



Second and Plankinton Parking Structure

The 35 year-old Second and Plankinton parking garage is an important asset in a growing entertainment district in the City of Milwaukee, WI. The city's decision to restore it has resulted in a renewed parking resource that exceeded expectations.

Structural modifications to enhance safety and efficiency involved the repair of all deteriorated slabs, joists, walls, stairwells, and delamination of the slabs and walls of the double-threaded helix. Construction joints and slab cracks were repaired and sealed, and minor repairs were made to the structure's beams and columns. Hydro-demolition removed delaminated concrete and prepared the surface for an overlay on the cantilevered helix slabs, the pan joints slab system and on other selected concrete areas.

Preventative measures were developed to reduce future deterioration, including varying the corrosion inhibiting and waterproofing strategies used throughout the garage. On the cantilevered helix slabs and the pan joist system, epoxy coated reinforcing bars and a micro-silica concrete overlay were applied. The pan joist slab system on level 2 and 3 also received a traffic-bearing membrane coating. On the garage's top two levels, the concrete was patched and a traffic-bearing membrane coating was applied. A detailed annual maintenance program was also implemented.

Architectural modifications to the garage were dramatic and complemented surrounding structures. The north façade features a cityscape with a neon band to create visual interest. The helix enclosure and railings

were painted to soften the interior and complement adjacent buildings. A brighter and more prominent lobby and offices will better serve patrons and staff. New signs and graphics were installed to enhance way finding. Improvements to the interior environment involved painting and lighting.

The results of the restoration have more than exceeded the city's goals. There is a waiting list to get into the structure, and the quality parking has attracted new businesses, which use the garage for parking. CEG and the rest of the team have received the 2001 "Award of Excellence" for the Parking Structure category from the International Concrete Repair Institute for the rehabilitation of the Second and Plankinton Parking Structure.



BIG plans in Little Rock

The City of Little Rock is undergoing an amazing transformation. Vacant warehouses have been converted into condominiums. The River Market area is now filled with small retailers. New office buildings are filling vacant lots. Preparations for the William Jefferson Clinton Presidential Library are underway. With all of this new economic activity, the City of Little Rock realized a potential hindrance to the development – a lack of parking. CEG was contracted to conduct a thorough review of Little Rock's parking assets.

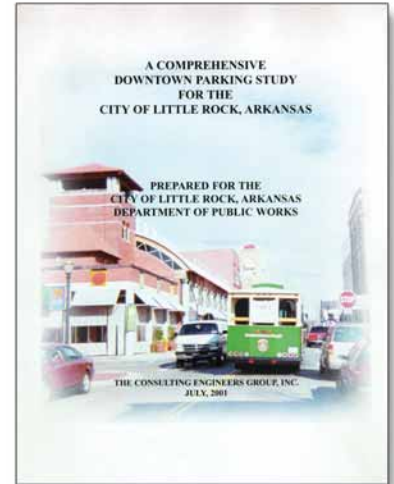
The result of CEG's analysis was *A Comprehensive Downtown Parking Study For The City of Little Rock, Arkansas*. The report, issued in July of this year, included a survey of existing parking facilities (on-street and off-street), input

obtained from over 40 meetings with downtown stakeholders, a review of the current parking organization, a study of the effectiveness of parking enforcement, and the financial capabilities of the City's parking system. With the data collected and analyzed, a clear picture of Little Rock's parking situation became visible. Little Rock needed at least 900 parking spaces now and more in the future.

CEG's report recommended a Parking Improvement Plan (PIP) for Little Rock. The plan included an outline for an entire new parking organization, sites for new garages, cost estimates, financing options, and enforcement enhancements. The release of the PIP included two presentations to the City's Board of Directors. With support of the Board,

the City of Little Rock is now implementing the PIP.

CEG continues to assist Little Rock with preliminary financial feasibility reports for two new garages and integrating a streetcar system into the Parking Improvement Plan.



ACI 318-02 – Changes Affect Design and Economy

ACI 318-02 – Building Code Requirements for Structural Concrete has several changes that will have significant effects on concrete structural design and the economy of concrete structures, said Les Martin (CEG-AR), a member of the American Concrete Institute (ACI) Committee 318.

The most significant change is, effectively, the reduction of load factors for flexural design of concrete members. The load and phi factors currently in Appendix C, which have been used by the steel industry, have been moved to the body of the code, except that the phi for flexure was retained at 0.9. This results in an increased allowable capacity of most deck members and beams of 10 – 12%. This is based on a relia-

bility study at the University of Michigan, and brings the overall safety factor of concrete structures more in line with steel structures. This will result in reduced costs of parking decks and other buildings, without impairing the safety.

An important addition is Appendix D, Anchorage to Concrete. For the first time anchors to concrete, such as headed studs, expansion bolts and others have been included in the Code. In the case of precast concrete connections which use welded headed studs, the provisions are significantly more conservative than the current provisions in the PCI Design Handbook and other publications. The code allows research-based modifications, and PCI has funded such research with Wiss, Janney, Elstner of

Northbrook, IL. This research is being monitored by a PCI team headed by Tom D'Arcy (CEG-TX), chairman of PCI's Research and Development Committee.

Chapter 21, Special Provisions for Seismic Design, has added provisions for precast concrete structures. Many of these revisions were a result of the work of ACI's Innovative Task Group I, chaired by Norm Scott, CEO of CEG.

In Chapter 18, Prestressed Concrete, the limits on stresses have been replaced with designation of "classes" of prestressed concrete members. While this will not change the designs of most prestressed members, it more closely defines the conditions under which the tension limit of

(ACI 318-02 Codes continued)

$12\sqrt{f'_c}$ may be exceeded. This may allow more sophisticated designs to help control camber and increase the capacity of members in special cases.

There are changes in the cover requirements for precast concrete members (Chapter 7) and the development of prestressing strand (Chapter 12) which may appear to be significant, but are in reality just clarifications of current provisions.

ACI 318-02 is currently under review, and is expected to be approved at the ACI Convention in Dallas in October, 2001, with publication anticipated in early 2002. The new Committee 318 is in place and will start work at the Dallas Convention. Les Martin has been reappointed chairman of Subcommittee G Precast and Prestressed Concrete. "There are a lot of issues we need to address to continue to make precast structures safer and more economical", Martin said. "These include torsion, release stresses and roughness

requirements for composite decks. We hope to get these passed for the 2005 or 2008 editions."

The PCI Industry Handbook Committee, of which Martin, D'Arcy and Mike Malsom (CEG-IL) are members, is working on incorporating the new code provisions into the *6th edition of the PCI Design Handbook*, as well as working on many other improvements. Martin is serving as technical editor. The committee has targeted mid-2004 for publication.



Westfield Shoppingtown

When Westfield Corporation decided to build three parking structures to support a new, state of the art shopping mall near St. Louis, PBM/Raider Precast and CEG answered the call. Originally engineered as post-tensioned, cast-in-place (c.i.p.) concrete structures, these garages were re-engineered to utilize precast concrete systems. By converting from c.i.p. to precast, the owner saved money by shortening the construction schedule. By changing from eight-

teen-foot bays to thirty-six-foot bays, and by eliminating an expansion joint in one of the structures, even more was saved.

The superstructures of the three garages are made up entirely of precast components; including ornate cornice and cladding pieces, architectural spandrels, free-standing arches, a vehicular bridge, moment frames, and other structural members. Brick and stone material was applied in the field to

enhance the appearance of the structures. The owner, Westfield (an Australian company), has built and continues to build shopping malls all over the country and the world. Their goal was to build their "showcase" shopping mall for the United States in Des Peres, Missouri, with considerable attention paid to detail, quality, and overall appearance. Since parking structures are the first and last impression mall customers receive, aesthetic detail and an "open look" were a high priority. These architectural requirements, along with significant engineering challenges were successfully met by PBM/Raider Concrete and CEG and resulted in three beautiful precast concrete parking structures.

News Bites

CEG

The Consulting Engineers Group Inc.

- CEG is pleased to welcome back **Dr. Larbi Sennour** as Vice President in the Texas office. His responsibilities will include marketing and project oversight.
- CEG is pleased to introduce and welcome **Griselda Gonzales** to the Texas office.
- CEG, as part of the **Phillips Swager** team, has been awarded the design contract for the new Treatment and Detention Facility in Illinois. A first in Illinois and one of only a dozen across the country, the facility will be for sexual offenders who have served their criminal time.
- **To celebrate our 35th anniversary**, CEG is hosting a number of activities in conjunction with various conventions and gatherings throughout the year. At the recent PCI Convention, we reminisced with many of our friends and clients over the long and wonderful association CEG has had with that organization.

Into the Wild Blue Yonder

From time to time, CEG branches out of the world of precast concrete-based engineering into the realm of the unusual. The San Antonio office of The Consulting Engineers Group, Inc. is currently involved with one of these unusual projects. Our involvement is with a local Air Force base to perform a structural investigation on an airplane – specifically on a B-24 bomber. The plane is a replica of an actual bomber and is constructed with tube-steel framing and “wrapped” with a painted fiber glass exterior.

When cracks developed on the plane’s exterior, CEG was contacted by the model’s builder. The structural investigation is at its beginning phase at this point in time. However, upon visiting the site (which is an Air Force museum located on the base), CEG initially observed that settlement has occurred at the plane’s supports and cracking was evident on several areas of the plane’s exterior.

Our investigation continues with calculating the steel framing capacity under the plane’s self weight and applied wind loads. Also, the differential support settlements will be considered a significant contributor to the cracking of the plane’s exterior. Although this model plane will never actually fly, CEG’s goal is to ensure that its exterior never cracks again.



Air Force B-24 Bomber

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