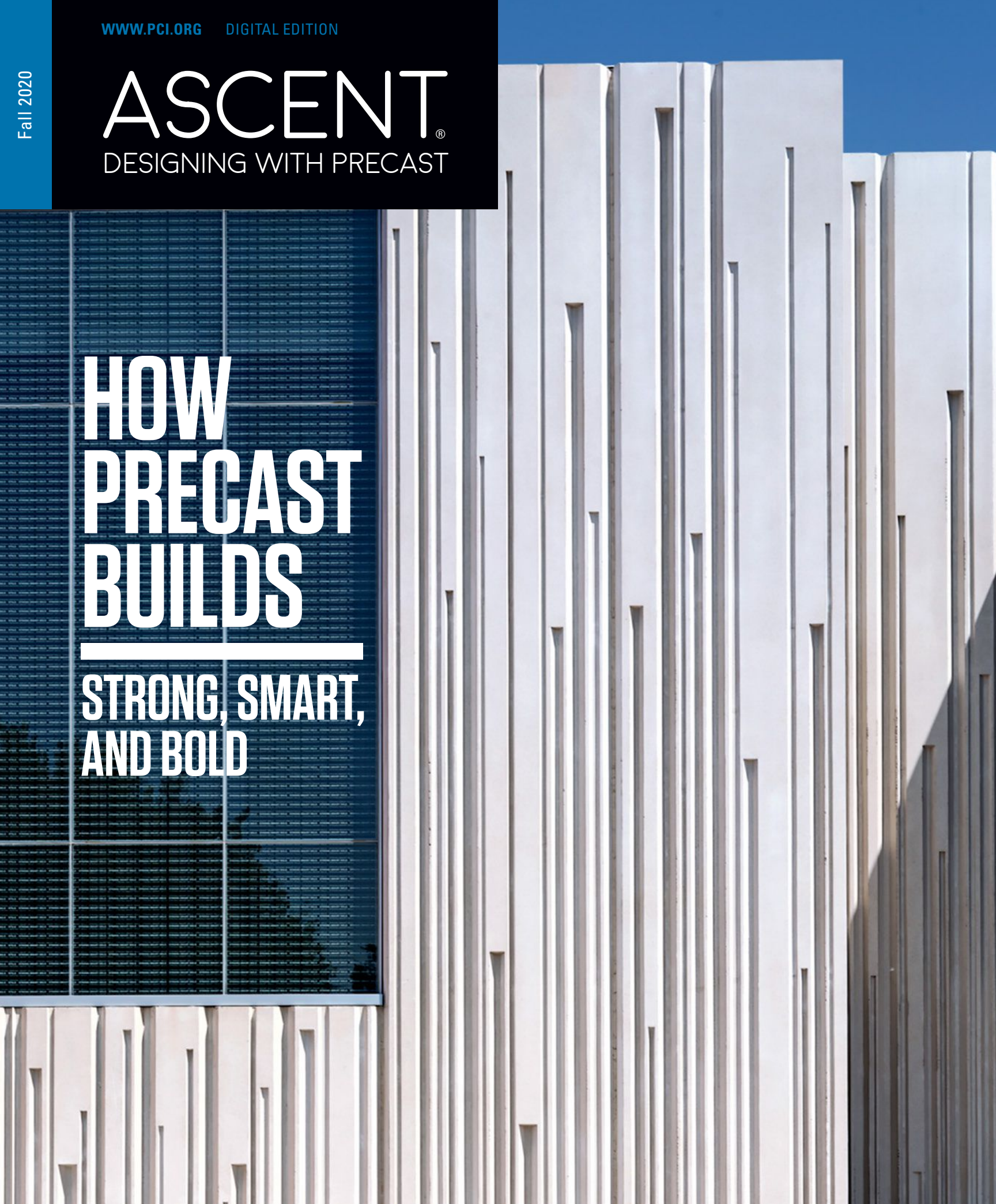


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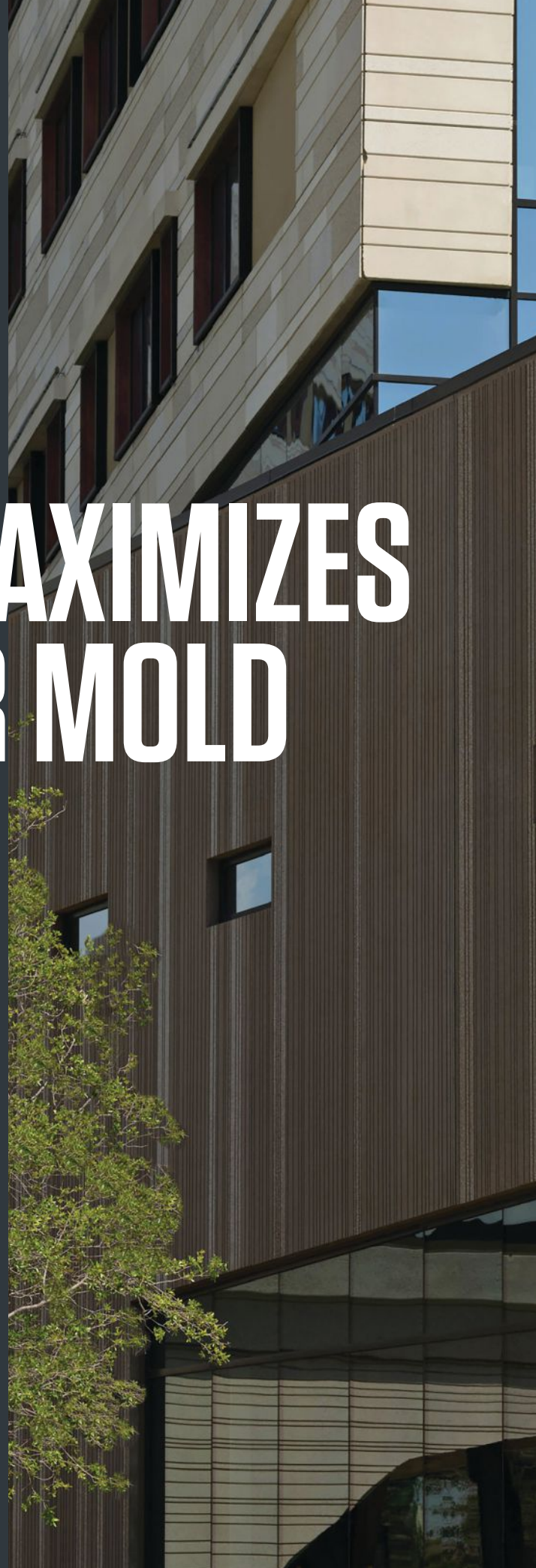
MAIN
FEATURE

HOSPITAL MAXIMIZES THE MASTER MOLD

ECONOMICAL CONCEPT GIVES PANELS AN ORGANIC LOOK

BY SUSAN BADY

On the outskirts of Dallas, the newly emerging community of Frisco, Tex., now has its own major health-care institution: Texas Health Hospital Frisco. Developed by a joint venture of Texas Health Resources (THR) and UT Southwestern Medical Center, THR Frisco isn't a hospital in the traditional sense, but a "health facilitator": a place people can visit for their ongoing health and wellness, not only when they're sick. The partners wanted their new 20-acre hospital campus to facilitate outpatient clinics and expand comprehensive cancer centers, women's care, and other services for the Frisco community.





The look of THR Frisco was influenced by biophilic design to increase human connectivity to the natural environment through direct and indirect references to nature, as well as space and place conditions. All photos: Daryl Shields.

With that as their overarching goal, the Dallas-based architecture firm HKS started meeting with city officials, community leaders, and Frisco residents to get their input on what was needed in the new hospital and develop design parameters. Frisco's prescriptive design standards lean toward solid exterior materials such as brick masonry, says architect Andrew Cortez, vice president of HKS.

"If you drive around the city, you don't often see precast concrete panels being used the way we wanted to use them," Cortez says.

HKS collaborated with Gate Precast Company to develop a façade system using insulated architectural precast concrete, with a finish that resembles a local limestone called Granbury chopped stone. "We like the textural quality of limestone because it feels organic," he says. City officials approved the use of precast concrete for the new hospital after they examined samples of the "stone" in different colors and textures and learned about the material's quality and durability.

Biophilic Design Influences

The look of THR Frisco was influenced by biophilic design, a concept used within the building industry to increase human connectivity to the natural environment through direct and indirect references to nature, as well as space and place conditions. The massing, the texture of the material, and the color of the indoor spaces reflect biophilic principles, says Cortez.

"We sought to strike a balance between the technical and organic aspects of precast concrete," he says, ultimately achieving "something that felt [as if it] came from nature."

Intrigued by an old farmhouse with a weathered exterior on the site, which felt to the architects as if it was deeply rooted in the Texas landscape, they started evaluating materials. Gate Precast Company supplied precast concrete to two iconic Dallas projects, which served as inspiration: the Perot Museum and Nordstrom's department store.

"We really liked the idea that we could take a monolithic, raw material, carve away at it, and push the boundaries of what precast can be," says Cortez.

The LINE (Laboratory for Intense Exploration) Group, a specialized group within HKS, was brought in at the start of schematic design to help HKS create a prototype and simulate different

The THR Frisco hospital tower uses architectural precast concrete elements that are similar to the medical office building to the left. The linear bands have multiple offsets and finishes, and the panel joints are stair-stepped to hide the caulk joint and eliminate a true vertical joint between spandrels after the components were installed.









PROJECT SPOTLIGHT

TEXAS HEALTH HOSPITAL

LOCATION: Frisco, Tex.

Size: 325,000 ft²

Cost: \$180 million

Owners: Texas Health Resources and
UT Southwestern Medical Center

Architect: HKS, Dallas, Tex.

Owner: Related Group, Atlanta, Ga.

Structural Engineer: Thornton Tomasetti, Dallas, Tex.

PCI-Certified Precast Concrete Producer and Erector:
Gate Precast Company, Hillsboro, Texas

PCI-Certified Precast Erector: S'N'S Erectors Inc., Arlington, Texas

Precast Concrete Specialty Engineer:
Stehler Structural Engineering, St. Paul, Minn.

Precast Concrete Components: 243 insulated spandrels and
wall panels. Podium: 188 panels; tower: 424 panels; screen wall:
56 panels; parking structure with elevated deck: 486 pieces;
parking structure cladding: 212 panels

Above: The partners wanted their new 20-acre hospital campus to facilitate outpatient clinics and expand comprehensive cancer centers, women's care, and other services for the Frisco community.

Left: Compared to a brick masonry system, precast concrete components took less time to erect, saving labor costs.

scenarios for the precast concrete panels. Using Grasshopper and Dynamo generative design tools and building information modeling, HKS, LINE Group, and Gate Precast Company came up with a design that met the owners' demands for economy and randomness. Custom formwork and four unique finish techniques were used, including polishing to create different colors and textures within one panel.

Master Molds for Greater Economy

The brainstorming and planning that took place at the beginning of the hospital project paid off in a big way when the master-mold concept was adopted. The precast concrete producer can create varied textures using one master mold, so that one panel doesn't look exactly the same as another.

Gate Precast Company builds its molds out of wood and metal that creates horizontal or vertical reveals, says Cortez. "With that parameter, we used their software to determine how many panels we would need and how many master molds, as well as the crane capacity required for the installation." By determining the optimal panel size based on how far the crane could swing, the team ensured that the same size panel was fabricated every time.

"We didn't have to work back and forth to change the size of a panel here and there," he says. "Once we found the aesthetics that we wanted, the program would tell us what size panels were too big for the crane capacity, and we could adjust it very quickly."

Compared to a brick masonry system, precast concrete components take less time to erect and thus labor costs are lower. "By working with the contractor, we saved about \$3 a square foot [over brick] on this project," says Cortez. "Precast concrete also shaved a month off the construction schedule."



Precast Concrete Makes It Resilient

The architect notes that because of the durability and impervious nature of precast concrete, there are no issues with water getting inside the insulated panel and causing damage.

HKS worked with Gate Precast Company and a Boone, Iowa, company called Thermomass, which created an energy model to test the wall system. "It was a 4-2-3 panel system with four inches of concrete on the outside and three inches on the other side. There is a two-inch edge to edge of XPS [extruded polystyrene] insulation within the cavity," says Cortez.

Thermomass determined that the thermal mass wall system met an *R*-value of at least 21, meaning that the batt insulation that would typically fill the stud cavity on the back of the wall

could be eliminated. Therefore, the contractor, who had already factored the extra insulation into the budget, realized some unexpected savings.

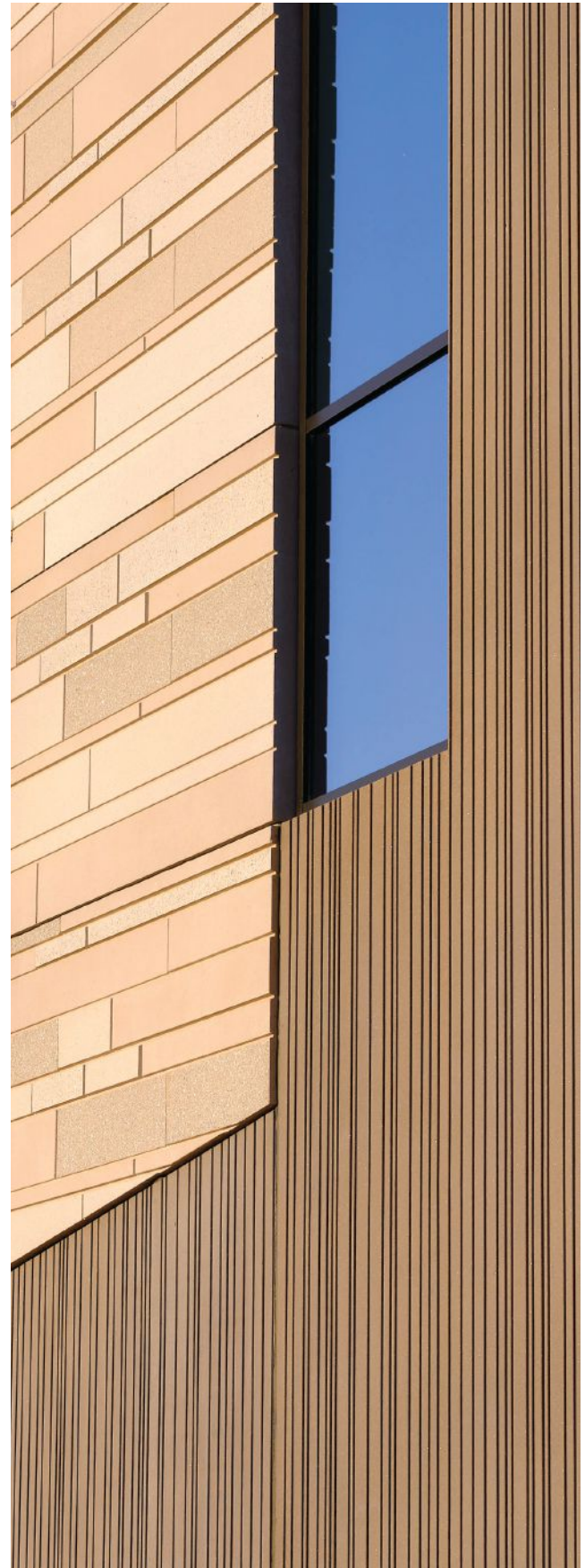
Not Your Ordinary Parking Structure

The project team's approach was to work out design problems and issues early to avoid cost overruns later on, Cortez says. For example, the parking structure design was finalized through the collaborative efforts of HKS, general contractor Austin Commercial, and Gate Precast Company, who created the schedule and determined the number of panels required.

"We also had to meet [the city's] open-area requirements to provide ventilation in the parking garage," says Cortez.



THR Frisco parking structure didn't cost significantly more than a standard column-and-spandrel structure.





The new hospital campus provides major health services to the Frisco community, including outpatient clinics, cancer centers, and women's care.

Michael Trosset, Gate Precast Company sales manager, says the THR Frisco parking structure didn't cost significantly more than a standard column-and-spandrel structure. "We were still able to achieve a unique look with exterior architectural panels, which provided load-bearing support for the double tees, slabs, beams, and other components."

From a production schedule standpoint, the parking structure did not take any longer to erect than a standard precast concrete structure, as Gate Precast Company was able to cast the architectural load-bearing panels inside the plant. "We were able to produce the double tees, I-beams, and other structural components concurrently without an issue," says Trosset.

The parking structure is clad in panels of bright white and dark brown with a flame-cut granite finish.

Marriage of Craftsmanship and Technology

By combining the look and feel of the architecture associated with the new bed tower and medical office building with the performance of an all-precast concrete parking system, the owners achieved a consistent look throughout the new campus.

"If we didn't have generative design tools, there is no way we could have achieved this level of aesthetic quality, and [stay within] the budget and schedule constraints," Cortez says. ●



Visit the digital issue of *Ascent* at pci.org/ascent to learn how The Perot Museum inspired a new hospital.



PEROT MUSEUM INSPIRES NEW HOSPITAL

BY SUSAN BADY

From the standpoint of precast concrete formwork and molds, the Perot Museum in Dallas, Tex., was the first of its kind, says Michael Trosset, sales manager for Gate Precast Company.

"In the past we would look at the mold as a fixed or rigid output, sort of like a copy machine," says Trosset. "Once the mold was built, it would provide the same copy until you had to rebuild the entire mold."

The Perot Museum took Gate Precast Company "to a master-mold mindset in which the overall shape of the mold remained 'rigid' for the most part, but within the area of the mold we were able to introduce additional formwork pieces that were interchangeable on a daily ba-

sis. This allowed for a complex and dynamic façade, as well as the ability to produce panels on a daily basis."

THR Frisco used a similar master-mold concept, working closely with the LINE Group, a division of HKS, to ensure that each master mold was maximized to achieve efficiencies in mold material and labor cost, but at the same time provide an output that was random and dynamic throughout the façade, Trosset says.

The ground-floor wall panels are accented with a vertical ribbed pattern and feature a limestone finish with a rich dark chocolate tone. The upper-floor panels have a light desert-tan tone. The horizontal bands within the panels step in and out, which achieves the "carving out" of the panel face and allows different offsets from one band to the other. Stair-stepping the joints also camouflages the vertical break between panels, he says.

The podium design has a vertical reveal pattern, also in a dark chocolate tone, and an acid-etched finish. Intermittent vertical polished bands were stretched over three or four ribs to give the elevation a lighter-colored vertical aesthetic feature.

The hospital tower features architectural precast concrete elements that are similar to the medical office building in that the linear bands have multiple offsets and finishes (polished, acid wash, sandblasted, and exposed aggregate). The panel joints are stair-stepped to hide the caulk joint and eliminate a true vertical joint between spandrels after installation. This aspect made the sequencing of the installation of the panels critical and required the erector to work the panels from the left or right of each floor line, says Trosset. ●



*The Perot Museum of Nature and Science in Dallas.
Photos: Philip Lange.*



PEROT MUSEUM OF NATURE AND SCIENCE

Health ~~Facility~~ Facilitator



Photo: HKS, Inc.

Destination for health and wellness

Using two iconic GATE Precast projects in Texas as precedents, Perot Museum and Nordstrom, the team at HKS embraced GATE's design-assist process to develop a façade system utilizing insulated architectural precast concrete with a GATEstone finish that resembles the look of the local Granbury chopped stone for Texas Health Frisco's new 20-acre hospital campus. Using Grasshopper and Dynamo generative design tools and BIM modeling, HKS, LINE Group and GATE created a design that met the demands of economy and randomness using custom formwork and four unique finish techniques, including polishing which creates different colors and textures within one panel.



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