

Focus of This Issue: Box Culverts and Three-Sided Bridges

PRECAST: THE SOLUTION OF CHOICE

The projects featured this month illustrate many reasons why precast box culverts and three-sided units have essentially captured the market for small bridges. They are readily available; installation is fast, and seldom subject to weather; with the concrete produced today by qualified, certified plants, they will have a very long service life; in-

side clear heights and span abilities have increased substantially; adjunct parts, such as wing walls, retaining walls, and barrier walls are easily included in the work. In the storm water retention field, box culverts have provided designers with the means to install below grade structures that can carry earth or parking loads as needed.



Many units are shipped on their sides to stay within maximum truck heights or bridge limitations on the way to the project site. They must be lifted and rolled to an upright position, and then set into their final location. Rectangular

shapes are most common, but tapered pieces can be used to form apparent curves when needed to accommodate existing stream flows.



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Precast: Solution of Choice *(continued from page 1)*

Many failing old structures built of concrete masonry, or simply corrugated steel pipes, are replaced with precast units of much larger dimension, thus safely accommodating significantly greater storm flows. An example is the French Road Culvert replacement project, which used 6' high by 16' span box culverts

Route 14 bridge in Vetran, NY required exacting fit and installation control. These 10' high units span 30', weighed 30 tons each, and were set in two days. The last section was placed with only 4" to spare adjacent to the temporary bridge that had been installed to maintain traffic during construction of the new structure.



Don't try this – but each of these seven 28-ton box culverts, 4' high and 16' long, were placed by reaching over high tension power lines!

Our thanks to our photo and article contributors: Mike Kistner (Kistner Concrete Products), Joel Dickinson, PE (Oldcastle Precast), Paul Sudol, PE and Jeremy Bourdeau, PE (Barton & Loguidice).

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Member Notes:

Kistner Concrete Products will send any consulting engineer their new 80-page 2008 Catalog upon request; just send an email including your name, company, phone, and mailing address to mikek@kistner.com. Besides information on hundreds of products, it also offers specifications, installation guides, warranty, conditions of delivery, certified plant information, etc.

Precast: Solution of Choice *(continued from page 2)*

The NYSDOT combined units in two phases to provide a structure under I-287 in White Plains. The first phase was made of twin 15'-5" x 11'-6" box culverts, forming 155 linear feet for stormwater detention and 37 linear feet for a

sand filter. The second phase is triple cell 12' x 10'-6" units forming a detention structure 135 feet long. All joints were provided with watertight gaskets to prevent exfiltration of stormwater runoff.



Relocate Crane for Last 8 pcs



Finishing Sand Filter

All the above project photos were submitted by two Producer Members: Kistner Concrete Products and Oldcastle Precast. One of our Professional Members, Barton & Loguidice submitted the next project.

An old culvert carrying Hollowville Creek under CR 16, consisting of a single span concrete slab supported by concrete abutments (built around 1910 !), exhibited severe deterioration in the form of cracking, spalling, undermining, and loss of roadway supporting materials. For the replacement project, Barton & Loguidice, P.C. provided preliminary and final design documents, and construction phase services assisting the Columbia County DPW through the process of building a three-sided, precast concrete culvert replacement structure. Project features

included maintenance of the existing horizontal alignment and profile grades of the roadway, maintenance of the existing stream flow alignment, and improving the hydraulic capacity at the site.

A stone formliner was used on the upstream face for esthetics due to proximity to private driveways and residences. The structure length was extended to accommodate the heavy skew and proximity to an intersection. Also, precast wingwalls with foundation anchors were used due to poor subsurface conditions.



CR 16 over Hollowville Creek



Precast wingwall installation

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Extracted from *Engineering News Record*, June 16, 2008, reporting on the 25th annual International Bridge Conference:

Bridge designers and engineers face increasing pressure to build and rehabilitate structures faster and more durably than ever.

Contractors gave their perspectives in sessions on accelerated bridge construction (ABC), a major theme championed by the Federal Highway Administration. Utah Dept. of Transportation officials said accelerated bridge construction was almost standard practice now. ABC, for UDOT, includes design-build project delivery and use of prefabricated or precast elements. □

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