

## Focus of this Issue: Box Culverts and Three-Sided Units

### GRIA Turns to Precast Concrete for Solution

At the Greater Rochester International Airport, a two year, \$20 million construction project currently underway with precast concrete means safety improvements for planes, cars, and trucks. Two existing roadways currently cross the Runway 10-28 Safety Area; this project will reroute these roadways underground in two tunnels using precast concrete arches. Its main purpose is to provide a 1,000 foot gently sloping grass aircraft landing safety area, as required by the FAA. That means the bridge/tunnel sections were all designed for aircraft loadings, specifically for impact of an Airbus A-320. Work started in mid-October 2005, and is expected to finish by the end of September 2007.



Pilot's view of project site

All photos by Clough Harbor

The landside tunnel (on the right in the aerial photo) will be used for fuel trucks and all supplies being delivered to the airport. The airside tunnel is strictly for on-airport vehicle use, thus separating private equipment from public delivery equipment, and providing a significant new level of airport security protection. The landside units have a span of 42 feet inside face to face, while the airside tunnel measures 32 feet clear inside. The Conspan units were produced by Riefler Concrete and Lakelands Concrete Products. General Contractor for the project is Crane Hogan Structural Systems.



Installation of tunnel arch members

In addition to the precast concrete tunnel sections, the project includes over 38,000 SF of precast concrete walls, more specifically Mechanically Stabilized Earth Structures produced by Reinforced Earth. Each panel is approximately five foot square and 6 inches thick. In addition, two new precast concrete buildings for electrical equipment and controls will be installed to service the airport. All work was cast with an ashlar stone faced finish. Thanks to

*(cont. on page 1)*



Stone faced precast concrete retaining walls

# Chautauqua County DPW Crew Sets New Culvert In Under 6 Hours

Installation of the first of two nearly identical County bridges went smoothly this summer, considering the box units, measuring 26 feet long by 10 feet 5 inches high by 5 feet wide, weighed about 25 tons each. It should not be a surprise that precast box culverts and three-sided units have become the accepted standard throughout New York. Plant precasting assures a high level of concrete quality, dimensional fit, and fast installation, thus minimizing road closure time.



Swinging last unit smoothly into place  
 Photos by Kistner Concrete Products

Outside boxes were cast with inserts for rebar connections to accommodate cast in place headwalls, toe walls, and wing walls. The location and spacing of the inserts to develop moment resistance for the safety barrier are barely visible in the photo below. Note the accommodation made in the top of the outer units for the small skew of Chautauqua Avenue running over the stream – a much simpler and less expensive solution than skewing every piece.



Keyway with rebar couplers cast on a skew to accommodate highway layout

The joints between units are packed with an expanded foam filler, and then typically receive a 12 inch wide joint wrap to prevent fines from leaching through. Without going into details in this publication, we strongly recommend that designers consult with precasters to become

acquainted with new hardware and details, all intended to improve unit handling and connections. These twelve units (for two bridges) were cast by Kistner Concrete Products, Lockport plant. Designer, contractor, and owner is the Chautauqua County Department of Public Works, Dave Rivet, Commissioner, and Dave Raecher, Engineer in Charge for these projects.



Fish Bottom Box Culverts

Many bridge situations require a concrete v-bottom in the culvert, to maintain a small stream flow – thus the term “fish bottom”. These can be easily formed when casting the culverts, since most precasters pour these units on their sides. The units shown in the storage yard awaiting shipment have v-bottoms, although it may be hard to make out in these small photographs. PCANY’s CULVERT Design Program handles rectangular boxes, v-bottom boxes, three-sided members, multi-unit boxes, etc, both for design or analysis. More information on this program can be found at [www.pcany.org](http://www.pcany.org). □

## GRIA (continued from page 1)



Stone faced precast concrete utility building

Robert J. Bilyo, P.E., Project Manager at Clough Harbour & Associates LLP and Monroe County GRIA personnel for these photos and facts. Clough Harbour was aided by Passero Associates and Popli Engineering for design and onsite inspection services. □

## New Bridge Looks Old

This structure in downtown Mount Kisco, NY blends nicely with the surrounding buildings and environment. The HySpan® bridge structure was an obvious choice for this location where a maximum hydraulic opening and a minimum amount of fill atop the structure were critical to the design. The brick parapet with coping and cast-in-place sidewalks make pedestrian traffic through the area more inviting.



New "old" bridge in downtown Mt Kisco, NY  
Photos by The Fort Miller Co.

A custom concrete wall was cast to control the water level while casting the footings. Sheeting was not an option since it could not be removed after the HySpan® installation. The wall was able to be saw-cut and removed. Custom openings were provided in the legs of the units to accommodate existing pipes. Accurate field dimensions and tight tolerances during the manufacturing process helped to ensure the success of the installation.



Note custom openings provided in unit leg

Credits for this project are: Engineer – Chas H. Sells, Inc; Contractor – Burtis Construction Co. Inc; Owner – Village of Mount Kisco; precaster (and supplier of this article) – The Fort Miller Company. □

**Calendar** – Septic Tank Meeting Oct 11 and 12 at Turning Stone Casino, Verona, NY – Golf, dinner, meeting. Reservations needed. □

## D260074 Phase One Complete – to be continued

Phase 1 of the Bath-Coopers Road Bridge over McNutt Run (Route 415 in Campbell, NY) was completed last summer, and phase 2 will be completed shortly. These three-sided rigid frames measure 39' 6" inside span by 8' clear high, and are cast to accommodate a 5 degree skew. Because of this height, units had to be shipped on their sides. The accompanying photograph clearly illustrates good rigging and handling practice. Two lines are used to lift and turn the piece. The main line is rigged with swivel connectors and rolling blocks to lift and turn, keeping the weight equally distributed. The second line is used to help lift off the truck and help rotate the piece; the spreader bar insures the lift forces are kept in the same vertical plane as the legs, thus not putting any induced bending forces into the unit. Also note the tensioned cable from leg to leg to keep the legs from spreading apart while setting until the legs are shimmed and grouted. Using this "lift and roll" procedure, Ramsey Constructors, Inc. was able to set 5 pieces in 5 hours.



Lift and Roll of 39' 6" three-sided bridge unit  
Photo by Kistner Concrete Products

Project specifications called for 6000 psi concrete; using an SCC mix, 28 day strengths of almost 9000 psi were achieved. To enhance water runoff from the deck surface, all pieces were fabricated with a 1" crown in the center, meeting the new NYSDOT 718 Specs. Outer pieces were made with shear keys and rebar connectors to tie in the cast in place headwalls and wing walls. This bridge, like many others, is replacing an old jack arch unit bridge (corrugated metal arch spanning I beam to I beam with a reinforced concrete overlay). Kistner Concrete Products supplied the precast pieces as well as the photos. □

## Welcome to SJB Services, Inc.

SJB Services of Hamburg, NY is our newest member. They offer both conventional and special inspection services, says Stanley J. Blas, President. This brings PCANY's total membership to 118 in all categories, a new high. □

**Precast Concrete Association of New York, Inc.**

2829 East Avenue

Rochester, NY 14610

Tel: 585-249-9564 • Fax: 585-381-0945

Email: [pcany@aol.com](mailto:pcany@aol.com) • Web: [www.pcany.org](http://www.pcany.org)

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## 2006 PCI Lunch Box Programs

There are eleven new presentations developed for lunch box talks available in New York by PCANY or your local producer. These are all sanctioned by the AIA, and carry Leaning Units (or PDH's). Please contact PCANY to make arrangements. The topics available are listed at right.

## PCI Box Lunch Programs — 2006/2007

Architectural Precast Concrete  
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