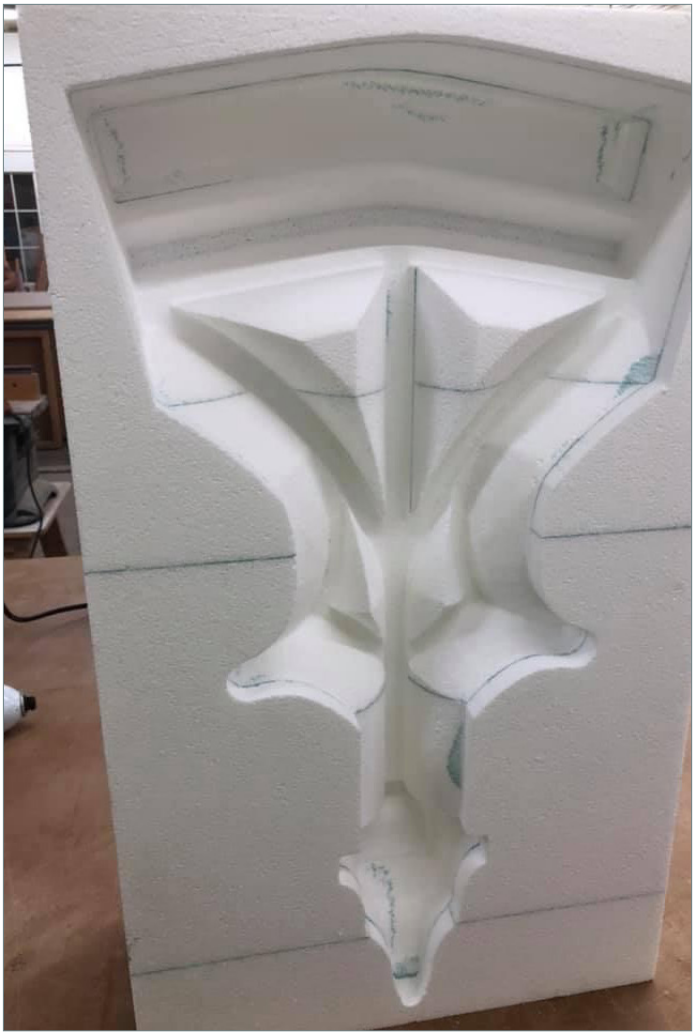


team found that cutting the foam in 2-inch layers allowed them to create better details and crisper lines. Doing so added steps at almost every turn, but in the end they paid dividends by ensuring a high level of accuracy and limited remakes.

## Manufacturing Excellence

The approved color was a light gray/limestone tone with a light etch finish. The team used a combination of gray and white cement in the mix design to create a cool tone and to blend seamlessly into the existing stone that remained in place. Using the same process and personnel when finishing each piece was essential since the slightest variation in etch depth can create a noticeable difference in color.

## Challenges

There were many challenges on this project, particularly the drafting issues mentioned earlier. The ND technology and carpentry teams then had their hands full building hundreds of Styrofoam molds on the CNC machine. For almost eight months straight, the teams had to produce 2-inch layers for every different tracery stone type on each interior and exterior mold. The carpentry team glued the layers together, sealed the seams, sanded them smooth and coated them with epoxy so the foam could handle the concrete's weight and heat. From start to finish, each mold took about five days to build and the plant had eight to 10 molds cycling through at a time.

The production team faced many challenges including composite pours, ensuring a perfectly consistent glass groove was maintained, and carefully stripping the

pieces so as not to damage molds that needed to be re-used. Impressively, more than 400 tracery stones were made and only four remakes were required.

The finishing team addressed the patching and curing of stones that show all the way around and precisely ensuring a consistent finish among the 900 pieces. And the shipping team was limited with how they could safely deliver these pieces which required many additional loads, because it was imperative to get the ornate pieces to site without damage.

With a project full of challenges, the ND team did a yeoman's job navigating the hurdles and doing the many little things that resulted in a product worthy of an APA Award for Excellence in Design and Manufacturing.

## By the Numbers

- Pieces produced: 900+
- Molds produced: 340+
- Pages of elevations, layouts and details: 140
- Production time: 8 months


On March 1, 2023 all APA plants will have at least one employee with an APA certification (QC I, QC II or Batch Plant Operator) who will have to submit verification of their 12 hours of Continuing Education (CE) requirement.

A list of qualifying CE options and the CE Log Form are on the APA website and can be found at: www.archprecast.org/personnel-certification

If you have questions please call 850.205.5637 or e-mail to jbrewton@executiveoffice.org.

*Some 20 years ago, Arban & Carosi supplied terra cotta-clad precast concrete panels for CityCenterDC in downtown Washington, D.C. It was the company's first project that involved large terra cotta-cladded panels. The principals chose the material and method to speed up construction and because of the reliability of the façade. Photo courtesy of Arban & Carosi*

# Cladded Panels Widen Options, Speed Up Building Process

*By Stacey Enesey Klemenc*

As skilled laborers get more expensive and help harder to find, architectural precast panels continue to gain favor across the country for large construction projects. The reasons are many.

"We manufacture large architectural precast panels," says Nick Carosi IV, president of Arban & Carosi, a family-owned and operated precast concrete company in Northern Virginia founded around 1920. When it comes to installation, "Less pieces save money, time and scheduling."

Building hospitals, high-rise residential facilities, multistory office buildings and other large construction projects is trending away from methods involving hand-laid material, he says. Instead, cranes pick up and set precast wall systems, and welders typically complete the installation.

*Cranes lift panels into place while welders typically complete the installation. Photo courtesy of Arban & Carosi*

Building with precast components, Carosi says, means less material and less people on the job site every day, which adds up to less impact to the project and the environment as a whole. "Using precast cladding (components) should be a win-win for all parties — the producer, contractor and owner. It provides a much more streamlined schedule and more reliable off-site production."

Myriad materials are used to clad these concrete panels, including brick, terracotta, and natural stone such as limestone and granite. Oftentimes, more than one material makes up the panel's face.

*Thin brick is a popular choice for architectural projects. The Pepco building in Washington, D.C., features thin brick-clad panels made by Arban & Carosi with brick manufactured by Endicott. Photo courtesy of Endicott*

A handful of independent companies in the U.S. produce formliners for architectural precast panels, while some companies — such as Arban & Carosi and American Stone Virginia — make their own. The more expensive rubber form liners are used to make multiple panels while the inexpensive plastic varieties are for one-time use. Some companies also make reusable form liners out of wood.

*Architectural precast panels are made with form liners in a climate-controlled facility. Photo courtesy of American Stone Virginia*

## Brick-clad Panels Offer Savings All-around

Brick has long been a favored construction material for architectural projects throughout the United States. And thin brick-cladded panels remain a favorite option for many architects and developers.

"Using brick-clad precast panels makes more sense for large buildings," says Steve Kegley architectural sales representative for Endicott Thin Brick LLC. In that capacity, "Precast with embedded brick becomes very effective and budget friendly."

Endicott, a fourth-generation family-owned business founded in 1920, makes thin brick and matching face brick in 30 colors in various textures. Sizes range from 8 to 16 inches long and 2-1/4 to 8-inches high. The material comes from a vein of clay near Endicott's plant in Jefferson County Nebraska.

The rich colors are manufactured by combining raw material and firing the bricks for a certain time at a certain temperature. "And the color (of Endicott architectural products) is always the same inside and outside," Kegley says.

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An exception to this, he adds, is the company's newest product line — glazed thin brick. "We introduced this product in the fall just prior to the COVID breakout and sales were slow to take off," he says. However, as business returns to a healthier pace, interest is gaining momentum.

*New varieties of thin brick are bring developed such glazed brick that can have different textures and can also be custom colored for a particular job. Photo courtesy of Endicott*

The glazed thin brick can be custom colored for a particular job. "Coming up with a glaze is like developing a paint color," Kegley says, offering the designer an opportunity to be creative at a fairly affordable price point.

## Proper Bonding is Key

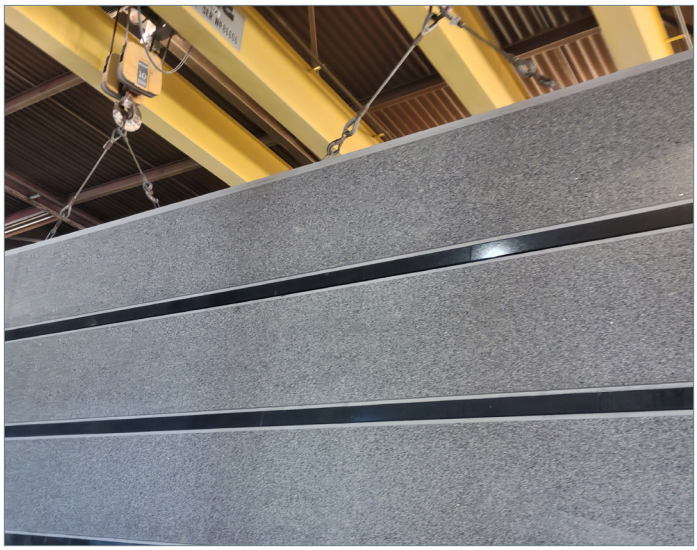
One of the challenges of producing cladded panels is effectively joining together significantly dissimilar materials such as marble and concrete, says Chris Cox, operations manager for Castone, an architectural precast concrete manufacturer in Opelika, Alabama. The company has supplied components for project such as sports venues, university and corporate campuses, residential projects, and churches since 1962.

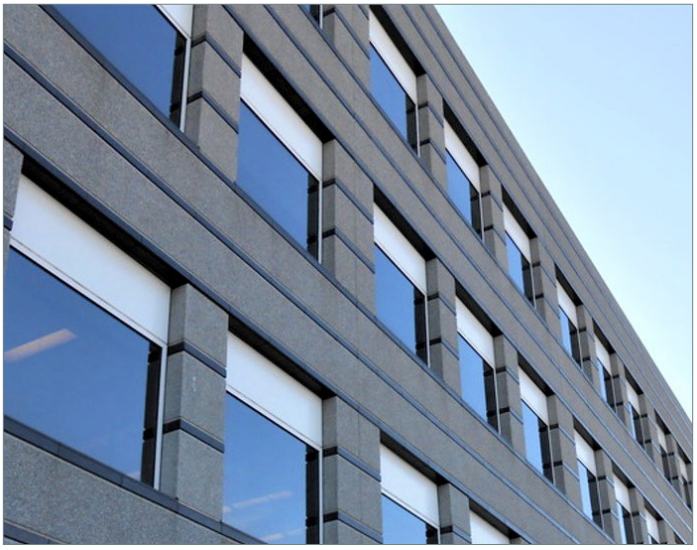
When the thermal contraction and expansion of materials vary greatly, they can't be bonded directly to each other. Instead, they are joined by bonding embedded mechanical anchors that allow materials to move

*The clip pictured here holds the granite component to the precast concrete panel, allowing them to move independently from each other while staying securely attached. Photo courtesy of Castone*

independently from another, Cox says. If you didn't allow for movement, he adds, a mortared bond could break and shatter or crack materials such as natural stone.

Carosi says methods to prevent cracking and other issues associated with expansion and contraction rates depend on the material. For instance, it's widespread practice to separate natural stone and concrete by installing a bond breaker between the two to avoid direct contact. Instead, mechanical pins inserted into the stone are bonded to concrete. This allows the stone itself to move when it expands and contracts.





*(Previous two photos) Precast panels of polished black granite and gray concrete with exposed aggregate clad the exterior of the HudsonAlpha Institute for Biotechnology in Huntsville, Alabama. Photos courtesy of Castone*

*With the right form liner, brick patterns may vary throughout the panel while still emulating a consistent look. Seen here, recessed and protruding sections combine for an appealing look. Photo courtesy of American Stone Virginia*

Besides polyethylene, a thin layer of foam between two incompatible materials can also be used as a bond breaker, Cox says. When it comes to brick and concrete, "You don't need to keep them separate because they're compatible. Precast concrete becomes the mortar," he says.

Dino Diana, managing member of American Stone Virginia, a company that's been in business for about 60 years, agrees. He says industry groups have studied brick's properties and maintain the coefficient of expansion between brick and concrete is negligible and nothing to worry about. However, a bond breaker should be used with limestone and granite. "You want enough flexibility that the stone floats and moves on the surface without any cracking," he says.

"When using natural stone, you use stainless-steel anchors as connection systems," he explains. "Devising bonds for natural stone and concrete is a little more one-off. We rely on engineers and engineering as to how many connections we need to have." For example, you may need one connection for every 10 square feet of stone-veneer panel.

In some buildings, a stacked and spandrel-column system enables precast panels to support the panels above them. "These are usually connected back to the building structure by means of steel-attached structural supports," Diana says. By using this system, a structure can be lighter. "But you can only stack so high," he adds. "It's something you can consider for four stories and under."

*In some buildings, a stacked and spandrel-column system enables precast panels to support the panels above them.Photo courtesy of American Stone Virginia*

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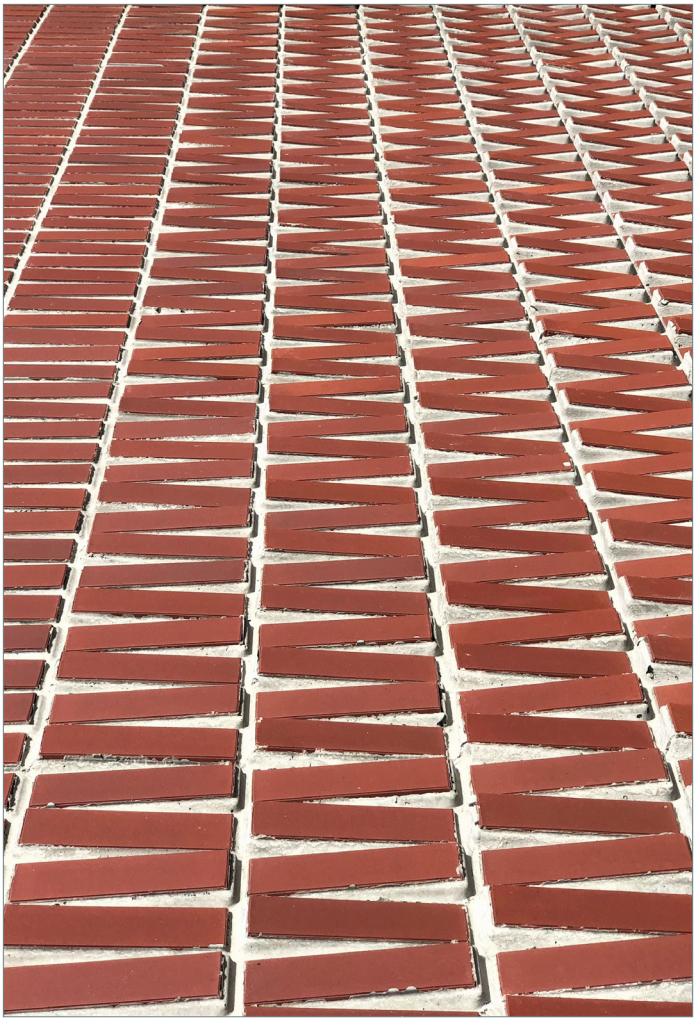
## When Bigger is Better

Cox says Castone prefers to make panels "as large as we can," limited only by the capacity of overhead cranes in the plant and onsite, as well as transportation restrictions. "The larger you make them, the fewer pieces there are to install."

"The biggest panel we've ever made was 65 feet long and weighed 80,000 pounds," Carosi says.

As a rule of thumb, Diana says, his company tries to stay under 40,000 pounds per panel but will go up to 60,000 pounds.



*One of the attributes of cladded panels is that they allow for designs that would be next to impossible to create on a job site. Photo courtesy of Endicott*

"One of the attributes of cladded panels is that the sky's the limit when it comes to design," Endicott's Kegley says. "Precast is gaining in popularity among designers because you can't create (some of these) configurations with conventional full-bed brick veneer."

And the speed of assembly is also inviting to owners and developers. Since instillation takes place in large modules — with typical panels ranging from 9-to 12 feet tall and 35 or so-feet long — considerable time is shaved off the job schedule.

Not to mention the savings in manpower. Some estimate 10 masons can set 5,000 square feet of brick in a day. In comparison, four people and a crane operator can do the same thing with precast panels in less than an hour.

*Arban & Carosi approached the team responsible for constructing the EPA headquarters in Potomac Yard in Arlington, Virginia, and convinced them to switch from traditional masonry to thin brick-clad precast panels. The building method and material streamlined the project and shaved months off the production schedule. Photo courtesy of Arban & Carosi*

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# HOW TO DISMISS A BAD APPLE EMPLOYEE -- THE RIGHT WAY

**"Conflict delayed is conflict multiplied." – Dr. Jordan Peterson**

In Virginia, there are lots of apple trees. Most of the apples are good but every now and then you come upon a bad apple that you have to throw away. Like apple trees, employers, face a similar challenge. It would be wonderful if all employees would follow the rules and perform at a high level of excellence at all times and we know that most employees meet this standard and do a good job. Sometimes, however, we come upon an employee that is a bad apple and when that occurs, we are faced with the question of dismissal. Sometimes the dismissal may be due to a lengthy record of poor performance or policy violation; other times, it may be due to an incident so serious that dismissal is the only proper course of action.

Dismissing an employee is unpleasant and some managers worry about dismissing employees too quickly. Usually, however, the opposite is true. Most employers we know are good hearted and want to give employees a second chance . . . and sometimes a third and a fourth chance. You can get into just as much trouble being too good to an employee as otherwise. As a result, we tend to keep the bad apples much longer than we should, in the hope that they will improve. Gazing upon the rubble of a backfired problem, many of us have said with a sigh, "I should have fired that person a long time ago." Most of the time, bad apple employees do not improve; to the contrary, they get worse.

Way back in "the Day," our high school physics teacher taught us the Second Rule of Thermodynamics which is that, left alone, things tend to get worse, not better. For example, if you toss an ax out into the yard, it will not tend to get shiny and sharp, but will become rusty and dull. The same principle is true with regard to bad apple employees – they don't tend to get better, they tend to get worse, and the situation will be worse at the end than it is now.

And, dismissals involve conflict and most managers would rather avoid this kind of confrontation. A dismissal can create "situational stress" which shows up in the form of restless sleep, anxiety, stomach pain and palpitations. On the other hand, you may have a profound sense of relief when it is all over and the bad apple employee is gone.

Therefore, if you have an employee who needs to be dismissed, it's better to move ahead and dismiss the employee now, take the heat of the moment, and let the healing process begin. Otherwise, it will get worse and will be worse at the end than it is now. I think this is what Dr. Peterson meant when he wrote, "Conflict delayed is conflict multiplied."

We thank the plants and companies that attended and sponsored the 2022 Spring Workshop in Alexandria, Virginia. The Spring Workshop offered valuable information to its attendees on Patching and Finishing. Attendees enjoyed learning from Kiley Marcoe and his great team and took away new techniques and processes.

The APA would like to thank Nick Carosi IV from Arban & Carosi, Inc. for his help in hosting this year's workshop for the hands on portion and for being the plant tour this year.

Check out the photos from this year's sessions and tour.

## WORKSHOP GALLERY


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Endicott Thin Brick

Welcome back, in this addition of the *APA Precaster* we will cover the art of cutting architectural precast. Art? Yes art! Equal parts good eye, steady hand, knowledge, proper saws, and PPE. Long gone are the days cutting openings in architectural precast meant using circular saws and using brute force to demo out the material.


# Cutting Precast

*By Kiley Marcoe, Metro Precast & Stone Services, Inc.*

With today's cut-n-break saws, concrete chainsaws, and wire saws cutting precast is easier, faster, and safer. These saws allow for detailed shapes and corner cuts without an overcut that must be repaired. Large sections can be cut quickly into manageable sized pieces.

It is not uncommon to have a panel cast with missing or mislocated reveals or chamfers. The remedial procedure to cut or grind in a reveal is not that difficult and with a few helpful tips completely inconspicuous. It is important to use only continuous rim diamond blades, not segmented blades. Only cut concrete with wet cutting saws or saws with a vacuum silica dust collection system and always follow OSHA table 1. Most cuts must

be performed free hand although saws with adjustable shoes, guides, and tracks are available.

## Cutting in of Reveals:

Saws equipped with adjustable shoe guides and diamond blades are utilized to cut in the reveals. The guides are set to the correct angle and depth of the reveals; also, the blade is marked with a permanent marker to the proper depth of the reveal as a secondary depth control.

1. The panel is marked to show the width and length of the reveal and then a chalk line is used to create a straight template.
2. Three cuts are made at each reveal. First the outside marks of the reveal are cut to the predetermined depth and angle. The center of reveal is then cut to the correct depth.


3. Hand tools are used to chisel out the center of the reveal creating a cavity of the correct width and depth.
4. For acid etched panels with a "sugar cube" finish the reveal is mechanically textured or textured trough etching to roughen the cut surface then a topical bonding agent is applied. The cut surface is then patched/rubbed to cover any exposed aggregate and chisel marks to mimic panel finish. For medium and heavy exposed finishes, the reveal is then textured to mimic panel finish.



The panel is then cleaned to remove any dust and debris.

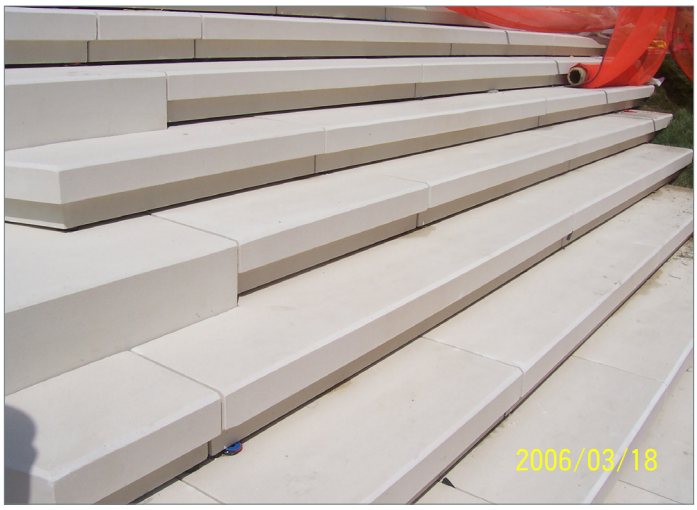
## Cutting Precast to Install Chamfers

Chamfers:

Cutting in a chamfer is performed when they were missed during manufacturing or to eliminate sharp corners that are easily damaged to reduce maintenance costs.

Lay out chamfer using chalk lines.


Cut precast at the chalk lines to create a chamfer eliminating the sharp corner. Then rub or texture the cut surface to mimic the panel's finish.




Completed installation of chamfers.

*Until next time, Kiley Marco*
*Metro Precast & Stone Services, Inc.*
*http://www.metroprecast.com/*