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DESIGNING WITH PRECAST CONCRETE

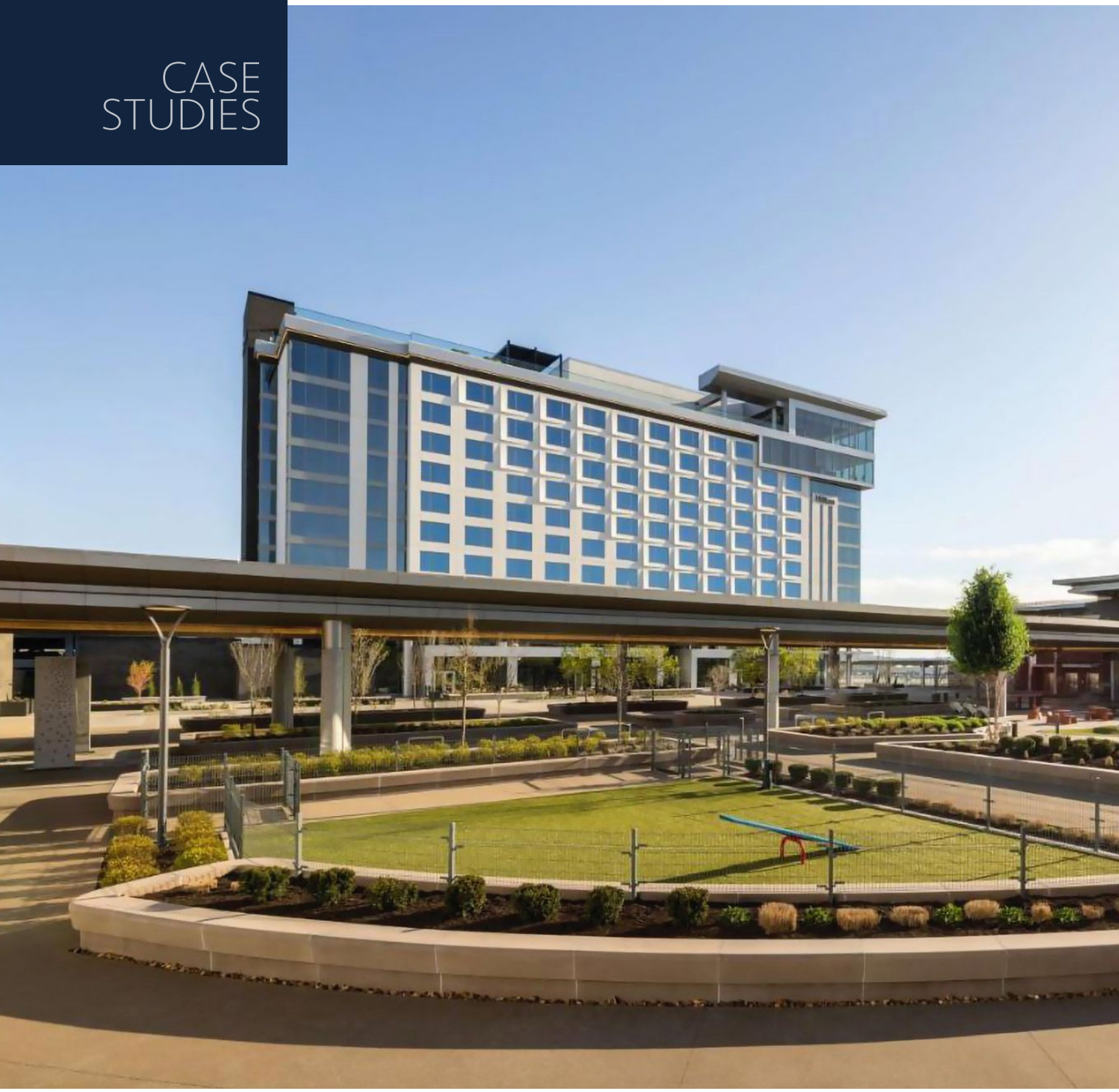
DIGITAL EDITION

FALL 2024

HOW PRECAST BUILDS

Did you know precast concrete is the ideal solution for many projects?

CASE STUDIES



The Hilton BNA Nashville Airport Terminal Hotel is constrained between two existing parking structures on either side and a heavily traveled airport loop at the front and back of the property. ***Photo:*** *GATE Precast.*

DID YOU KNOW?

PRECAST CONCRETE IS THE IDEAL CONSTRUCTION MATERIAL FOR HOTELS, GOVERNMENT BUILDINGS, AND WAREHOUSES. LEARN HOW PRECAST CONCRETE MADE EACH OF THESE PROJECTS A SUCCESS.

HILTON BNA NASHVILLE AIRPORT TERMINAL

NASHVILLE, TENN. /// *BY DEBORAH R. HUSO*

When Franklin, Tenn.–based Chartwell Hospitality was charged with overseeing building and development of the new Hilton BNA Nashville Airport Terminal Hotel, the developer faced a number of site challenges. "We had to meet all Metro Nashville Airport Authority façade requirements and building longevity requirements," says Will Schaedle, Chartwell's executive vice president of development and acquisitions. "We also wanted to use materials that would allow our construction team's schedule to move in a timely manner."

The 229,274-ft^2 airport hotel on four levels of parking climbs 10 stories, plus a sky bar and amenity deck. With 298 guest rooms, 23,000 ft^2 of meeting and event spaces, and a rooftop pool and bar, the hotel site is constrained between two existing parking structures on either side and a heavily traveled airport loop at the front and back of the property.

Installation involved only one tower crane to lift the precast concrete panels into place. Each had sizable window openings measuring roughly 6 ft 8 in. tall by 9 ft long. ***Photo:*** *Gate Precast.*

PROJECT SPOTLIGHT
HILTON BNA NASHVILLE AIRPORT TERMINAL

- Location: Nashville, Tenn.
- Size of structure: 229, 274 ft^2
- Cost: $97 million
- Owner: Nashville Airport Hotel Partners, Franklin, Tenn.
- Architect: Rabun Architects, Atlanta, Ga.
- Contractor: Crain Construction, Nashville, Tenn.
- Structural Engineers: EMC Structural Engineers, Nashville, Tenn.
- PCI-Certified Precast Concrete Producer: GATE Precast, Ashland, Tenn.
- Precast concrete components: 58,180 ft^2 of preglazed architectural precast concrete panels; 400 pieces total

Designing with Site Constraints in Mind

With the hotel's proximity to an international airport, architectural precast concrete panels offered the best solution for the building's elevated exterior façade, providing innate thermal, acoustical, and blast-resistance strength characteristics while also meeting the minimal ground clearance needed for installation.

Dana Rector, principal-in-charge with Atlanta-based Rabun Architects, says another challenge of the job was that the hotel was to sit on the top level of an already-designed and partially built four-story parking structure. "You pass through the parking garage to get to the hotel," he explains. "We were not the architects of the garage, so we had to work with the garage design team and contractor [in developing the design]."

Rector says his team actually looked to the airport for the hotel's contemporary design inspiration. The hotel rooftop has a wing element to emulate an airplane. "We also wanted large openings for windows for the guest rooms."

Efficiencies Gained Through Precast Concrete and Preglazing

To gain efficiencies by reducing panel manufacturing time, Rabun Architects project manager Sandy Chatman notes the team looked to limit the number of unique panels. "All the guest rooms were essentially the same," she explains, noting that Ashland City, Tenn.–based GATE Precast basically had only two forms for the guestroom precast concrete wall panels. "So if we had a flat panel, it was one shape; if it was a faceted panel, it was another shape." The flat panels featured a light finish, while the faceted ones had a heavier texture.

Mo Wright, director of architectural systems for GATE Precast, says precast concrete was a natural fit for the project. He cites the flexibility to easily create custom shapes, precast concrete's inherent soundproofing qualities that enabled the airport's sound transmission class rating to be met, the speed of installation with preglazed precast concrete panels, and the overall resiliency of the material in an environment with heavier air pollution.

GATE manufactured 400 precast concrete pieces in total, 126 of those with double-punched and eight with single-punched windows installed. Wright says the project's speed was the result of "the unitized nature of the system" with the preglazed panels. "It was similar to an all-glass curtain wall project with a single-source option for the majority of the façade." This reduced schedule coordination with trades and also reduced the number of people on the jobsite.

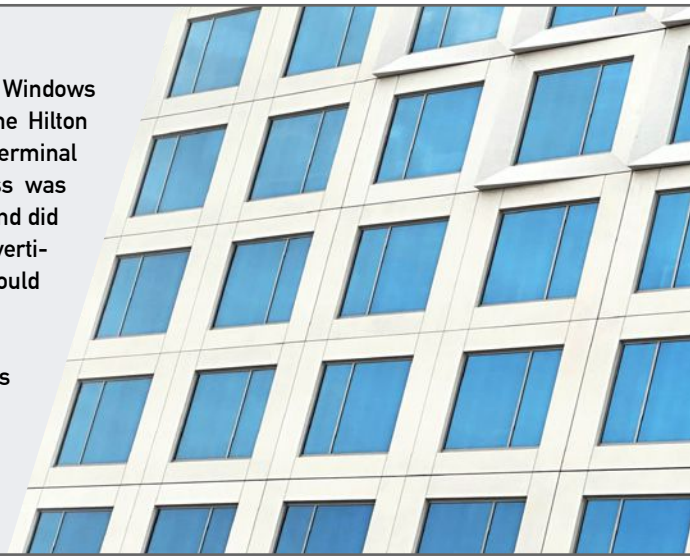
The precast concrete architectural panels really showed their benefit when it came time to install. "We were restricted on all sides of the building," says Chatman. This meant there was no laydown area. "We only had room on one side of the building to bring one trailer in at a time, so we were feeding the crane [with panels] every day," says Wright. "It was a very congested site." The precast concrete trailers had to be backed down a 30-ft-wide, 500-ft-long alley between the two airport parking structures for their staging each night shift and cleared out or moved the next day to allow other trades access to both the parking structure and hotel work the next day.

Installers were building on top of a cast-in-place parking structure for which GATE had also provided cladding, and it was an active building site with architectural panels being installed on the hotel above it.

The Perks of Preglazed Precast Concrete

New York–based Skyline Windows provided the glazing for the Hilton BNA Nashville Airport Terminal Hotel project. "The process was very straightforward," says GATE Precast's Mo Wright. GATE set up formwork and did normal casting and finishing operations, and then put the panels in the racks vertically like library books. While the panels were in this vertical storage, the team could install the windows, which Skyline shipped as a hybrid structurally glazed unit.

The GATE team placed the units in the window openings and bolted connections to the inset in the panels. "It only took about 30 minutes to install a window," says Wright. After installation, the team caulked the panels, let them sit for a minimum of 20 days, and then did a cavity test on the panels before shipment to the jobsite.



Gate Precast basically had only two forms for the guestroom precast concrete wall panels: one for flat panels and another for faceted panels. The flat panels feature a light finish, while the faceted ones have a heavier texture. ***Photo:*** *Gate Precast.*

The architectural precast concrete panels are attached to a structure of post-tensioned, cast-in-place concrete. Installation involved only one tower crane to lift the precast concrete panels into place. Each panel had sizable window openings measuring roughly 6 ft 8 in. tall by 9 ft long. Most of the preglazed panels ranged from 27 to 30 ft long with a height of 9 ft 8 in. and 5 in. thick. The heaviest panel weighed 19,500 lb, though the vast majority weighed about half that, according to Chris Cruze, project manager with Gate Precast.

To speed up panel installation, the team used a unique connection system with an embed, given that the panels each broke at the floor line. They developed a gusseted gravity connection on the panels that would fit against a prewelded embed in the structure. This made for easier and faster erection because installers didn't have to position the panels but could just slide the loose hardware into place and then weld across the top line. "It was a very fast connection to install," says Wright.

Erectors averaged about seven panel installs per day, according to Wright.

Faster Construction, Substantial Savings

The most advantageous thing with the preglazed panels was a quicker timeline for exterior finishing," says Schaedle. "This was important on this project as we had contractual schedule deadlines with the Airport Authority."

"Getting the building dried-in was important," Rector says. "Hotels are heavy on interior, time-consuming construction."

The speedy enclosing of the hotel was due in large part to the preglazed precast concrete panels. According to Wright, "Installing glazing at our facility saved the owner over $500,000 compared to traditional delivery methods." The hotel opened for business in 2024.

In July, 2024, GATE Precast joined Wells, expanding the national footprint.

DID YOU KNOW?
Interesting Facts

Did you know precast concrete is the ideal building material for hotels?

In the case of the Hilton BNA Nashville Airport Terminal Hotel, with its major jobsite constraints and air- and noise-pollution concerns, precast concrete architectural panels offered the following assets:

- A fast construction timeline and speedy structure enclosure
- A high-quality, self-cleaning surface finish
- No need for construction site laydown
- A reduced amount of traffic and number of trades on-site
- Low maintenance needs and high durability
- Inherent soundproofing and self-cleansing with a titanium oxide finish