Bridges for Life™
call for papers for NBC Conference

A call for papers for the Annual Precast/ Prestressed Concrete Institute’s National Bridge Conference (NBC), which is scheduled for October 17-20, 2004, has been issued by PCI. The conference will be held at the Hyatt Regency Hotel in Atlanta, Georgia and will focus on High Performance Bridges plus Prefabrication for Rapid Construction.

The PCI National Bridge Conference is a national venue for the exchange of ideas and state-of-the-art information on concrete bridge design, fabrication and construction - particularly precast prestressed concrete bridges. The call notes that concrete continues to grow as the material of choice for the nation’s bridges. Each year more than 70% of all highway bridges are built with concrete, and 60% are built with precast/prestressed concrete.

The call for papers lists 18 suggested topics for consideration. These include:

- Creative Bridge Solutions
- Post-Tensioning Technology
- LRFD Issues, Research and Monitoring
- Repair and Rehabilitation
- Aesthetics, Coatings and Colors
- Segmental Concrete Bridges
- Precast Bridge Deck Solutions
- Designing and Retrofitting for Seismic
- Early Precast Bridges/History of Precast
- Contractor Alternatives and Value Engineering
- Research in Action
- Innovative Concrete Bridges
- Design-Build Projects
- Designs to Facilitate Fast Construction
- Case Studies
- Precast Substructures
- Plant Production Solutions
- Hauling and Transporting Solutions

Abstracts should be submitted electronically according to instructions at the PCI website. Papers are due by June 11, 2004. Requirements for papers may be found at wwwpci.org. The Conference will include up to six open technical sessions encompassing a maximum of 54 papers.

Tie-down erection without falsework towers used for spliced girder bridge

A tie-down erection method which allowed for installation and post-tensioning of spliced girders without falsework towers was used successfully on the new 26 span Ocean City-Longport replacement bridge in New Jersey. The bridge includes a 10 span high level portion constructed with three separate three span continuous spliced and modified (90° deep) AASHTO Type VI girders. The balance of the bridge is constructed with simple span AASHTO Type IV and VI girders.

Continuous spliced girders

Continuous spliced girder design allows longer spans than can be achieved with simple spans. Each continuous girder segment consists of two pier table girders, a middle drop-in girder and two end drop-in girders. The two end spans are 184’ long and the center span is 222’ long.

Pier table girders were first installed and post-tensioned vertically to the tops of hammerhead piers for a temporary connection. After temporary tie bars were installed at the ends, a drop-in girder was installed between opposing girders to form the middle span. Finally, the two end drop-in girders were installed. Steel strongbacks were installed at both ends of the pier table girders for temporary support of the drop-in girders before the splices were made.

A sketch of the kick force developed by the drop-in girder is shown on page 2. Temporary falsework at the splice points would have been prohibitively expensive given the depth of water, tidal current, wind and impact that would have to be considered in their design.

Sand jacks were used for temporary support of the pier table girders during erection and completion of the splice work. The jacks and temporary tie-down tendons allowed transfer of unbalanced moment during erection into the hammerhead piers. After the girders were in place and the CIP splice concrete placed and cured, the longitudinal post-tensioning was completed and the girders became continuous over three spans.

PCI design awards winner

The new bridge was completed in September 2002 and was the winner in two categories in the 2003 PCI Design Awards Program: the Harry H. Edwards Industry Advancement Award and the Best Bridge with Spans greater than 135’. An article in the November-December 2003 issue of the PCI Journal describes the design, construction and extensive use of precast concrete in both the substructure and superstructure. Also included is a Project Timeline and a Material List of Precast Components with quantities and cost.

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Instant bridges, A+B awards and time is money

One of the ways of bidding and awarding contracts these days is to recognize the cost of delays and the advantages of minimal closings of bridges for replacement. “A+B” bidding adds a cost (B) to the conventional cost (A) of a particular project for user delay or so-called closings. Contractors bid a conventional “hard” figure (A) plus the number of days they estimate to complete a (B) cost-out by the state or agency in user costs.

When suitable off-site detours are not available, precast systems can offer significant savings in time for bridge replacement projects. Many standard products are available that permit bridges to be installed rather than built on the jobsite.

A good example is the 900’ of twin highway overpass structures that were built in San Juan, Puerto Rico in 1991 in a record 72 hours and later dubbed the “Instant Bridges.” At that time, the existing highway was carrying 100,000 vehicles per day. The new overpasses were to carry traffic over two of the busiest intersections.

The precast fabricator for all of the precast products including hollow 54” diameter cylindrical piles, 14” square piles, cofferdams, AASHTO Type IV girders, AASHTO Type VI girders and 90” modified AASHTO Type VI girders, 3.5” half-depth deck panels was Bayshore Concrete Products located in Cape Charles, VA.

Guidelines for SCC, self-consolidating concrete from PCI

A 153 page set of “Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete” is available from PCI. It includes chapters on:

- Materials and Mix Design
- Production
- Quality Control and Curing
- Confirmation of Quality
- Forms, Transport, Placing and Finishing
- Performance and Specifications
- Appendix with Test Methods, Checklists, Design Examples and Test Apparatus


Calendar of Coming Events:

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<th>Date</th>
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<td>April 7 - 8</td>
<td>PCI Zone 5 Meeting, Hartford/Windsor Marriott Hotel, Windsor, CT</td>
<td>Visit: <a href="http://www.pci.org">www.pci.org</a> for details and registration</td>
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<td>April 22 - 24</td>
<td>PCI Committee Days, Millennium Knickerbocker Hotel, Chicago, IL</td>
<td>Visit: <a href="http://www.pci.org">www.pci.org</a> for details and registration</td>
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From PCI Ascent, Summer 1993 issue
115' girders eliminate center pier for Allegany County replacement bridge

New 115' box beam girders have eliminated the need for a center pier on a new Allegany County replacement bridge located on County Route 1 over Van Campen Creek. The girders were installed in mid December 03 less than three months after flood waters undermined piers on the original bridge and it was closed to traffic.

The girders are type B3-915 (39" deep x 36" wide) in accordance with NYSDOT standards and are 120' in overall length with skewed ends. A total of 11 girders were required and they each weighed 55 tons. They were the longest that the precaster LH Whitford Co has made to date. The girders will be grouted, railings installed and wearing course applied in the spring.

This bridge is an example of standards promoted by the National Concrete Bridge Council (NCBC) to reduce costs and extend service life. They include:

- Long service life with HS concrete
- Low maintenance requirements
- Longer spans eliminating pier lines
- Shallow depths with HS concrete
- Rapid construction on the job site
- Predictable performance and close tolerances

Effideck™ for deck replacement

The photo above shows a lightweight precast decking system used for replacement of the existing cast-in-place deck on a high arch bridge over Cascadilla Creek at Cornell in Ithaca, NY. In addition to savings in forming, precast decking offered a number of advantages over a cast-in-place deck. For more details see the insert with this letter.
Today's bridges and a look at the future:

Data from the National Bridge Inventory offers some interesting conclusions about the nation's bridges and we presume those in New York State. Of the structures built between 1996 and 2000, most are constructed of simple spans (74%), cross water only (80%), and have an average length of 72' and an average width of 46'.

The typical bridge is constructed of stringers that rest on bearings supported by abutments which are founded on piles. Bearings and a deck joint separate the superstructure from the substructure. The stringers are generally prefabricated and the substructure, deck and parapets are constructed in place. Construction of the foundations and the substructure accounts for the majority of construction time for most bridges.

Workers spend significant time forming and placing the concrete bridge deck. After placing the deck, curing often requires a month or more. Deterioration of the substructure, stringer ends and the deck, often caused by leaking joints, govern the service life of a bridge. Cracking of the deck can result from poor placement and curing. Even decks constructed with the highest quality control may experience cracking due to differential creep and shrinkage.

With time and proper curing, creep and shrinkage strain of precast deck slabs can be cut in half or more. Details for developing composite action between deck slab and stringers are available. Several major bridge deck rehabilitation projects in New York City and along the Thruway are good examples of what can be done. If there are leaking (not cracking) problems they can be solved with technology currently being used in precast parking garages.

Given the economy, precast technology and labor market it is inevitable that more bridge substructures and decks will be constructed with precast in the future. That is a given, and the only question is what are they going to look like.