New White Plains parking garage for mall, condos and apartments

The new White Plains City Center Garage provides parking for a shopping mall, condos, apartments, and the public in downtown White Plains. The garage also includes a top floor with a health club, swimming pool, and meeting room facilities.

It is massive with more than 723,000 sq. ft. of structural deck on 10 levels of parking. It was designed and constructed for adding a future level with the health club and pool. Work on the base structure was completed in the first half of this year. Work on the health club addition, (the 11th level) is already underway.

Some of the members, particularly the precast columns, are massive in size as well. The largest are 6’ x 3’ at the base and were cast with 10 ksi concrete. Column sections were limited to two and three stories in height in order to keep lifting weights in a practical size for erection. The heaviest column sections (base) weighed 50 tons. Pre-topped double tee deck members were cast with light weight concrete to reduce dead load and provide a fire rating. Interior light walls and full depth exterior walls are used for lateral restraint in both directions. One of the exterior shear walls was 60’ in height.

Almost 2,000 precast pieces were required on the project excluding the health center. A photo is included on page 2.

New PCI program certifies erectors

The new PCI Erector Qualification Program is steadily gaining in recognition and acceptance by the construction industry. The latest directory lists 56 firms that are certified in one or more of three classifications:

- Category 1 Simple Structural Systems
- Category 2 Complex Structural Systems
- Category A Architectural Systems

PCI manuals MNL 127-99 and MNL 132-95 are the standards used for erector classification. For more information on the program visit the PCI website at <www.pci.org>.

Parking Structures:
Recommended Practice for Design and Construction

Precast concrete offers a number of advantages for construction of parking structures. The PCI publication "Parking Structures: Recommended Practice for Design and Construction" is a comprehensive source of information for owners, architects and engineers undertaking a new garage.

Chapters in the manual are included on functional design, durability considerations, structural design, connections, production, and erection. An appendix includes recommendations for management and maintenance. Parking structures are an important element in today’s urban and suburban environments. Parking can be a pivotal factor when consumers decide where to do business. Parking structures must be designed for the types of visitors they serve and the flow of daily traffic.

Precast prestressed concrete parking structures outline competing materials. Precast members, cast with a low water-to-cement ratio and accelerated curing in a controlled plant environment offer high strength, low permeability and high durability. In addition, precast structures have an ability to "breathe," which allows a structure to relieve pressure at precast joints from volume changes that occur as a result of shrinkage, creep, and temperature changes throughout the year.

Most precast parking structures are built with double tee deck members that can be topped with cast-in-place concrete as the riding surface or pre-topped so the entire flange or deck thickness is monolithic with the member. Pre-topped tees are considered more durable and economical by most specifiers of garages.

Variations in exterior facades are available to achieve any look or aesthetic goal. Garages can project a bright, contemporary style or an older historic look complementing the neighborhood. Precast panels can incorporate brick or tile inlays, exposed aggregate or finishes that are molded to resemble stone, brick or textures with form liners placed in a mold. A variety of framing systems are available to meet structural and functional requirements, including safety and security.

Erection is shown on the City Center Parking Garage in White Plains, NY. The structure includes parking for 2,000 cars on 10 raised levels. An 11th floor was added this summer for a health center and other facilities. Additional photo and details are included on page 2. 

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New RPI garage keeps in scale, blends with the neighbors

Most parking structures have a problem keeping in scale and blending with the neighbors. Some parking structures can be seen massive, extremely long, and rather plain. With precast concrete, wide variations in exterior facades can be developed to achieve almost any look, color or aesthetic goal.

A new 700-car garage now under construction on the South Campus at Rensselaer Polytechnic Institute (RPI) in Troy, NY, is a good example. The architect has created a unique wall-framing system to break up the long side walls and create a vertical frame for resisting lateral wind and seismic loads.

Vertical ribs support 12' wide pretopped double tee stems in back with monolithic corbels. Deep horizontal beams finish the top and bottom of each panel. The panels are connected, via NMB splices, from foundation to roof, to create full height lateral shear walls.

Standard brick is being installed over the first level panels and brick recesses at each end of the panels. The latter will simulate columns, visually break up the elevation and cover the panel joint. The exposed concrete fins and horizontal beams were cast with a light buff concrete to simulate limestone and contrast with the brick. The limestone and brick will blend with other buildings on the campus. Deep shadows created by the fins and beams are expected to create a changing and interesting facade.

Precast stairs and landings are another unique feature of the RPI garage. Twin precast columns with extended corbels support landings which in turn support the stair members. A beam and roof slab connect the two columns at the top. A glass curtain wall will enclose the structure.

The architect and engineer on the RPI structure is Desman Associates from New York City. The contractor is McCarthy Construction from St Louis, MO. The William E. Dailey Co located in Shaftsbury, VT provided specialty engineering, fabricated the precast products and performed the erection.

White Plains garage continued from page 1

300-ton crane with a luffing jib was used for the primary setting crane. Erection started in November 2002 and was completed in June 2003. Erection started in some areas three levels below the street level grade.

Some of the exterior full-depth spandrels, shown above, are finished with thin brick in contrasting colors of alternate bays. The panels are highlighted with features of lightly sand-blasted buff concrete.

The garage is part of a new development which includes apartments, condominiums and a shopping mall. The owner is a joint venture of LC White Plains Development and Cappelli Enterprises from Valhalla, NY. The George A Fuller Co was the contractor. StreetWorks Development and Consulting Group from White Plains was the architect, and Desman Associates from New York City was the engineer and parking consultant.

Unistress Corp. located in Pittsfield, MA provided the specialty engineering, fabricated the precast members and performed the erection, for the original project and 11th floor addition.

Thin brick panels:

Thin brick (min 1/2") are preferred for facing precast concrete panels such as those above. They are placed on a template and bonded to the concrete when the panel is cast. "Clay Product-Faced Precast" (DN-8), part of the Designer's Notebook Series is available from PCI and recommended as a reference.

Calendar of Coming Events:

December 18-19 Training and Exam for ACI Concrete Field Testing Technician Grade 1
Hudson Valley Community College, Troy, NY
For schedule, fees, and registration contact Ron Vaughn at 518-283-8637

February 6-8 World of Concrete, Atlanta, GA
Visit: www.mcpx.org for details and registration

January 28 PCANY Board Meeting (9:00 AM - 12:00 Noon) and
Annual Meeting (1:00 PM - 5:00 PM) Turning Stone Casino, Verona, NY
For details contact PCANY: 518-895-8352
Greater level of commitment required for central mix HPC

The greater level of commitment for materials, personnel and time that was necessary for production of high-performance-concrete (HPC) on a recent cast-in-place (CIP) project in Chicago is detailed in the May/June issue of HPC Bridge Views. The article, by Gary Hall with Prairie Materials, is entitled “The Concrete Suppliers Perspective.”

Materials, testing, batching

Special aggregates (non local) were sometimes necessary. Rigorous sampling and testing procedures were more stringent than normal and more time was required by the lab. Approved materials did not always meet project specifications and were rejected. Mechanical adjustments for the cementitious material gates and adjustments to the batching software were necessary to compensate for different flow characteristics. Two central mix plants located less than 2 miles from the project were set up to accommodate the cementitious components for the mix.

Weighing times were increased considerably due to each of the four cementitious materials having to hit its target before the next could be weighed. An increase in mixing time of about 50 percent was necessary to ensure uniformity. Procedures for using the high-range-water-reducer (HRWR) were modified to allow introducing a portion at the plant and the rest at the job to control slump. Meetings were necessary before each placement to finalize rate of delivery, routing of trucks, location of concrete testing stations, and the type and configuration of placing equipment. The later was important due to its impact on plastic air content at the point of placement. At times it was necessary to ship concrete exceeding the upper limit of the specified air in order to be within specification at the point of discharge.

Production and ideology

During placements, a yard manager and quality control technician were required at the plant, while at least one operations and two quality control personnel were present at the jobsite. Frequent sampling was done at the plant, and each batch was sampled and tested at the job site. Air entraining and HRWR admixtures were at hand to provide field adjustments of mixes when required. Finally, the author notes that production of HPC while at times difficult, was not impossible. HPC is not only materials and production but an ideology that must be adhered to.

Improper shoring of Atlantic City garage may have caused collapse

Improper shoring or failure of a component of the shoring system during construction of a 10-story cast-in-place (CIP) parking garage at the Tropicana Casino in Atlantic City, NJ are being investigated as possible causes of a collapse which took place on October 30, 2003. Four workers were killed and more than 20 injured. It was not initially clear whether the structure would be torn down and rebuilt or salvaged with only cleaning of the damaged portions.

Filigree-wideslab system

The design system incorporates 2.5” thick precast “Filigree-wideslab” stay-in-place forms for the deck slab. The panels are reinforced with pretensioned strand and open web bar joist that protrude from the top. Polystyrene voids are placed on top of the panels, and topped with CIP reinforced concrete for a total composite slab thickness of 10 inches. Columns, beams, spandrels, shearwalls and stairs are all cast-in-place concrete.

Missing connections

A story in the November 17 issue of ENR reports on missing connections as another focus of the investigation. The system has been used successfully in the US and in Europe for over 30 years. Initial shoring is traditionally removed and moved to higher floors as construction progresses. An unshored lower deck with inadequate concrete strength could also have precipitated the collapse.

All precast, 26-span NJ bridge earns PCI award for Bayshore

An all precast 26-span precast concrete bridge, in Cape May County, NJ has been named a Co-Winner of the PCI 2003 West Bridge Award for Spans Greater Than 135’. The award was made in November at the PCI Convention in Orlando. The unique design included precast cylinder piles, pile caps, continuous spliced-girders, double-tee beams, and half-depth deck panels. All of the precast members were made by the Bayshore Concrete Products Corp. at their plant in Cape Charles, VA.

Unistress receives ASBI CA/T award

A portion of the Central Artery/Tunnel, “Big Dig” project in Boston, with nine precast segmental bridges that required 11,600’ of girder segments, has been recognized by the American Segmental Bridge Institute (ASBI) as a winner in their 2003 Bridge Awards Competition. The award was made in November at the ASBI Convention in San Francisco. The segments were precast by Unistress Corp. at their plant in Pittsfield, MA.

Training and exam for ACI certification

A special training course and examination for certification as an ACI Concrete Field Testing Technician Grade 1 is scheduled for December 18 and 19 at Hudson Valley Community College in Troy, NY. The course and exam will be based on the new CP-1 (2003) Technician Workbook which will be furnished to registrants. Call Ron Vaughn at 518-283-8637 for details.

Packing structures continued from page 1

The functional or non-structural aspects of a parking structure design are reviewed in detail. Recommendations for street access including entrances and exits are noted. Common circulation systems are shown and discussed in detail. Space parameters, accessible parking, security, lighting and graphics are also reviewed.

The PCI Designer’s Knowledge Bank can be accessed at <www.pci.org> and includes a number of resources for design of parking structures. The Parking Structures manual can be opened for review and downloaded in a PDF format or ordered in hard copy.
Happy Holidays and Best Wishes in 2004