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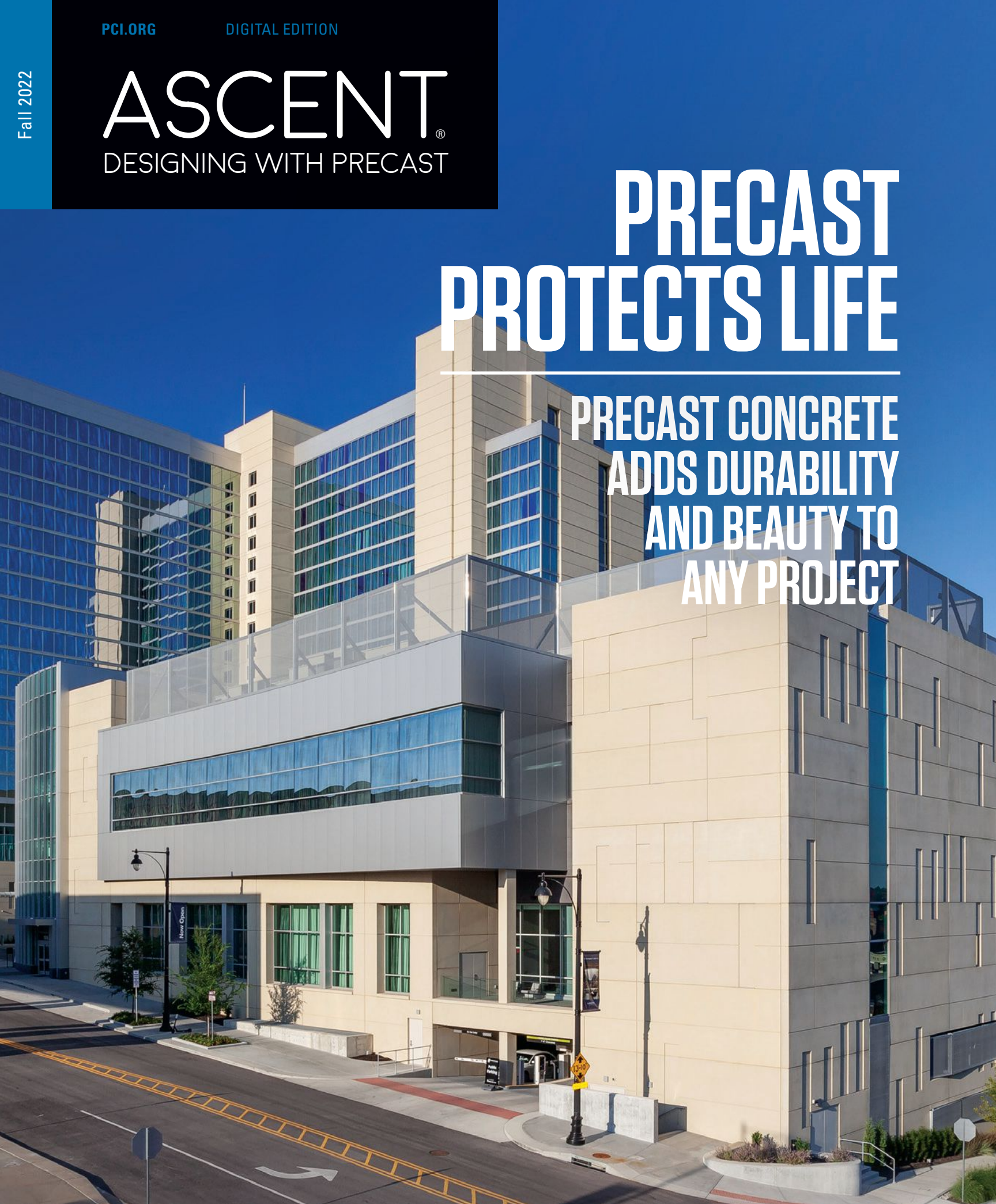


The sawtooth detail on the exterior of the community center draws indirect sunlight into and through the pool area. ***Photo:*** *WELLS.*

BROOMFIELD COMMUNITY CENTER

BROOMFIELD, COLO.

The City and County of Broomfield, Colo., needed to replace its aging recreation and senior center with a centralized facility that would connect the city's diverse population. The overarching goal was to create a landmark that would not only connect the physical building and lush open space to the existing city campus, but also be inclusive of all generations. The structure would also provide shelter and a safe, conditioned space during severe weather.

To accomplish this, a complex, multiphase demolition and full rebuild of the existing facility was required, and precast concrete was selected as the best way to meet an accelerated construction schedule and deliver a modern, striking community facility. Precast concrete was recognized as a superior structural material with the flexibility to create a variety of façades—in this case, one that would blend with Broomfield's color and material palette—and as a durable material that stands up to high winds.

The project team, including Davis Partnership Architects in Denver, Colo.; Adolfson & Peterson Construction in Aurora, Colo.; and precast concrete producer Wells in Brighton, Colo., developed a design-build solution incorporating precast concrete for the recreation portion of the facility. This 60,000-ft^2 structure contains a natatorium with a warm pool, a competition cold pool with viewing bleachers, a hot tub, and a therapy pool; a fitness center; and an elevated, indoor running track. The total–precast concrete building comprises 62% of the entire project, which is 93,000 ft^2.

Construction Phases

The phased construction plan began with phase 1: making the existing senior center wing (last renovated in 1990) a standalone building and demolishing the existing recreational wing (built in 1974). In phase 2, the new facility was built while the senior center remained open. Once the new facility was completed, phase 3 commenced, including the demolition of the remaining building and the completion of remaining site work.

The initial plan to use load-bearing concrete masonry units with a steel floor and roof structure was converted to total–precast concrete because of its durability, flexibility, efficiency, safety, and most of all, cost savings and speed of design, production, and erection. These were major selling points for the owner, contractor, and design team, says Scott Maclay, account manager for Wells. Maclay observes that given the wide variety of amenities the center offers, intense planning, maximized coordination, and over-the-top attention to detail were essential to completing the structure on a fast-track schedule.

Precast concrete offered several viable solutions, according to Ben Hanlon, associate architect with Davis. "Precast was chosen for its ability to be constructed quickly and efficiently, avoiding weather delays," he says. "It also provides durability on the inside. The gym and natatorium are spaces that take abuse from bouncing balls and high humidity. Precast mixed with a high-performance paint product stands up to that abuse."

Furthermore, Hanlon says, it provides a continuous envelope. "Precast insulated panels create an exterior that avoids any thermal bridging and improves building performance."

Substantial Room for Activities

The project team leaned on precast concrete to drive the design of the facility, producing five different depths of double tees, with lengths ranging from 40 to 109 ft, that were used as roofing and floor members. A well-thought-out and engineered solution allowed for varying roof heights from the natatorium to the fitness center to the gymnasium, which turned out to be the quickest, safest, and most efficient result.

The high volume created by the long-span double tees and insulated precast concrete walls in the multiuse gymnasium provided an additional benefit: it allowed the integration of an elevated, three-lane running track cantilevered off the walls. The track doubles as a looped viewing platform to watch the athletic activities in the gym on the ground level.

Specialized surfaces and custom architectural concretes were developed for the exterior of the community center. Davis Partnership Architects chose a formliner from Reckli-Columbia to craft a façade that hints at the aquatic activities going on inside the building. The multiuse, polyurethane formliner introduces a wave-like texture to the façade, says Maclay.

"Because Wells' architectural, insulated wall panels are cast 'down-in-form,' the form liner creates negative image of a particular shape or texture," Maclay explains. "Once the panels are cast and stripped from the forms, the formliner leaves an exact positive impression of the shapes or textures."

The sawtooth detail on the north elevation draws indirect sunlight into and through the warm pool. A custom ribbed liner was used sparingly as an accent at the main entry and around the natatorium and picks up the masonry detailing on the adjacent senior center. "It was chosen for its playfulness and ability to change with the light," says Hanlon. The sawtooth detail in plan

On the north side of the site, the community center is only 10 ft away from protected wetlands. The project team took great care not to disturb any protected areas. ***Photo:*** *WELLS.*

PROJECT SPOTLIGHT
BROOMFIELD COMMUNITY CENTER

- Location: Broomfield, Colo.
- Size: 60,000 ft² (recreation portion)
- Cost: $28.5 million
- Owner: City and County of Broomfield, Colo.
- Architect: Davis Partnership Architects, Denver, Colo.
- Contractor: Adolfson & Peterson Construction, Aurora, Colo.
- Structural Engineer: Martin/Martin Consulting Engineers, Lakewood, Colo.
- Precast Concrete Specialty Engineer: FDG, Arvada, Colo.
- PCI-Certified Precast Concrete Producer: WELLS, Brighton, Colo.
- PCI-Certified Precast Concrete Erector: WELLS, Brighton, Colo.
- Precast Concrete Components: 326 pieces including 105 double tees, 2 beams, 2 columns, 66 wall panels, 122 insulated wall panels, 15 bleachers and flat slabs, four custom raker beams, and 10 column bases

also avoids any direct sunlight into the natatorium, which would cause safety issues with glare on the water, he adds.

Acid etching on the architectural precast concrete ensured color consistency. "Brick was a predominant material on the other city and county buildings, and Broomfield wanted to maintain a similar aesthetic and relationship to those buildings," Hanlon says. "The exterior massing of the new senior wing lent itself much better to brick than precast; therefore, a formliner was chosen that resembles the pattern and scale of the brick on other buildings."

Reducing Weather Delays

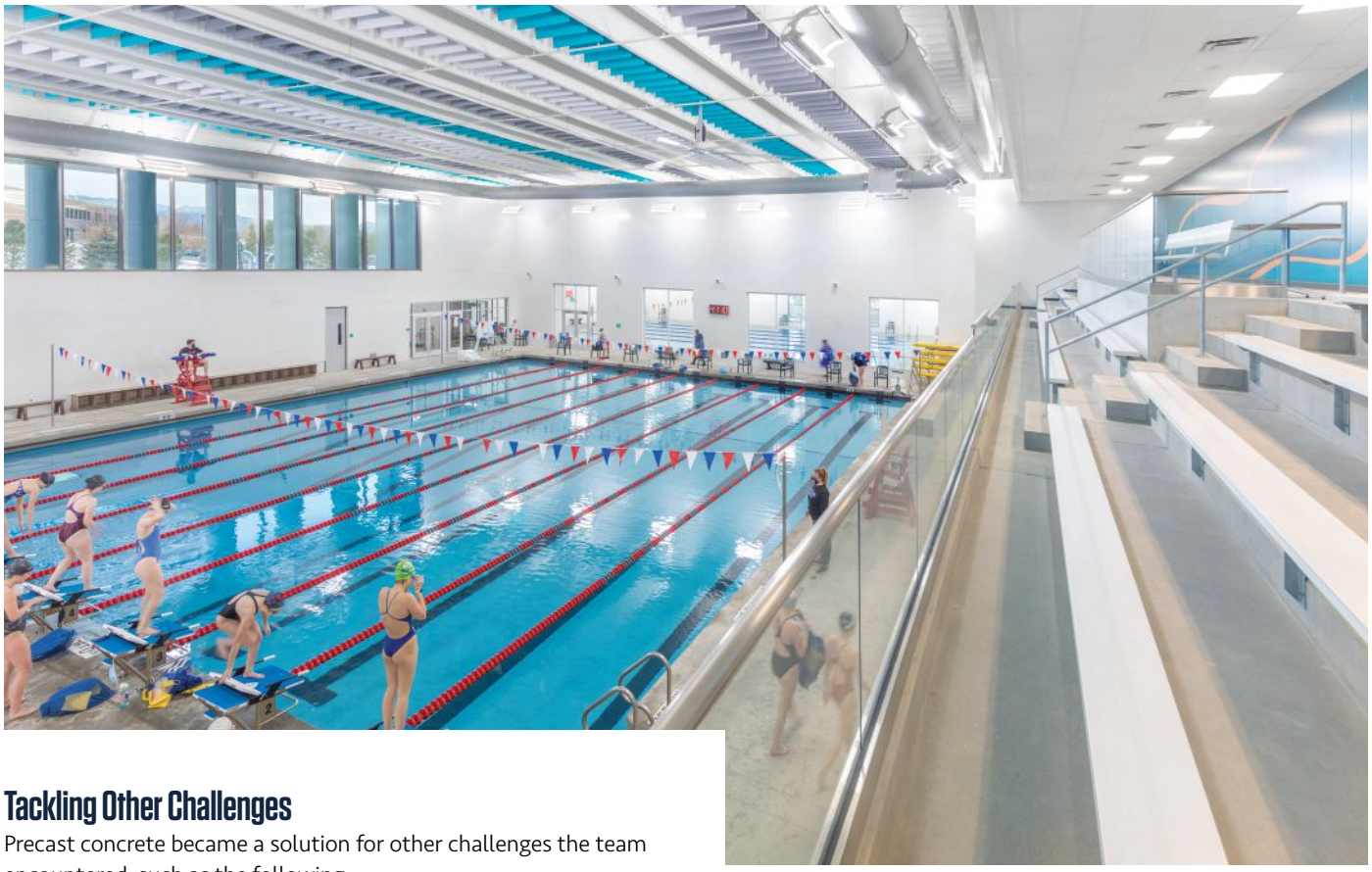
Precast concrete allowed the team to tackle big challenges from the start, such as unexpected weather delays. With precast concrete installation taking place during the worst part of Colorado's extreme and uncertain winter, it was necessary to prepare accordingly. No one could have predicted the historic Bomb Cyclone of 2019 with its vicious winds, but thoughtful site management and planning kept the project on track, says Maclay.

"With its trifecta of wind, below-freezing temperatures, and accumulating snow, the Bomb Cyclone caused havoc," he says. "Winds of 90 mph and heightened safety concerns stopped site work for three days."

However, production of precast concrete components continued in the plant, allowing advance planning and preparation for rapid product delivery to the site after the storm had passed. Once conditions were deemed safe, the components arrived just in time, playing an important role in eliminating additional schedule delays and other on-site conflicts.

To ensure that the 109-ft-long double tees made it safely to the site—and minimize the impact on the neighborhood and surrounding community—the team coordinated off-hour delivery times and used stretch trailers. In a total of 33 days, they supplied and installed precast concrete structural and architectural building components for the community center.

"We estimate that the total–precast solution reduced the overall project schedule by approximately two months," says Maclay, in addition to the month saved on component installation.



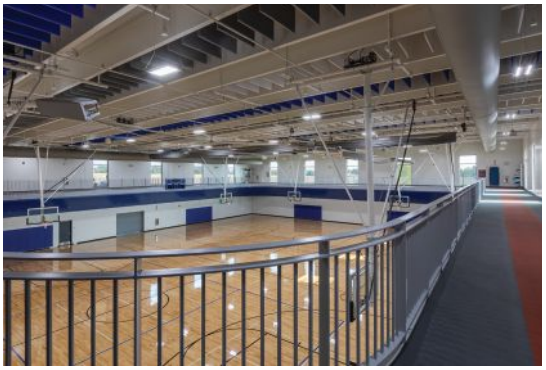
Tackling Other Challenges

Precast concrete became a solution for other challenges the team encountered, such as the following:

- Highly expansive soils at the location of the locker rooms were mitigated by excavating an additional 6 ft to create a crawl space topped with 40-in.-deep double-tee flooring. This heated area allowed the suspension of sloping plumbing lines, which lets the soil expand naturally without impacting utilities. "The locker-room structural floor system was built with precast tees to allow plumbing to be run below the slab and provide access to maintenance personnel in the future," says Hanlon.
- Precast concrete eliminated the complexities of direct-burying utilities, which in turn will prevent future service disruption and protect the hanging plumbing lines while providing convenient access for maintenance and repairs.
- The City and County of Broomfield requires all exposed wiring to be concealed, meaning that all electrical, information technology, and fire-alarm conduits had to be embedded within the insulated precast concrete walls. Each assembly was carefully placed within the precast concrete bed, before each pour, resulting in a clear and utility-free appearance in the finished product.

Compared with load-bearing masonry construction, Maclay says, precast concrete construction had minimal impact on the senior center.

He believes precast concrete was "the piece of the puzzle needed to bring this project to life. Problem-solving was key every step of the way from the ground up, and the elaborate new recreation center speaks to that."



Top: C-GRID®, a carbon-fiber reinforcing grid that connects the interior and exterior wythes of insulated precast concrete walls, was used in the natatorium spaces, where humidity is high, to prevent mold and mildew.

Bottom: Precast concrete combined with a high-performance paint prevents damage from bouncing balls in the gymnasium and the wet environment of the natatorium.
Photos: *WELLS.*