Specifier Q&A / Unique Precast Sculpture / LEED + EPDs

precast solutions®

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ON THE COVER:
Rise Up: "Uplifted Ground" is a special piece of artwork. In addition to containing nearly 400 pieces of ornate precast concrete, the sculpture weaves a tale of the geologic history of Austin, Texas, with a thought-provoking blend of colors, patterns and forms. Learn more about how Michael Singer Studio sought to tell a story through precast concrete on page 18.

Photo courtesy of Jeremy Green.

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WHAT'S INSIDE

Photo courtesy of Michael Singer Studio

Honoring Excellence in the Precast Concrete Industry

Each year, the National Precast Concrete Association honors excellence in the precast concrete industry through awards competitions. The Creative Use of Precast (CUP) Awards competition recognizes innovative applications of precast concrete in two categories: above-ground and underground. The Sustainability Awards competition rewards NPCA members for their sustainable products, practices and operations, highlighting the precast concrete industry's continuing commitment to sustainability. The 2016 CUP and Sustainability winners – recognized at The Precast Show 2016 in Nashville – are highlighted below.

CUP AWARDS

Above-Ground

FIRST PLACE

Superior Concrete Products (concretefence.com)
Project: Cleburne Precast Ranch Home
Location: Cleburne, Texas

What's the most effective way for a precaster to showcase the versatility of its products? That's the question Todd Sternfeld, owner of Superior Concrete Products, faced when he decided to create a ranchette from two existing buildings on the property of his manufacturing facility in Cleburne, Texas. The results of his efforts are a 600-square-foot rustic home and 150-square-foot shed that serve as a one-of-a-kind showroom. And, because

Superior Concrete is located in Texas, no ranchette would be complete without a horse corral – especially one completely enclosed with precast rail fencing.

The project showcases a major advantage of precast concrete and its ability to mimic the look of other materials while saving time, money and promising little or no maintenance. Using only in-house design, labor and materials, Sternfeld and his team completed the project in less than five months. This included a green approach of using 100% of the products from overruns and materials deemed "unusable" due to minor defects. Instead of parking these unwanted products in the boneyard, the team transformed them through a creative use of stains and paints.

While Superior Concrete is known primarily as a full-service precast concrete fencing manufacturer and contractor, the ranchette broadens that perception by a considerable margin. The house includes: faux brick precast fence panels, precast stucco fence panels for the home's interior and precast stone columns as accents. Wood rail precast fencing is used for the horse corral and entrance, and precast rails are used for the patio and sidewalk. Precast fence panel caps are used in the parking lot to simulate railroad ties, and a privacy fence is made of precast cobblestone with a decorative concrete wood-grain lattice trim.

"My goal was to build a prototype ranch complex showcasing the creative and unique uses of our modular precast fence components," Sternfeld said. "Our products can be used for so much more than fencing. The ranchette successfully demonstrates the cost-effectiveness and versatility of using precast concrete in the construction of small houses, buildings and other projects."

SECOND PLACE

Utility Concrete Products LLC (utilityconcrete.com)
Project: Counterfort Retaining Wall System
Location: I-90 Corridor, Illinois State Tollway

Utility Concrete Products developed a new retaining wall system that uses clay available on site, avoiding the costs associated with special backfill. The new system was specified for a major interstate project on Interstate 90 in Illinois, where 160,000 square feet of precast concrete Counterfort Retaining Wall was installed.

THIRD PLACE

StructureCast (structurecast.com)
Project: Black's Beach Custom Restroom
Location: La Jolla, Calif.

In La Jolla, Calif., alumni from the University of California-San Diego sought to install a restroom and lifeguard storage facility on an environmentally sensitive site. StructureCast saved the day with a custom precast concrete solution that met the stringent requirements of the California Coastal Commission. The structure was designed with a color palette that helped the precast blend in with the surrounding area.

HONORABLE MENTION

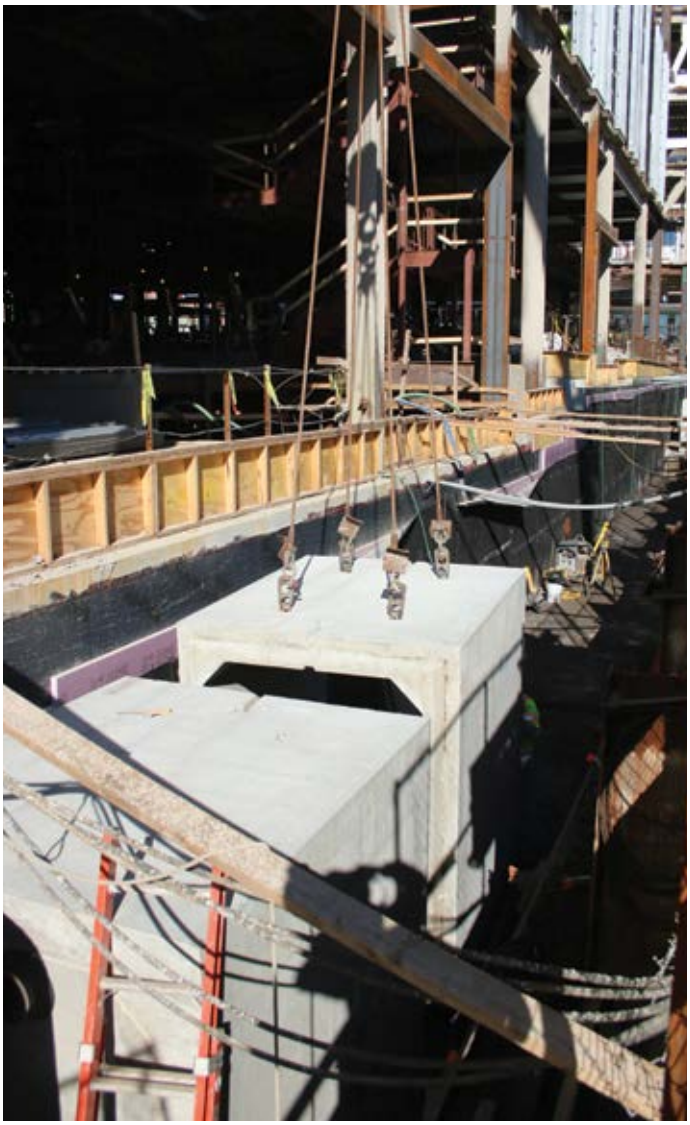
Colorado Precast Concrete Inc. (coloprecast.com)
Project: The White House Restroom Facility
Location: Center, Colo.

HONORABLE MENTION

StructureCast (structurecast.com)
Project: Armenian Genocide Memorial Monument
Location: Las Vegas, Nev.

HONORABLE MENTION

Universal Precast Concrete Inc. (universalprecast.com)
Project: Bootleg Canyon Animals
Location: Boulder City, Nev.



Underground

FIRST PLACE

Lindsay Precast Inc. (lindsayprecast.com)
Project: Holden Arboretum Deer Deterrent Vaults
Location: Kirtland, Ohio

To a deer, an arboretum filled with rare and woody plants likely looks like a giant, welcoming salad bar. The problem for the Holden Arboretum in Kirtland, Ohio, was how to keep the deer away from the salad and still provide access to the public. Lindsay Precast provided the answer.

The 230-acre core of the massive, 3,600-acre arboretum is protected by an 8-foot-high wire and wood post deer fence. The fence protected the perimeter, but the deer could easily enter via the road and help themselves to the diverse range of plants in the ecologically sensitive area.

The solution was a set of steel grates set atop a vault. Cars could pass over the grate, but the deer – peering into the vault below – would not take the risk. Lindsay Precast, along with its fabrication division, manufactured two custom precast vaults and steel grating 20 feet long by 34 feet wide. The width was needed due to the jumping ability of deer, which can make leaps of up to 30 feet.

Lindsay constructed the 34-foot-wide, 4-foot-deep vaults in two pieces. The vaults create the void under the grating needed to deter the deer, similar to a cattle guard, and also allow for stormwater draining. The four pieces were set in one day.

Production began in early June 2015 and consisted of one pour for the base and a secondary pour for the vault walls. Each vault took five days to complete, including panel setup and stripping. Mentioning the project in the Holden Arboretum Leaves Magazine, president and CEO Clement Hamilton said that the project marked a major improvement for the facility. The local deer population would probably disagree!

SECOND PLACE

Kistner Concrete Products Inc. (kistner.com)
Project: Jacobs School of Medicine Stormwater Detention System
Location: Buffalo, N.Y.

With limited space and difficult site conditions, manufacturing a stormwater detention system for a new medical school at the University of Buffalo was no easy task. But Kistner Concrete Products' 50,000-gallon stormwater detention structure fit the bill, meeting the project's high tolerances, tight schedule and vigilant quality control.

THIRD PLACE

Gainey's Concrete Products Inc. (gaineysconcrete.com)
Project: Mississippi River Breasting Dolphins
Location: Mississippi River Port

Gainey's Concrete Products manufactured a series of custom breasting dolphins – man-made marine structures that enable the berthing of a ship – for a port on the Mississippi River. Despite the design changing multiple times throughout the project, the precast met the exacting needs of the project and was delivered on time.

For complete descriptions of this year's CUP Awards winners, visit precast.org/cup2016.

SUSTAINABILITY AWARDS

Producer

FIRST PLACE PLANT

Shea Concrete Products (sheaconcrete.com)
Project: Recycling Process Water
Location: Nottingham, N.H.

Lowering water usage, reducing waste, preserving resources and saving time can greatly impact a precast concrete plant while also protecting the environment. The employees of Shea Concrete Products in Nottingham, N.H., have changed the way they clean their tools, bucket and mixer and how they dispose of waste. By creating a new way to recycle their process water, Shea has saved resources and improved the quality of its facility and environment.

Shea designed a triple-filtering system that uses readily available materials, is inexpensive, easy to maintain, takes up little space and has solved a problem faced by many precast concrete companies.

All the washout water from the plant is now contained in a single location, which allows it to be reused in the mix the next day. The filtering system saves Shea an estimated 12,500 gallons of water per year at the Nottingham facility. The old way of rinsing off equipment and losing the water to the ground, rinsing out the pouring bucket and mixer into a washout bucket, and dumping it into an outdoor pit was time-consuming and wasteful. The simple new process saves time and money and is sustainable and healthier for the environment.

FIRST PLACE PROJECT

StructureCast (structurecast.com)
Project: Stormwater Detention
Location: Bakersfield, Calif.

StructureCast contracted with StormTrap LLC on behalf of the Los Angeles World Airports to manufacture, deliver and install a sustainable, modular stormwater detention system for the West Aircraft Maintenance Area Project at Los Angeles International Airport. This cost-effective water treatment system was chosen for its modular design, quick installation and small footprint.

StructureCast manufactured a total of 121 StormTrap components over 6 1/2 weeks for the system, which is designed to address sediment, oil/water separation, filtration and/or infiltration. StormTrap's Stormwater LID (low impact development) solution makes efficient use of land and offers solutions that collect stormwater on site for use in irrigation or greywater inside buildings. LID solutions also address infiltration and bioretention and mimic pre-development hydrology at project sites.

This unique design also assisted the project in obtaining LEED certification, qualifying for sustainable sites, water efficiency, and materials and resources LEED credits. The system offers a sustainable stormwater solution to control the volume and timing of potentially damaging runoff and minimizes pollution by filtering oils, hydrocarbons, heavy metals, debris and trash from the water before it is discharged back into the groundwater system or harvested for further use.

PRODUCER PLANT HONORABLE MENTION

Arto Brick (artobrick.com)
Project: Upcycling Beats Recycling

PRODUCER PROJECT HONORABLE MENTION

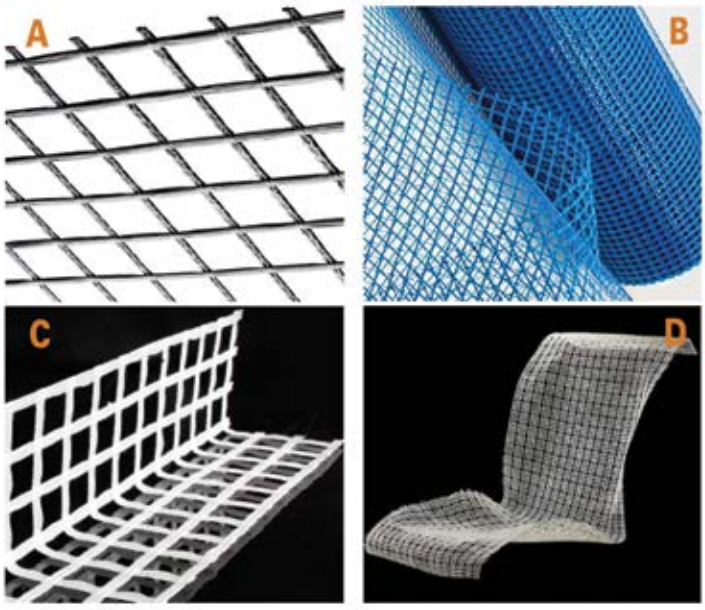
Lindsay Precast – Colorado Springs (lindsayprecast.com)
Project: Clear Springs Ranch Fish Passage

Associate

FIRST PLACE PLANT

Laurel Steel (laurelsteel.com)
Location: Burlington, Ont.

Laurel Steel is no stranger to sustainable practices in the plant. The company has had a waste reduction policy since 1992 and is always looking for ways to divert waste from the landfill. Its culture of reduce/reuse has led to a waste diversion rate of 98%. The company recycles or reuses paper and cardboard products, cans and bottles, wood, electronics, batteries, fluorescent lamps, compost, metals, steel dust, scale, aerosol cans and gloves. When the program started, the company sent about 21 metric tons to the landfill. It has reduced that to three tons or less in recent years.



In addition, Laurel Steel has replaced metal halide lamps with fluorescent lamps, reducing electrical consumption by 50% and saving more than 1 million kilowatt hours per year. Propane lift trucks have been converted to compressed natural gas, reducing carbon emissions by up to 95% and carbon dioxide by up to 11%. Among its other efforts, the company recently planted 33 trees in a local park and plans to plant a new tree for each employee who retires. These actions have won Laurel Steel several environmental awards over the years. Now it can add another: the NPCA Sustainability Award!

FIRST PLACE PRODUCT

solidian (solidian.com)
Product: Lean Reinforcement GRID
Location: Albstadt, Germany

The solidian GRID is a non-metallic concrete reinforcement that does not corrode and offers a variety of advantages related to its light weight and easier handling capabilities. The solidian GRID is an alkali-resistant mesh composed of glass or carbon fibers coated with epoxy resin or Styrene-Butadiene rubber. It comes in a variety of options for different applications, including a stiff carbon reinforcement (Figure A); a flexible reinforcement (Figure B); an L-shaped cross-section (Figure C); and a free-form pattern called "freedom" reinforcement (Figure D).

The solidian GRID requires less cover than other reinforcement, so structures can be slender and lighter in weight without sacrificing durability. The solidian GRID also reduces the overall weight of the concrete element because it weighs 30%-to-90% less than common reinforcement. Sustainable benefits include the overall reduction in raw materials through a leaner design, lower transportation costs and reduced cost of concrete.

ASSOCIATE PLANT HONORABLE MENTION

G & K Services Inc. (gkservices.com)
Environmental Stewardship in Industrial Laundry Services

ASSOCIATE PLANT HONORABLE MENTION

HELIX Micro-Rebar (helixfiber.com)
99% Waste-Free Facility

ASSOCIATE PRODUCT HONORABLE MENTION

BASF (basf.com)
Product: Green Sense Concrete

ASSOCIATE PRODUCT HONORABLE MENTION

Concrete Batch Solutions (concretebatch.com)
Product: Turbomatic and Curematic Thermal Energy Units

ASSOCIATE PRODUCT HONORABLE MENTION

Kalmar USA Inc. (kalmarind-northamerica.com)
Product: Making Every Move Count: The Kalmar ECG50-90L Electric Forklift

For complete descriptions of this year's Sustainability Awards winners, visit precast.org/sustainability2016.

Building Art

Architectural precast and exterior finishes create **attractive, aesthetically pleasing** structures around the U.S.

By Bridget McCrea

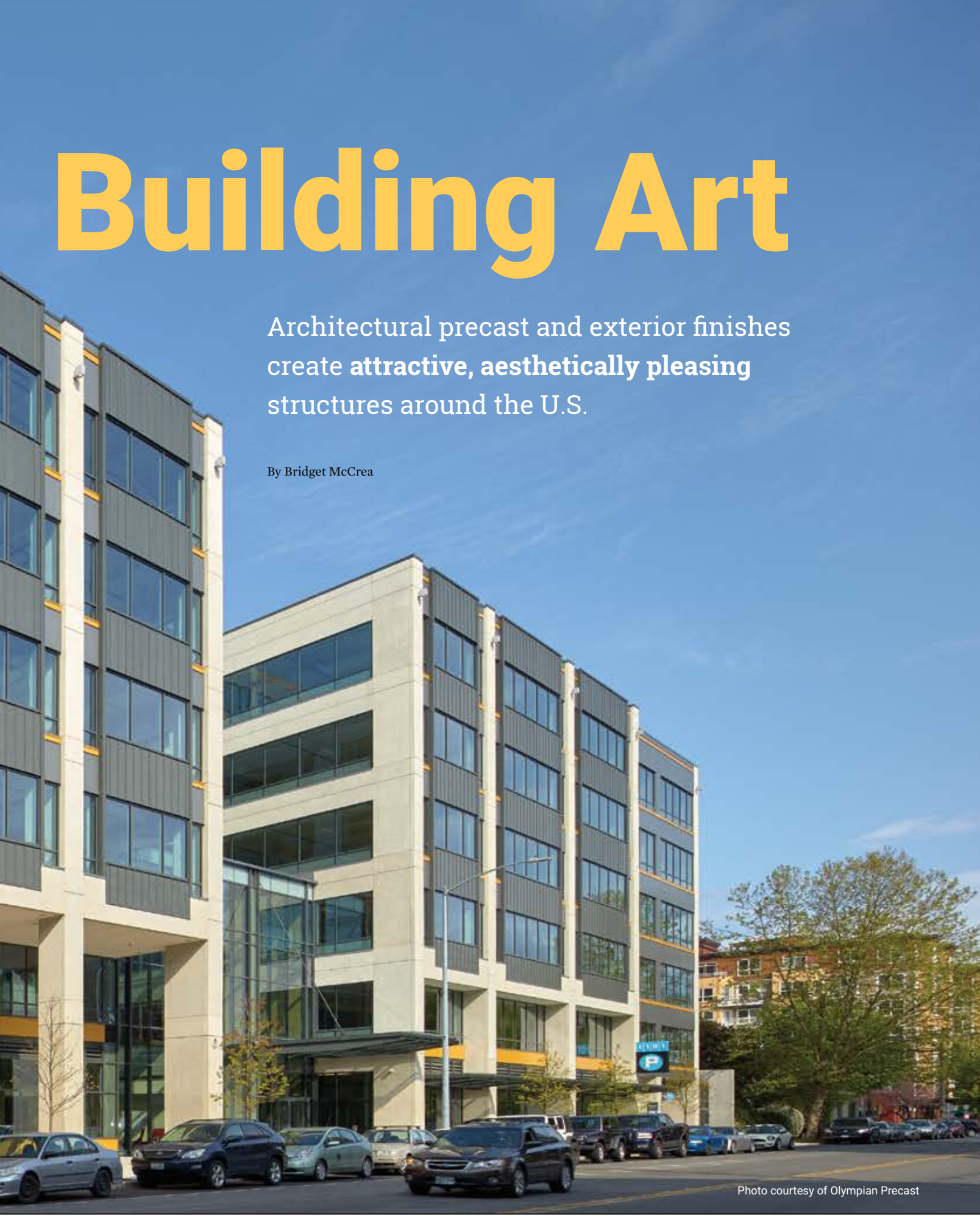


Photo courtesy of Olympian Precast

Olympian Precast of Redmond, Wash., manufactured architectural precast concrete for Seattle's First Hill Medical Pavilion.

Creating a public restroom that looks like it's made of wood and steel. Building new structures that blend perfectly with 30-year-old buildings. Casting large dinosaur eggs. Though these projects couldn't seem more dissimilar, they all share one thing in common: precast concrete made them possible.

Best known for its strength, durability and efficiency, precast has also proven its worth as a flexible and aesthetically appealing building material that offers numerous "shape shifting" qualities on a wide range of construction projects. Most of these projects find precasters manipulating the color, texture and/or form to make concrete more attractive, help it blend in with surroundings or execute design ideas that would be difficult to achieve with any other material. Through the use of architectural precast, formliners, myriad aggregates and various exterior finishes, designers can replicate the finish and color of existing masonry or stone, incorporate intricate details and achieve other project goals without breaking the bank.

"We're seeing a high demand for architectural precast elements on projects, particularly as designers and engineers compare other options for their building skins," said Kevin Jewell, project manager at Olympian Precast in Redmond, Wash.

During those comparisons, he explained most specifiers find architectural precast to be extremely cost-competitive, flexible and adaptable.

"Here in the Northwest, we're seeing strong demand for sandblasted and acid-etched finishes as well as veneering applications," he said. "We've done more of these in the last year than we have in the last five years total. It's certainly a growing market."

NO BOUNDARIES

Olympian Precast isn't the only company that's filling more architectural precast orders these days. In Florida, Leesburg Concrete Company is also getting involved in more projects that incorporate architectural materials and unique exterior finishes. Kirk Rouse, co-owner and vice president, said the company offers a selection of formliner and sandblast finishes, acid etching, integral colors, and multiple finishes and aggregates within single panels.

"We have used many types of different aggregates from all around the country to create different looks," Rouse said.

For one project, Leesburg Concrete incorporated black granite as an aggregate. The product was polished for a smooth, almost glass-like finish.

Rouse said the aesthetic quality of the final product draws in designers who want to stretch their "unlimited imaginations" when creating beautiful, appealing structures.

"There really are no boundaries on what you can dream up," he said. "In essence, we are building art here."

Leesburg Concrete recently finished a project at Mayport Naval Station in Jacksonville. Engineers specified 30-foot-tall, 45,000-pound panels that combined both structural and architectural precast. The panels not only hold up the building's roof, but also incorporate three different colors and four different finishes on each panel. According to Rouse, each panel included a formliner finish, a smooth form finish, a deep and a light sandblast, ledges and water tables.

"The completed project is beautiful," he added.

Rouse said his company has also used architectural precast on a few smaller projects, including precast concrete column covers for the Withlacoochee Bridge – part of the Florida Trail Project – as well as several baseball dugouts and public restroom facilities.

Each of the architectural precast panels Leesburg Concrete Co. manufactured for the Mayport Naval Station project incorporated three different colors and four different finishes.

> "There really are **no boundaries** on what you can dream up. In essence, **we are building art** here."
>
> – Kirk Rouse, *co-owner and vice president, Leesburg Concrete Company*

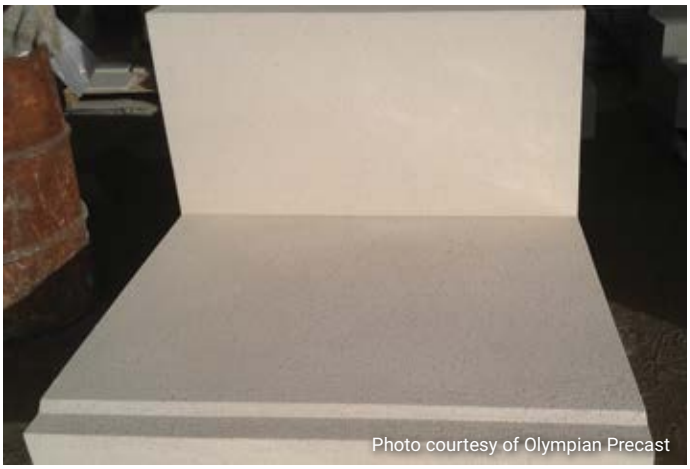


Photo courtesy of Olympian Precast


Photo courtesy of Olympian Precast


Photo courtesy of Olympian Precast

Boeing's new Commercial Delivery Center in Seattle, Wash., features a variety of precast panels meant to help the structure blend in with its surroundings.

Being situated in Florida – where wind-loading requirements are extremely strict and the elements can take a toll on buildings over time – Rouse explained the engineers and designers he works with enjoy the combination of the strength of precast with the beauty of architectural materials.

"The sun is a force to be reckoned with here; it's hard on everything," he said. "With precast, we're able to infuse color and texture into materials without the need for paint, minimize long-term maintenance issues and provide unmatched durability. It's a real win-win for everyone."

BLENDING IN

In Seattle, Boeing's new Commercial Delivery Center features numerous architectural precast elements. Located at Boeing Field, the CDC is more than 90,000 square feet in size and includes a new three-story building and new delivery and departure areas with three covered jetways. The buildings also include additional space for customers and Boeing support groups as well as a new entryway. The design features an open, airy look with large windows.

For this project, one of Boeing's primary concerns was how to make its new building blend well with existing structures, many of which are decades old.

Working with the project's contractor, Olympian Precast devised a plan to use two different mix designs – one being a light-colored cement (yellow/tan) that would be medium-sandblasted to expose the mixture's aggregate, and the other a grey cement that incorporated a black admixture.

According to Mike Yore, project manager and estimator, the latter was a very dark mix that went along the base of the building. Yore said the lighter-colored mix had to match up with existing Boeing buildings that are 30-to-40 years old.

"The new building basically butted right up against the older ones, so getting the right coloring was a challenge," he said. "We went through several rounds of putting together samples and making subtle changes to get everything matched up correctly."

In the end, the precaster was able to put together an effective mix design and sandblast approach.

Yore added that architectural precast panels and finishes proved especially valuable on this project, namely because Boeing

was intent on having its new delivery center match with its surroundings.

"Once everything was in place, the contractor looked at the finished product from the freeway and said he couldn't tell any difference among the buildings," he said. "That was definitely a testament to how well the finish turned out."

ARE THOSE REAL DINOSAUR EGGS?

When Oldcastle Precast of Loveland, Colo., was asked to "look into the past" and create 27 different 6-foot-by-3-foot dinosaur eggs, team members put on their thinking caps and found an interesting way to incorporate architectural precast into the project. The eggs, which weigh 2,700 pounds each, were colored green and brown and then stained to give them a "prehistoric" appearance. The dinosaur theme was chosen to reflect the prehistoric finds that have been made in the area, including a 2010 find of the bones of a woolly mammoth.

Today, the decorative replicas stretch across Colorado Highway 82 between Aspen and Glenwood Springs. Bill Williams,

Oldcastle Precast of Loveland, Colo., produced 27 precast concrete dinosaur eggs weighing 2,700 pounds each.

Architectural precast concrete panels located inside a structure greatly enhance a building's aesthetic.

architectural project manager for Oldcastle Precast, said the project owner wanted the eggs to be textured to match the look of old, fossilized dinosaur eggs.

"We came up with a variety of colors and textures," he said. "It was a fun way to incorporate architectural precast into a very different application and final product."

Oldcastle Precast has also worked on dozens of more typical architectural precast projects over the years, including a hospital expansion project in Colorado Springs that required a bullnose radius manufactured from white cement with a retarder surface finish. Williams noted the legwork on that project took longer than usual, namely due to the need for custom tooling. Once those initial steps were taken, the rest of the job went smoothly.

"The finish was kind of 'stony' looking when it was completed, with the bullnose serving as an accent line on the building among all of the brick," he said.

Photo courtesy of Olympian Precast

On another project, Oldcastle Precast constructed panels for a U.S. Department of Veterans Affairs building in Montana. For that job, the company used precast panels with built-in reveals that blended with the brick structure. Williams said the tricky aspect of that project was manufacturing and shipping the panels in sequential order.

"We were making panels per location for that building, so we had to ship them in order and then have them mounted in the [right] places on the building," he said.

CLAMORING FOR PRECAST

In assessing the growing demand for architectural precast and exterior finishes in today's construction market, Williams said interest seems to be picking up as the economic climate improves.

"During the downturn, precast was sometimes removed for value engineering – particularly on the private side – but now we're seeing it put back in," he said. "Even on projects that could be poured on site, we're seeing more and more customers asking for precast formliners and colored concrete in lieu of poured-in-place."

As the precast concrete industry continues to evolve, advancements in technology will result in more architectural pieces being integrated into projects. Many of these products will likely be included in unexpected ways. No matter what the application, specifiers can count on precast solutions that are as pleasing to the eye and artistic as they are durable, resilient and easy to install. 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.

Uplifted Ground

Photo courtesy of Michael Singer Studio

Photo courtesy of Michael Singer Studio

Stunning precast concrete artwork at a Texas airport raises spirits and keeps a walkway structurally sound.

By Mark Crawford

When officials at Texas's Austin-Bergstrom International Airport decided to build a pedestrian walkway between the facility's terminal and car rental facility, they wanted more than just a path from Point A to Point B. Key to their vision was incorporating a grand, artistic component as part of the structural design that would add emotional value to the otherwise dull journey.

The airport received more than 100 proposals from firms interested in designing the artwork. An independent panel then reviewed the proposals and shortened the list to five candidates. Officials eventually selected Vermont-based Michael Singer, whose work includes an atrium garden in the Denver International Airport and sculpture gardens around the world.

Singer's highly acclaimed contribution to the walkway – a work entitled "Uplifted Ground" – accomplishes exactly what airport officials had hoped. Visitors are mesmerized by the attractive and thought-provoking flow of colors, patterns and forms that blend together to tell the story of Austin and its geologic place in time.

Even with a very specific story to tell, Singer and his studio accomplished it all with precast concrete.

Hundreds of precast concrete pieces create a sense of rise and fall as travelers at Austin-Bergstrom International Airport walk alongside Uplifted Ground.

Precast concrete allowed Michael Singer Studio to incorporate the geologic history of Texas into a stunning display of art.

UP, UP AND AWAY

The $1.66-million project, which consists of hundreds of geometric precast sculptures, opened at ABIA in fall 2015. Singer's goal was to create a sculptural landscape that would be the focal point of the pedestrian bridge. Interrelated design concepts include geometries and transitions based on local geological formations as well as ground patterns revealed by aerial photography taken across the state. Combined, these features create a multi-dimensional theme of uplift highlighting aviation, the tectonic history of Texas and, once viewed along the walkway, the human spirit.

As a transition space, Uplifted Ground relies on the viewer's motion to create a sense of rise and fall along the more than 300-foot-long walkway.

"As you enter the space, you see hundreds of earth-toned, ground-based and suspended precast concrete elements," said Jason Bregman, a Michael Singer Studio environmental planning and design associate involved with the project. "Farther along, the shapes diminish in length while rising in height into cubic elements with textured relief patterns, copper and steel details, and cut and incised shapes and scores."

To achieve his vision, Singer used nearly 400 precast concrete pieces. The designs and colors used are inspired by the Texas landscape, including geologic features like caves, faults and the dusty red granite of the Llano Uplift, a nearby area of tectonic activity estimated to be nearly 1 billion years old.

The designs and colors used are **inspired by the Texas landscape,** including geologic features like caves, faults and the dusty red granite of the Llano Uplift.

THE PERFECT MATERIAL

Designing Uplifted Ground – which was commissioned by Art in Public Places, a program of the City of Austin Economic Development Department – presented many unique challenges. Since the precast elements would be in an open-air environment, they needed to be durable. The components also needed to be easily suspended from wire cables. And, because the pathway was being converted from a parking garage floor into a pedestrian walkway, it could only handle a certain amount of weight.

Singer is known for using a great deal of precast in his artwork. Precast enables his designers to have complete control over artistic details in the concrete, something that is impossible to guarantee with cast-in-place concrete and the variables associated with on-site work.

"Precast is a big part of what we do for public works because it is very durable and we can control the specifications to meet the unique requirements of every project," Bregman said. "Colors, textures and finishes are much easier to control."

The precast pieces – which varied in size – were manufactured by Architectural Precast and Foam of West Palm Beach, Fla. They contain different colors, patterns, acid-wash finishes and embedded materials such as copper, stainless steel and pieces of the red Llano Uplift granite. Openings within the blocks also allow light to pass through.

According to Bregman, another big advantage of precast is that it is compatible with the other materials in the sculpture, such as the copper and steel detailing and stone inserts. Knowing the sculpture would be exposed to sun and rain, the design team combined these materials so their colors would deepen over time, especially the copper patina. Small pockets were built into the block surfaces to capture water and facilitate "patina in situ" and intricate patterns of weathering.

During the day, the reflection of daylight on the precast and embedded metals creates shifting geometric patterns of light and shadow. At night, 256 LED lights throughout the sculpture create a subtle, attractive glow that emerges from the hollow elements through geometric openings, creating a graceful pattern of light.

ART THAT CAPTIVATES

Creating a sculpture for an outdoor public space presents both difficulties and opportunities. The design must plan for how the materials will work together as they weather over time, taking into consideration both the structural integrity of the sculpture and how the colors and patterns will evolve. For Michael Singer

Photo courtesy of Michael Singer Studio

Studio, precast concrete solved these challenges, allowing the design team to meet the tight engineering restrictions for the site while also captivating airport visitors.

Singer believes the project is a great success.

"It's especially rewarding for me to watch as people of all ages walk along, obviously concentrating on getting to their rental car, and then they suddenly stop and look toward the sculpture as though they're just becoming aware of it," Singer said. "Many will put down their suitcases, take out their phone cameras, and start

Photo courtesy of Jeremy Green

taking photos. It's also a treat to hear some of these travelers pass by asking each other what this could possibly be, as though a mystery needs to be solved.

"An artist can't ask for much more." PS

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

Singer is known for using a great deal of precast in his artwork. Precast enables his designers to have **complete control** over artistic details in the concrete.

Photo courtesy of CHA Companies

Specifier Q&A

This month, Precast Solutions magazine sits down with Jason Rowley of CHA Companies to discuss his involvement with precast concrete products and projects.

Name: Jason Rowley

Title: U.S. 31 – Hamilton County Design Project Manager

Company: CHA Companies

Professional Designations: P.E.

Q: What is your field of focus and what particular products do you specialize in?

A: CHA Companies is a highly diversified, full-service engineering and construction management firm providing a wide range of design services to public, private and institutional clients. We are organized to serve three broad sectors – transportation, campus & institutional, and industrial & energy.

The Indiana Department of Transportation selected CHA as the program manager and lead design firm for the reconstruction and upgrade of 12 miles of signalized arterial to a full freeway facility consisting of 11 interchanges. The project is located on the north side of Indianapolis, where acquisition costs are at a premium. This required innovative designs to reduce the overall footprint of the new roadway. The $500 million project is scheduled to be completed by the end of 2016, two years ahead of schedule and over $100 million under the original budget.

By designing major portions of the U.S. 31 project with precast concrete components, CHA Companies accelerated construction and reduced costs.

As a project manager for our Indianapolis office, I managed over 100 engineers, scientists and land acquisition experts to complete the design, environmental services, utility coordination and land acquisition for the U.S. 31 project in Hamilton County.

Q: What are the benefits of using precast concrete products?

A: Precast concrete products have revolutionized the construction industry. Every day, buildings and transportation corridors are being built faster with more quality-controlled precast.

The precast industry deserves a lot of credit for turning the U.S. 31 project into a reality. Without precast products, it would have been much more expensive and could not have been built as quickly. Having precast industry experts design their products also increases quality and adds efficiencies to the construction process. Construction time savings also reduce impacts to businesses, the traveling public and the environment.

Q: What precast concrete products were specified for this project?

A: Precast concrete products such as MSE walls, three- and four-sided structures, bridge beams, sound walls, temporary concrete barrier and storm sewer were heavily used on this corridor. These materials were selected because they could be fabricated quickly and economically. MSE walls allowed INDOT to eliminate spill slope and thereby reduce bridge lengths.

The precast MSE walls were another cost-effective solution which saved INDOT time and money. The formliner was designed to mimic Indiana's natural limestone outcroppings. Without the use of a precast option, the limestone appearance would have been very difficult to replicate.

Q: How have you seen precast concrete evolve? How do you see it continuing to impact your work?

A: Precast concrete products continue to evolve. The precast industry is continuously developing new products. Some of the more recent innovations include more variety in decorative precast concrete walls, precast concrete pavement and the use of concrete pipe for culvert slip lining. PS

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A Declaration f
Material Transp

Precast concrete environmental product declarations enable environmentally conscious specifiers to achieve **more success** on projects.

By Claude Goguen, P.E., LEED AP

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Environmental Product Declaration (EPD) for Precast Concrete
CPCI
NPCA
PCI
Raw Material/ Energy Extraction
Preliminary Production
Manufacture of End Products
Architectural & Insulated Wall Panel Industry Wide EPD
ASTM INTERNATIONAL
According to ISO 14025 and ISO 21930
Structural Precast Concrete Industry Wide EPD
ASTM INTERNATIONAL

EPDs are a great tool for architects and designers looking to **maximize sustainability** while **creating and building the best** possible projects that earn industry certifications and LEED credits.

For thousands of years, humans have manipulated the natural environment to better suit their needs. One of the results is a construction industry which has become the largest consumer of renewable and non-renewable natural resources. It relies heavily on the natural environment for supplying raw materials such as timber and aggregates. Globally, buildings use 40% of raw materials and almost 14% of all potable water.[1]

With this much demand on our natural resources, owners want more transparency in what materials are used to construct buildings. It's been a challenge for specifiers and designers to choose the right materials based on inconsistent and conflicting information, but the need for a standardized format of reporting relevant life cycle data has been met with the advent of the environmental product declaration (EPD).

WHAT IS AN EPD?

An EPD provides quantifiable environmental data used to compare products that fulfill the same function. It's like a nutrition label on boxes of cereal, which contains information such as calories, fat and sugar. Thanks to the labels, a consumer can make an informed decision on which cereal to choose. EPD indicators include acidification potential, primary fossil energy consumption and net fresh water. The detailed analysis that goes into making an EPD considers all processes in the manufacture of a product, including raw material and energy extraction, preliminary production and the manufacture of end products.

International Organization of Standards defines three types of EPDs:

- Type I – Eco-Label
- Type II – Self-Declaration
- Type III – Environmental Declaration

The type depends on the degree of third-party verification and endorsement.

Considerable work goes into creating an EPD. Initially, large groups such as the precast industry collaborate to develop a product category rule (PCR). This provides instructions on how to conduct a life cycle analysis (LCA) and the subsequent EPD. Three precast industry groups – National Precast Concrete Association, Precast/Prestressed Concrete Institute and Canadian Precast/Prestressed Concrete Institute – developed the PCR and LCA in recent years. With the help of data from nearly 100 plants throughout North America, the EPDs were written and published in late 2015.

The industry-wide EPDs are available for architectural and insulated wall panels as well as structural and underground precast concrete products. The wall panel EPD addresses conventional and sandwich wall panels and architectural trim products. The structural EPD covers bridge products, building products, retaining walls and sound walls. Structural precast products can be conventionally reinforced or prestressed. The underground products EPD covers pipe, culverts, manholes, wastewater and stormwater tanks, chambers and related products such as electrical utility products. These documents provide architects, engineers, building owners and other project stakeholders insight on precast concrete's environmental impacts across a wide range of end uses.

EPDS AND THE GREEN BUILDING MOVEMENT

Leadership in Energy and Environmental Design v4, the Architecture 2030 Challenge for Products and the International Green Construction Code either request EPDs or reward building product manufacturers for submitting them. LEED v4, which will replace the older version of LEED in October, provides two points for a project with 20 products with EPDs and 50% of products demonstrating lower impacts than industry baselines through EPDs. LEED v4 values different types of EPDs as follows:

- Self-declared EPDs (Type II) are worth 1/4 value (not third-party verified)
- Industry-average EPDs (Type III) are worth 1/2 value (third-party verified)
- Product-specific EPDs (Type III) are worth full value (third-party verified)

WHAT DOES THIS MEAN FOR DESIGNERS AND SPECIFIERS?

The green construction industry is constantly growing. While it used to be confined primarily to California and the Northwest, it's now spreading across the country. Last year, a customer even asked an NPCA member in Georgia for an EPD on a grease interceptor.

EPDs are a great tool for architects and designers looking to maximize sustainability while creating and building the best possible projects that earn industry certifications and LEED credits. Use them to your advantage as you consider your next building, bridge, sewer or road design. Familiarize yourself with these tools to make your material selection process simpler and your completed work more successful.

Copies of the EPDs referenced here can be downloaded for free at precast.org/epds.

For questions or comments, please contact Claude Goguen, director of sustainability and technical education, at cgoguen@precast.org or (800) 366-7731. PS

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References

[1] Lenssen and Roodman (1995). Worldwatch Paper 124: A Building Revolution: How Ecology and Health Concerns are Transforming Construction. Worldwatch Institute.

NPCA webinars are an excellent way to provide practical, precast-specific training to your employees. Webinars run throughout the year and cover a variety of topics, ranging from safety to quality control and everything in between.

For a complete list of course descriptions – and to register – visit

precast.org/2016webinars

NPCA
National Precast Concrete Association