

Parking Structures



Interior Photos: Parking garage interior. Courtesy of Getty Images.

Exterior Photos: Night shots of the City Center Parking Facility highlight the use of lighting to add visual interest. Courtesy of Quinton Myers, copyright: Architectural Design Group Inc.

An award-winning parking structure becomes an architectural beacon for Oklahoma City's urban renaissance

Clahoma City was once called the Unassigned Lands, a vast expanse that was opened to homesteaders in 1889 by President William H. Harrison. In the chaotic rush for land that ensued, nearly 10,000 landless pioneers fought to claim homesteads in an unprecedented event. In this city, it seems fitting that the architects and engineers display this same pioneering spirit in developing original precast concrete designs and unprecedented solutions. Oklahoma City's new City Center Parking Facility transcends its primary function and emerges as a central architectural player of the city's renaissance. Here we find much more than a functional parking facility. We discover an award-winning design so sophisticated and bold that it presents itself as the gateway to the city's business district.

Traditionally and in general, municipal parking structures have not been the source of architectural drama.

Contradicting this traditional characterization, the City Center Parking Facility claims the spotlight.

This well-crafted project is a parking structure that not only blends with its upscale neighbors but stands on its own as a visually appealing structure in an urban setting. A prestigious PCI design award demonstrates that inspired precast concrete solutions can transform parking structures into sophisticated structural elements.

This article explains the aspects of the planning, design, production, and erection of the two total-precast concrete parking facilities that were built on top of existing foundations on a space-restricted urban parcel. The project shows that unprecedented and inspired parking-structure design can successfully create a human-scale ambience in a welcoming and upscale gateway for this metropolis.

A total-precast concrete design, the \$23.5 million, 537,280 ft² (49,913 m²) City Center Parking Facility covers 4.8 acres (2 ha) and accommodates 2770 vehicles, which is a 100% increase in capacity. The structures were built with precast concrete loadbearing walls, beams, columns, double tees, stair treads, and panels.

Team members

Architect:

Architectural Design Group Inc.
of Oklahoma City, Okla.

Engineer:

Zahl-Ford Inc. of Oklahoma City

Owner:

Central Oklahoma Transportation & Parking
Authority of Oklahoma City

General contractor:

Central Oklahoma Transportation & Parking
Authority of Oklahoma City

Precaster (beams):

Coreslab Structures (OKLA) Inc. of Oklahoma City

Specialty engineer:

Salmons P.C. of Albuquerque, N.Mex.

Parking consultant:

Walker Parking Consultants of Houston, Tex.

Lighting consultant:

HLB Lighting of New York, N.Y.



Parking structures that are more than beautiful

Oklahoma City's revival is invigorated by a renewed and growing interest in downtown office space and increasing occupancy rates in the business district. This movement back to the city, however, created a significant shortage of conveniently located parking. In addressing this dearth of adequate parking, the Central Oklahoma Transportation and Parking Authority (COTPA) planned to add 1000 additional parking spaces by authorizing the expansion of an existing two-story, 900-space parking structure built in 1980.

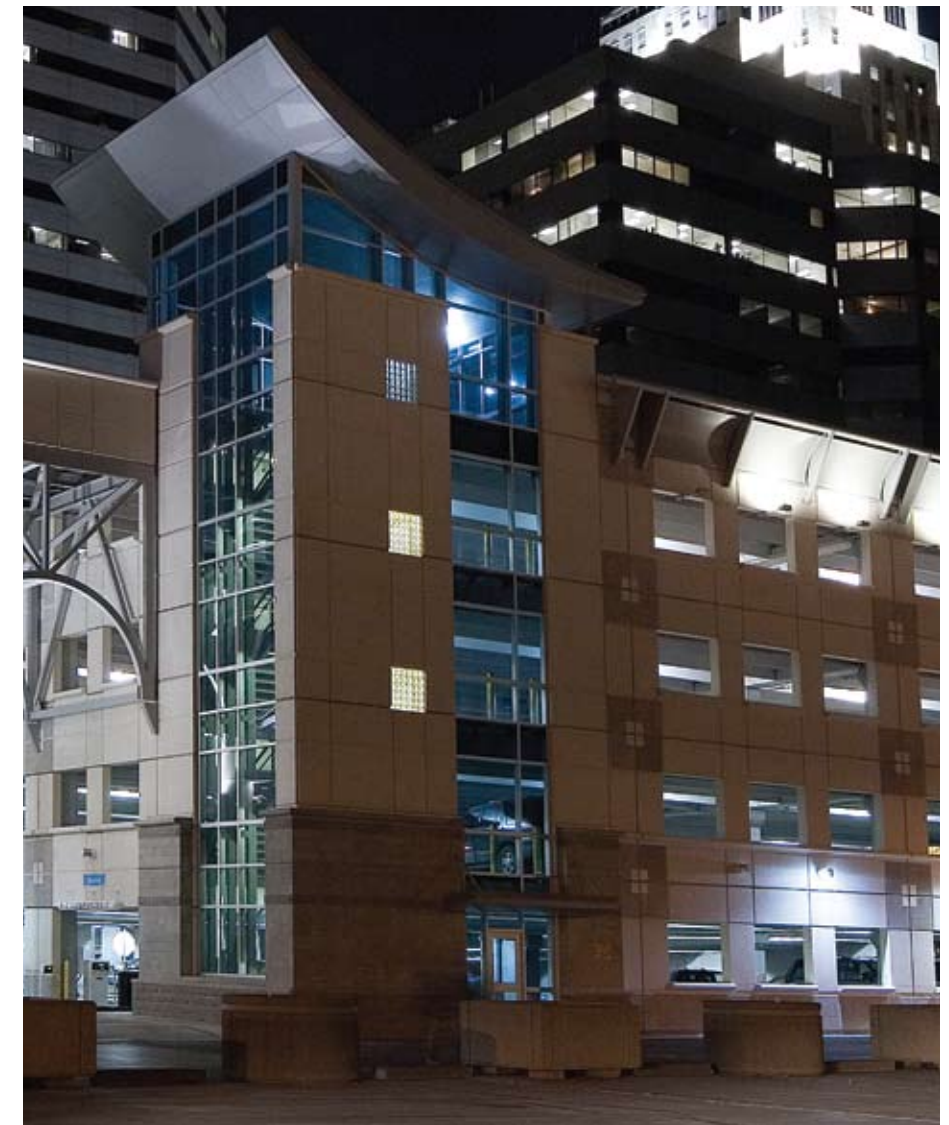
The City Center project is not typical of new parking construction in major cities. In Oklahoma City, the City Center area is the heart of the high-rent business district. City Center parking structures, therefore, are not merely utilitarian appendages to the larger function of an urban district but are the center of Oklahoma City's architectural and civic renewal. Occupying an important seat in the heart of downtown, the project site is ringed by a number of prominent buildings, historic hotels, and municipal centers. These include Oklahoma City's main public library, botanical gardens, modern art museum, government offices, theaters, outdoor gardens, festival plazas, and financial and corporate offices.



Left Myriad Gardens and the city skyline exemplify the ongoing urban renaissance in Oklahoma City, Okla. **Courtesy of Oklahoma City Chamber of Commerce.**

Right Blue-tinted glass in the stair towers of the City Center Parking Facility in Oklahoma City, Okla., not only picks up the glass color on the new downtown library next door but serves to enhance passive security. The new parking facility boasts dramatic vertical elements that are lit by sunlight during the day and become downtown beacons for city visitors by night. **Courtesy of Quinton Myers, copyright: Architectural Design Group.**

“Here we find much more than a functional parking facility. We discover an award-winning design so sophisticated and bold that it presents itself as the gateway to the city's business district.”



Because of its critical location, COTPA, the owner, clearly stated that the two new parking structures must be designed to appear as both an upscale office building and as a distinctive architectural beacon, a recognized gateway to the public in Oklahoma City’s continuing renaissance.

This posed difficult design challenges, especially in light of the restraints and complications that were presented by the outdated existing concrete-and-steel parking structures that would necessarily serve as the foundation for any new designs, and a confined and cramped urban site with little space for demolition or construction operations. Remarkably, the owner mandates were not only met but exceeded with sophisticated designs and inspired precast concrete solutions in an award-winning final product.

This aerial photo shows the completed City Center Parking Facility in Oklahoma City, Okla. Courtesy of the City of Oklahoma City.



This site-plan drawing for the City Center Parking Facility shows the location of west and east parking structures and the southward extension of Harvey Avenue in Oklahoma City, Okla. Courtesy of Architectural Design Group.



City Center Parking Facility project data and precast concrete components

East parking structure	Architectural panels (filler, exterior, stair), 7 in. to 12 in.	236
	12 in. interior vertical wall columns	38
	Double-tee beams	277
	Inverted tees, L-beams, and R-beams	56
	Spandrel beams	28
	Columns	25
	Stair treads	290
	Miscellaneous	44
	Total	994
West parking structure	Architectural panels (filler, exterior, stair), 7 in. to 12 in.	382
	Interior wall columns, vertical and horizontal	116
	Double-tee beams	580
	Inverted tees, L-beams, and R-beams	79
	Spandrel beams	98
	Columns, 24 in. × 28 in.	48
	Stair treads	360
	Miscellaneous	98
	Total	1761
Total structure	Number of pieces	2775
	Square footage	537,280
	New parking spaces	1000
	New and old parking spaces	1937
	Total cost of structure	\$23.5 million, about \$12,000 per space
Schedule	Start design	November 20, 2003
	Start production	February 6, 2004
	Finish precast concrete production	October 31, 2005
	Start erection	August 25, 2005
	Finish erection	May 22, 2006

Note: 1 in. = 25.4 mm.



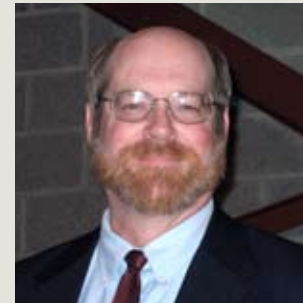
In the evening, the City Center Parking Facility has transparent stair towers awash with light, making the new facility a warm and welcoming gateway to downtown Oklahoma City, Okla. *Courtesy of Joel Menciano, copyright: Architectural Design Group.*

COTPA objectives establish design challenges

The following COTPA objectives became design challenges for the project architects, Architectural Design Group Inc. (ADG) of Oklahoma City:

- Design and build a parking facility in the middle of an active downtown business district while minimizing adverse, construction-related effects on city parking. The paramount project goal was to design two structures that resemble nearby upscale buildings and that are not identifiable as typical parking structures.
- Replace existing parking and add 1000 new spaces for a total of 2770 parking spaces.
- Extend Harvey Avenue between the two new structures with the potential for future extension one block farther south when surrounding parcels are developed as office buildings, hotels, and apartment units.
- Maximize the project's architectural appeal as a desirable prime development site in the heart of downtown.
- Establish the City Center Parking Facility as a good neighbor by creating a generous setback between the public library and office buildings along the north and east and by maintaining views and maximizing natural light for existing office occupants.
- Incorporate the design elements of nearby buildings, including government and public-sector office buildings, the new downtown public library, and the botanical garden. The immediate project neighborhood is urban, and architecture dates from historic 1920s styles through the modern glass towers of the 1980s. COTPA's mandate to ADG was to blend old and new designs in a composite look that is timeless and inviting to downtown visitors and, particularly, appealing to potential developers.

CITY CENTER PARKING FACILITY PROJECT ENGINEER EXPLAINS PRECAST CONCRETE ADVANTAGES



Jerry Hasselwander

Sue McCraven interviewed Jerry Hasselwander, P.E., Ph.D., project engineer of record for Zahl-Ford Inc. in Oklahoma City, Okla.

SM: What was the biggest obstacle on this project?

JH: We had to insert two new multistory parking structures on either side of a new city street extension into part of the footprint of a 1980s steel-framed, one-story parking garage. The new parking structures had to have vehicle and pedestrian access with the existing structure on two or three sides at both the basement and the street levels, so it was necessary to phase the demolition of the existing structure and devise a foundation system for the new parking structure that avoided conflict with the existing one while permitting the new structures to be adjacent to it.

The two new parking structures also needed to be accessible to each other, so we had to tunnel under the new street extension at the basement level and bridge across the new street extension at the fifth levels. These bridges became a significant element of the unique architectural expression of the new parking structure. We also had to maintain a basement-level pedestrian tunnel that originally connected the old structure with an office building north of the site. The new east parking structure replaced that portion of the old structure and we ultimately rebuilt the pedestrian tunnel.

There was also an existing basement-level truck-loading dock that bordered two sides of the new east parking structure. The loading dock serves two office buildings north and east of the site. Although some of its walls were actually a part of the existing structure that would be demolished and replaced with the new structure, the loading dock is outside of the property line of our site and it could not be taken out of service for any length of time for demolition or erection.

SM: Why was precast concrete an advantage?

JH: From a design point of view, the 60-ft-long (18.3 m) double tees gave us a way to frame the parking structure efficiently and economically while accommodating the demands of a new foundation that had to be configured to avoid conflicts with the foundation of the existing structure.

We also found that the constraints posed by the existing structure geometry—that dictated the basement and street-level elevations—left very little structural depth available for the roof framing of the two tunnels that link the structures under the new street extension. The relatively long span and the heavy city-street loads required a series of closely spaced, specially designed and fabricated, pre-stressed concrete inverted-tee beams for the tunnel roofs.

Using precast concrete allowed us to combine a striking architectural expression with the lateral and gravity-loadbearing structural elements while maintaining the open geometry that was essential for passive security, natural lighting, and ventilation.

SM: What particular skills did the precaster bring to the table?

JH: The key to the success of this project was the involvement of the precaster from the earliest stages of the design process. Coreslab's input and expertise allowed the design team to develop structural and architectural possibilities that resulted in a parking structure that exceeded Central Oklahoma Transportation and Parking Authority's expectations both functionally and aesthetically, and remained economical to construct and operate.

For instance, the exterior wall panels included multiple window openings; a variety of reveals, colors, and textures; and large bull-nose windowsills. These panels also served as gravity- and lateral-load-resisting members. By working with Coreslab, the design team was able to configure the window-opening geometries, the architectural detailing, and the proportions of the bullnose sills in a manner that resulted in wall panels that satisfied the structural and architectural demands while remaining economical to fabricate and erect.

Old structures and site pose obstacles

In the beginning, the first goal facing the project team was an evaluation of the two dated, 1980s-vintage, downtown parking structures that would be the foundation for the new, two-parking-structure facility. One of the old structures was built of cast-in-place and post-tensioned concrete and the other comprised steel and concrete.

ADG, project architects, worked closely with Coreslab Structures Inc. (CSI) and Zahl-Ford Inc., project engineers, to find the most economical and practical solution for the site.

A forensic investigation of the existing structures evaluated the feasibility of a vertical expansion of either the post-tensioned or the steel-framed parking structure and explored different configurations of city-street extensions into the site.

It was concluded that the optimum solution was to retain the post-tensioned parking structure and to demolish and replace a large portion of the steel-framed structure with the two new parking structures on either side of the Harvey Street extension from the north side of the site. The remaining portions of the existing steel-framed structure would abut the two new parking structures. This allowed patrons entering the site to use the two new structures, the existing steel-framed structure, and the existing post-tensioned structure as needed.

Adding to the site constraints of the existing older parking structures, COTPA needed to keep a significant portion, about 50%, of the parking spaces in the south structure in use for downtown employees during construction operations. These project challenges of dealing with old structures and ongoing parking operations were made even more burdensome by the confined urban site conditions with virtually no laydown space or room for materials and equipment.

Logistics were further complicated by the need to demolish and remove the old, existing steel-frame structure in a confined site. In particular, the 60-ft-long (18.3 m), precast concrete double-tee beams eased the task of incorporating the new structure with the existing foundations by establishing a workable grid system with vertical supports that did not compromise the older foundation piers.

For ADG, the site limitations predicated architectural possibilities. First, project architects needed to find ways to harmonize a design for the new parking facilities with the considerable range of architectural styles in the neighboring buildings. Second, designers had to find an exciting, dramatic look for the owner that would not be compromised by the need to incorporate new construction into old, cast-in-place concrete and steel parking-structure foundations. Third, the new design had to accommodate continued parking operations in portions of the retained structure during construction.



Top Architectural elements double as art in the City Center Parking Facility in Oklahoma City, Okla. Curvaceous roofs mimic the swooping fins of a 1950s Cadillac. *Courtesy of Anne-Marie Funk, copyright: Architectural Design Group Inc. (ADG).*

Upper left Roof lines that cap the stair and elevator towers imitate elements of sports-car spoilers in the City Center Parking Facility in Oklahoma City. *Courtesy of Erin Merryweather, copyright: ADG.*

Upper right Loadbearing exterior precast concrete panels are 12 in. (305 mm) thick and display the beautiful finish detailing of the City Center Parking Facility in Oklahoma City. *Courtesy of Coreslab Structures (OKLA) Inc.*

Lower left Broad expanses of blue glass in stair towers of the City Center Parking Facility in Oklahoma City and well-designed lighting are not only aesthetic elements but function to create a warm and secure environment. *Courtesy of Quinton Myers, copyright: ADG.*

Lower right As part of the aerodynamic automobile design of the City Center Parking Facility in Oklahoma City, the perforated metal-screen panel on the east facade is designed to mimic the front-end grill of a classic Mercedes sedan and serves to conceal sloped ramping. *Courtesy of Quinton Myers, copyright: ADG.*



REMEMBERING A PASSION FOR PERFECTION



Levern Burk

Levern Burk was known as a perfectionist in the precast concrete industry, a professional devoted to accurate communication documents. Levern worked diligently on the City Center Parking Facility in Oklahoma City, Okla., before his death. His friends and coworkers remember Burk's extraordinary attention to detail and service to the client.

Burk possessed an unmatched passion for perfection and attention to every detail as he made sure each project was constructed within the budget and on schedule. He brought his passion and commitment to accuracy with him to the job, and this passion was contagious to all who worked with him.

Every day, Burk shared his insights and ideas with team members in the Oklahoma division of Coreslab Structures Inc. (CSI). Because of his talents and his recognition of the importance of serving the client, Burk was named project manager for the City Center Parking Facility project.

In 1970, Burk began his career as a drafter at Thomas Concrete Products in Oklahoma City and was promoted to drafting squad leader and then to chief drafter until CSI purchased the company in 1990. He managed the drafting department for 25 years and was promoted in 2004 to manager of the calculations and drafting department, the position he held until he died in October 2005.

Design emulates automobile styling

A total-precast concrete structure produced a distinctive look for the facility, incorporating a variety of automobile elements throughout. The idea to emulate automotive detailing in the precast concrete parking facility appealed to the owners, was fitting for the structure's function, and gave ADG an opportunity to orchestrate a flexible and fresh design concept for Oklahoma City's business district.

In the cornice supports, one can see the tail-fin lines of a 1950s-vintage Cadillac. Metal-halide floodlights are incorporated to trigger images of tail lights. Project architects not only infused a new automobile design concept but blended the concept with the architectural look of adjacent buildings. The cornice itself was molded to mimic the look of the nearby historic Colcord Building, built in 1909. Ornamental details on the loadbearing precast concrete wall panels help complete the visual drama of the design.

There are other references to the aerodynamics of automobile design in the new facility. On the east facade, the perforated metal screening, meant to conceal sloped ramping lines, was designed as a tribute to the front-end grill of a classic Mercedes sedan. The roof caps, in particular, remind downtown visitors of the wind-foil spoilers used on racing cars. Blue-tinted glass in the stair towers harmonizes with the glass hues on the new downtown library to the north, and the tower bases were crafted to resemble limestone, reflecting the historic Art Deco courthouse across the street to the east.

Establishing a secure environment

Security for the public is critical in the design of all parking structures. The City Center Parking Facility succeeds in establishing a welcoming and secure ambiance through the extensive use of glass panels and inspired lighting systems. Glass-enclosed circulation towers enhance passive security and create vertical elements that are lit by sunlight during the day and become downtown beacons by night.

While the facility's main purpose is to provide parking for downtown employees, entertainment venues in Oklahoma City have grown to include professional sporting events and more. A welcoming, lighted parking facility helps to maintain a safe atmosphere for visitors, sports fans, and convention goers. High levels of lighting throughout the precast concrete structures help eliminate dark spots at elevators, stair towers, and in the basement. Exterior precast concrete walls are well lit with a mixture of fluorescent and ceramic metal halide lighting that increases security and showcases building aesthetics. The metal halide lamps at the cornices and the colored LED (light-emitting diode) lighting at the perforated-metal screen wall on the east add visual interest and produce an overall glow from the inside to the outside.

Precast concrete exterior wall panels are pierced with large openings for both ventilation and passive security purposes, and the interior shear-wall openings allow natural light to penetrate deep into the structure. The typical parking level boasts an airy 11 ft (3.4 m) floor-to-floor height with a minimum clearance of 8.33 ft (2.5 m).

Precast concrete details

City Center's new parking structures were designed in accordance with provisions of the *International Building Code 2000*,¹ with detailing requirements compliant with seismic design category C (moderate-level seismic forces). The most significant design challenges, says the specialty engineer for the project, Tim Salmons of Salmons P.C. in Albuquerque, N. Mex., "centered on the lateral-load-resisting system of the west parking structure. The exterior walls of the structure were stacked, horizontal shear walls with 60% of the panel length comprised of punched openings."

The parking structures were five stories high (not counting the basement level) with design provisions to add five future levels to the west structure, resulting in "a complex design for the exterior precast concrete panels as stacked shear walls with frame-like behavior," Salmons says. To resist overturning, the exterior precast concrete wall stacks incorporated a coupling in an emulative grouted joint detail. Interlocking bars in the vertical joints did not require a special erection sequence because the interlocking bars could pass without interference as the exterior panels were lowered onto the extending dowels.

The exterior precast concrete walls have an architectural finish and were designed with a series of large openings to provide both ventilation and natural light to the parking environs. A set-retarding admixture was used in manufacturing the concrete wall panels so that the aggregate would be exposed.

Precaster finds solutions

The precaster, CSI, successfully addressed a number of difficult design and production issues.

Work with an existing elevation The new structure had to match the first elevated level of the adjacent existing parking structure. In addition, the new design needed to avoid the foundation system of the demolished parking structure and provide adequate headroom to meet ADA (Americans with Disabilities Act) requirements. CSI solved this problem with long-span double-tee beams and special inverted-tee beams.

Top A Coreslab production crew places concrete in litewalls. *Courtesy of Coreslab Structures (OKLA) Inc.*

Middle left Self-consolidating concrete is being placed at Coreslab's Oklahoma City, Okla., production facility. *Courtesy of Coreslab Structures (OKLA) Inc.*

Middle right The 500-ft-long (150 m) double-tee bed has reinforcing in position and ready for concrete placement. *Courtesy of Coreslab Structures (OKLA) Inc.*

Bottom Typical reinforcing steel for horizontal litewalls includes a mechanical splice system for connecting a panel to the one that will be placed over it. *Courtesy of Coreslab Structures (OKLA) Inc.*

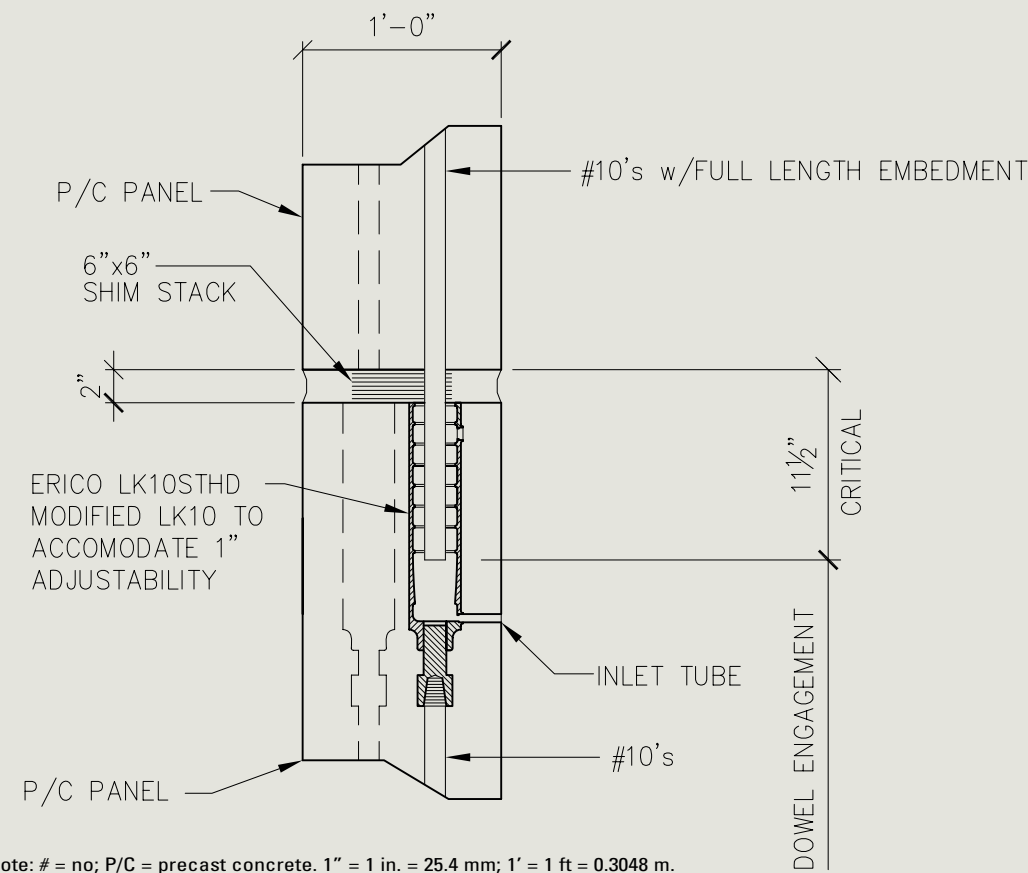


Delivering precast concrete just in time Because the site afforded no laydown area, precast concrete products were carefully scheduled for manufacture, finishing, transport, and just-in-time delivery for erection for rapid construction at the City Center site. More than 45 drilled piers extend through over 35 ft (11 m) of sand to penetrate up to 12 ft (3.7 m) into the loadbearing sandstone.

Designing hidden vertical connections A design criterion was that no exposed connections were permitted in the completed structure. Precast engineers met this specification with some innovative connection designs used to join the panels in a long, monolithic shear wall.

This detail shows a panel joint at the City Center Parking Facility in Oklahoma City, Okla. *Courtesy of Tim Salmons P.C.*

**PANEL-TO-PANEL CONNECTION BETWEEN OPENINGS
(WEST)**



Fabricating loadbearing, seismic-force-resistant panels Architectural, loadbearing wall panels displaying several ornate features were manufactured for the exterior envelope. In addition to generating architectural interest, the precast concrete wall panels provide the lateral resistance to moderate-level seismic forces.

Managing a complex schedule on a restricted site The congested site and the need to keep the existing parking structure functional during construction required careful planning of the construction sequence. The choice of precast concrete enabled the structures to be erected in a sequence that maximized the number of parking spaces available for use at any one time.

Solving a drainage problem Using proprietary software, CSI helped to design effective drainage for the parking structure by developing a tight contour grid that took account of slope, warp, and camber of the precast concrete double tees. In this way, CSI's engineers established critical elevation points, the required amount of floor slope, and drain locations to keep the warping of the double-tee beams within acceptable limits. As a result, the finished parking facility is free from ponding.

Creating outstanding architectural enhancements The structural system comprises precast concrete wall panels with three different face textures integrated into a surface grid design. Several trial concretes were developed and samples were produced by CSI to achieve the color palettes required by ADG architects to blend new construction aesthetics with the surrounding buildings.

This detail shows a bullnose at the City Center Parking Facility in Oklahoma City, Okla.



Fabricating a bullnosed window ledge A bullnose sill detail was an important part of the precast concrete panel system, creating a shadow that evokes a window, a look richer than a plain wall cutout.

Producing architectural finishes to meet owner's needs Because the exterior walls of the parking structures were 12-in.-thick (305 mm) loadbearing and non-loadbearing walls, the selected white-cement-based concrete was employed as a face mixture for economy. The exterior concrete was fabricated with three different degrees of sandblasting to achieve the aesthetic appearance desired by the architect. When all shapes, reveal styles, colors, and surface finishes were ultimately defined, a mock-up of the exterior wall was created to replicate the final design. All team members, including the owner, were able to view the anticipated final result and sign off on the design.

Two-phase construction minimizes impact

A new two-building parking facility was constructed in phases to minimize adverse impacts on those parking downtown. Phase 1 outlined construction of a five-story parking structure on the east side of the site. Phase 2 included erecting a five-story parking structure on the west side and installing bridges linking the two project phases. The west facility is designed to accommodate five additional levels of parking in the future, for an additional 1000 parking spaces.

By extending Harvey Avenue, a north-south street, project architects effectively broke up an existing superblock. The east and west placement of structures presented an opportunity to create a new gateway to downtown, and Harvey Avenue serves to divide the site into small development parcels to attract future developers. The arched pair of functional sky bridges connects the two structures above Harvey Avenue and serves to frame an inviting human-scale milieu on the landscaped avenue below. Steel-tube arches also serve to frame Oklahoma City's Myriad Garden to the south.

The circulation system of the west parking structure was selected for its ability to accommodate future expansion as a six-level, four-bay, double-threaded helix with two-way traffic. The structural system is capable of supporting vehicular loads of an additional five levels. In order to maintain the flat facade along Harvey Avenue, the east parking structure has a single-threaded helix in a six-level, two-bay arrangement. When a parking structure is at capacity, the bridges spanning Harvey Avenue allow drivers to search for available parking without exiting the facility.



The siting of structures for the City Center Parking Facility in Oklahoma City, Okla., presented an opportunity to create a new gateway to downtown, comprising an arched pair of functional sky bridges linking the two structures above the new street. Courtesy of Erin Merryweather, copy-right: Architectural Design Group.

Remarks on the building

“We are really pleased with the way the City Center Parking Facility met our design criteria and blends with the architecture of the surrounding buildings,” says Rick Cain, director of Public Transportation and Parking for Oklahoma City. “We have received numerous favorable comments about the parking facility design. It has set a new standard for parking structures in Oklahoma City.”

“Oklahoma City, like many American cities, has an underutilized bus system,” says Scott Demon, AIA, and project designer for ADG. “As a result, parking for vehicles is always a high priority and will grow in importance as housing developments increase in urban areas. Cities everywhere seek to eliminate the inefficient land use of unsightly parking lots and this means more parking structures. With the growth of upscale parking facilities, we see more amenities being offered in the same structures, more mixed use. People across the Oklahoma City metro area are moving downtown again.”

Acknowledgments

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1. International Code Council. 2000. *International Building Code 2000*. International Code Council: Washington, DC.

About the author



Sue McCraven is an engineer, freelance writer, and editor in Farmington Hills, Mich. She has worked as the engineering editor of the *PCI Journal* since 2002.

Synopsis

The new totally precast concrete Center City Parking Facility in Oklahoma City, Okla., was constructed in the heart of the business district on a site occupied by two old and functionally obsolete parking structures. The owner, Central Oklahoma Transportation and Parking Authority (COTPA), wanted to add an additional 1000 parking spaces while maintaining parking operations during construction.

The project was erected in two phases on the east and west sides of a high-rent parcel. COTPA instructed the project team to design a structure that would function as a parking structure but not appear as one, create a design that would harmonize with diverse nearby architectural styles, and stand on its own as a beautiful and welcoming gateway to Oklahoma City’s vigorous revival.

Keywords

Architectural precast concrete, buildings, double-tee beams, foundations, loadbearing walls, parking structure, seismic.

Reader comments

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