Focus of This Issue: Miscellaneous Projects

Precast Concrete Transfer Deck System


Ellsworth Commons, Malta, NY

The typical transfer deck components normally consist of 12” thick hollowcore plank, precast columns, allowing ample space for parking, and precast beams under the plank. Precast wall panels can also be utilized for elevator and stair towers as shear walls.

The precast concrete transfer deck solution fulfills the immediate fire separation requirement between retail/parking and residential wood structure. Three to four hour fire rating can be achieved, thus eliminating any need for fire spraying or other fire proofing applications. Precast also provides flexible design options. There is no need to line up upper wood structure load bearing walls with foundation walls. The hollow core plank allows long clear spans below. This is a great solution for mixed-use projects, with open parking, stores and offices under the multifamily housing units.

Installation of precast concrete deck systems are normally performed by experienced Oldcastle PCI qualified crews, with no weather restrictions (all year around) affecting production or installation, and typically done in one continuous mobilization. The crane can be set inside the building footprint, if site restrictions require. There are tremendous dollar savings on winter protection, as minimal heating is required for grouting and concrete topping only.

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Precast Concrete Transfer Deck System (continued from page 1)

Finished project photos - Ellsworth Commons, Malta, NY

Similar projects were built by Oldcastle, including Boulders I and II in Exeter, NH, and 163 Franklin Street, Stamford, CT.

Boulders at Riverwood, Exeter, NY  
(continued on page 3)
Abstract
Fiber reinforcement replaces steel welded wire fabric (WWF) in certain drainage structures, including four foot diameter manholes. To demonstrate the efficacy of synthetic fiber reinforcement, New Hampshire requires head-to-head testing of synthetic fiber reinforced manholes versus WWF reinforced manholes. Testing is performed on a test rig whereby the precast manholes are tested as though they were pipe sections. This “three edge bearing” test applies crushing force on the precast until a crack forms. At this point a gauge indicates the downward pressure required to cause the crack. This is the pertinent number.

Comparing results among various sections reveals comparative strengths and is an indicator of the utility of various reinforcement means. Forta Ferro manholes broke at pressures equal to, or better than, WWF manholes.

Observations
Four foot diameter manhole sections of 24 inch, 36 inch and 48 inch heights were wet-cast on 4/16/07, 4/18/07, and 4/20/07. All fiber reinforced products were made with five pounds of structural fiber per cubic yard of 5,000 psi design strength Portland cement concrete. Dry-cast manholes reinforced with welded wire fabric (WWF) had an area of steel equal to 0.14. The design requirement is for an area of 0.12, but since the manufacturer, S.T. Griswold, makes a broad variety of products, the only WWF used by them happens to exceed the requirement for these manholes.

Test cylinders made from the batches used to produce the manholes were broken at 28 days, using standard test methods. Average compressive strengths for 4 cylinders of the batch used for fiber reinforced manholes averaged 5,394 psi. 2 cylinders for the dry-cast averaged 5,453 psi. Two gauges piped in series measured test forces. The smaller gauge verified the accuracy of the larger gauge. Markings on the gauge only allowed accuracy within 50 psi.

Three Edge Bearing Test. Long used to test pipe, the procedure requires crushing force to bear down on a round structure supported by three edges. One on top, a heavy wooden beam evenly distributes the load, while two hardwood boards cradle the pipe. Downward pressure is increased until the concrete cracks at least 0.001 inch.

Cracks form at the four equal points of the circle. Cracks on the outside show at 3 o’clock and 9 o’clock. Inside, the surface shows no crack. Cracks at 12 o’clock and six o’clock show only on the inside.

Conclusions
The pressure required to crack a manhole is a measure of its reinforcement. Three edge bearing tests have been used for many years to verify design strengths in WWF reinforced pipe. Using the same test method for 48 inch diameter manholes sections is reasonable. Engineers have many years’
Comparison Testing – Fibers versus Steel (continued from page 3)

experience designing concrete structures reinforced with steel. There are tables, books, and computer programs in abundance to design these structures with WWF reinforcing. Synthetic fibers, on the other hand, reflect new technology that is not as well known. There is no design standard for precast, using fibers as the sole reinforcing. Therefore, comparing test results among various sections tested the same way, but with different reinforcing, is a reasonable way to get comparative results. In every instance Ferro structures were equal to or better than WWF reinforced structures.

Thanks to Ed Pennypacker, Jepco Sales, for submitting this article on the referenced tests made at the S.T.Griswold Facility in Williston, VT, on May 17, 2007.

PCANY MEETINGS

Please arrange your schedule to attend the full PCANY Association Meeting on October 29, from 9 am to 12 pm, at the Comfort Inn and Suites, 16 Wolf Road, Albany, NY, and the Joint Meeting with the NYSMDT Materials and Structures Groups, 1:30 pm to 3:30 pm, NYSDOT Headquarters Building, 40 Wolf Road, Albany. Preliminary agendas will be emailed to all members soon; please send back any topics you wish to have added.

PCANY CONGRATULATIONS

to William E. Dailey Precast LLC, Shaftsbury, VT for receiving the PCI Award for Best Total Precast Concrete Bridge, Route 112 Bridge over the Kearney Brook, Worthington, MA. (and if there is room, continue with By choosing an all-precast concrete solution, the designers were able to replace the deteriorated single-span steel bridge with a more durable prestressed, precast concrete span, delivering a high-performance, cost-effective bridge in far less time than a traditional design. NEXT beams are also cost-effective, says Michael Culmo, VP of structures and transportation at CME Associates, Engineer of Record. “Preliminary investigations by several fabricators indicate that the NEXT beams could be as much as 40% less expensive than traditional beam slab bridges.”