

Concrete Pipe News

WINTER 2013
Volume 65 No. 1

SUNRISE COXT
LEXUS OF NASHVILLE
JB4 CABR323246



American **Concrete Pipe** Association

www.concrete-pipe.org

Concrete Pipe News is published four times each year by the American Concrete Pipe Association. It is available in hard copy and digital format posted on the ACPA website. *Concrete Pipe News* content is linked to archived technical information, research and product development, educational products and applications of precast concrete pipe and boxes. Content is linked to archived word and graphic files on the ACPA and other industry-wide websites. Readers include engineers, specifiers, contractors, suppliers, government officials, and members of the American Concrete Pipe Association.

Media Task Group

Mark Omelaniec, Chair
The Langley Concrete Group of Companies

Anthony Bussio
Geneva Pipe Company

Phil Gale
Geneva Pipe Company

Scott Lander
Hamilton Kent

Richard Langguth
Cretex Concrete Products Midwest, Inc.

Robert Powers
Inland Pipe Limited

Ed Sexe
Cretex Concrete Products Midwest, Inc.

Marketing Committee Chair

Randy Wahlen
Oldcastle Precast, Inc.

Contract Editorial Service

A. Grant Lee
AGL Marketing Limited

ACPA Editorial Staff

Sheila Clevenger

Published by:

American Concrete Pipe Association

Phone: (972) 506-7216

E-mail: info@concrete-pipe.org

www.concrete-pipe.org

On the Cover:

Installing precast junction box manifold system.



American Concrete Pipe Association

Opinions expressed by authors other than staff of the American Concrete Pipe Association do not necessarily reflect the official positions or policies of the Association. No part of this publication may be reproduced or transmitted by any means without written permission from the publisher.

© 2013 American Concrete Pipe Association, all rights reserved.

Editorial

ACPA is a Knowledge-based Industry Association



Matt Childs, P.E., President
American Concrete Pipe Association

An industrial association does not prosper non-stop for 105 years without embracing a core business acumen. The creation of new knowledge through data collection and analysis to form information that translates into knowledge has characterized the ACPA since its inception. ACPA has always shared its knowledge about concrete and precast drainage products, competitive materials, and thermoplastic and corrugated steel conduit.

In the early days, knowledge sharing focused on technology and the evolution of the production of concrete pipe into a modern era of automation and high performance drycast concrete.

Richard Longfellow, an industry icon honored by the ACPA to this day, introduced *Concrete Pipe News* to the industry to document projects, new

technology and advances in research and development. *CP News* remains the flagship publication of the ACPA. In the 50s the short course schools emerged to share advance knowledge on technology, production and marketing/sales. In early 1958, ACPA hosted education short course schools for nearly half of the state highway departments in the United States, and at several locations in Canada. Presenters explained the new ASTM C76-57T Specifications and the principles of loads on underground conduits. In 1986, ACPA hosted the first combined Marketing and Production Short Course School.

Education (transfer of knowledge) has never strayed far from the collective mind at the ACPA. But knowledge and education do not always go hand in hand. Educating in industry may have other meanings like pitching information about products and services for economic gain, or promoting with information to effect change in policy of specifiers and regulators. The meaning of knowledge continues to be studied among philosophers. There are elements of the notion, however, that are generally accepted; certainty (hard to deny), evidence (based on something), practicality (something works in reality) and broad agreement (something is true). These are the essential elements of knowledge.

ACPA shares knowledge through many forums. There are volumes archived on its website of information, knowledge-based publications, video, and software. Much of the archived material is occasionally referenced and debated in Webinars, Pipe and Quality Schools in the late winter/early spring, *Concrete Pipe University* courses for staff of member firms throughout the year, and P3 training. ACPA has never lost its ties with departments/laboratories of universities and colleges where knowledge about concrete and precast products continues to be advanced, along with knowledge of competitive products and materials. The *Concrete Industry Management* program, established in 1996, is a partnership between the concrete industry and Middle Tennessee State University to deliver a four year BSc. degree. The program is available through Arizona State University, California State University, Chico, and the New Jersey Institute of Technology.

There are many reasons why corporations join the ACPA, and among them are continuing education through Pipe, Production, and Quality Schools, *Concrete Pipe University*, and other training. ACPA's members compete vigorously for market share of the gravity pipe market through the auspices of the ACPA, but the hallmark of that competition is centered on knowledge, not the manipulation of information.

LINKS

www.concrete-pipe.org/pdf/2010SpringCPNewsWebEdition.pdf

An After Bid CMP Proposal Falls Short! Sound Engineering Worth More Than Initial Pipe Price

By Michael D. Kusch, Director of Technical Marketing
Sherman-Dixie Concrete Industries, Inc.
MKusch@shermamdixie.com

A 4-barrel, 96-inch diameter reinforced concrete pipe detention system was designed for a Lexus automobile dealership in Nashville, Tennessee. Each of the barrels had a length of 160 feet connected with a precast concrete pipe and precast junction box manifold system. Storm water had to be detained on site then drained very slowly through a storm water quality unit. The system has 33,000 cubic feet of storage capacity.

After the structure had been designed by an engineer, an alternative design was presented by a distributor of 96-inch diameter corrugated metal pipe (CMP). The alternative had a lower capital cost of pipe.

To strengthen the design by the engineer, it was necessary to present design considerations of a CMP detention structure to compare the options based on sound engineering and not a price point or polished sales pitch. The core of the design comparison was [service life vs. design life](#)¹ and the performance of materials according to design standards. It is not enough to consider only storage capacity. Other factors include structural integrity, load-bearing capacity, and maintenance over the design life of the system.

To determine durability of CMP, you must evaluate the pH and the resistivity of the soil. CMP service life (years to perforation) is a function of delaying inside abrasion and corrosion, as well as the harmful effects from aggressive soils surrounding the pipe. [The Handbook of Steel Drainage and Highway Products](#)² contains helpful information for selecting the proper gage of steel and the proper protective coating. To determine the structural strength of the CMP system, you must evaluate the gage of the pipe along with the type and placement of the backfill needed to help the flexible pipe carry the load. The gage of the steel determines pipe stiffness. All steel will rust. A heavier gage (greater thickness) is required to allow the pipeline to function for its design life. The supplier of the alternate pipe material suggested 14 gage (very thin) steel and only a plain galvanized (the minimum) coating.

A conservative assumption of a soil pH of 6.0 and a resistivity of 5,000 ohm-cms indicates that 16 gage galvanized metal will last 20 years before the first sign of perforation (small holes abrading through the steel). If the design life is 50 years, a 10 gage galvanized metal thickness (multiply 2.3 times 20 years) is required to last 46 years. The CMP structure would require the extra cost of additional crushed stone to 12 inches over the top of pipe, while the built-in strength of RCP required crushed stone only to the "springline" to give the owner an RCP service life of 100 years. The CMP was under-designed and destined for replacement long before the 100-year concrete system. Premature replacement might translate into loss of business.

After a report from the concrete pipe producer that supported the engineer's original design of a precast concrete structure by detailing necessary CMP design considerations, Engineer John Gore, PE of [Barge, Cauthen & Associates](#)³ of Nashville) denied approval of the CMP proposal. [Sunrise Contracting](#)⁴ of Nashville installed 644 feet of 96" diameter concrete pipe in about 12 hours. [Sherman-Dixie Concrete Industries](#)⁵ supplied the reinforced concrete pipe.

LINKS

1. www.concrete-pipe.org/pages/faqs.html#D13
2. www.aic.ca/site/media/aic/CSPI_Handbook%20of%20Steel%20Drainage%20&%20Highway%20Construction%20Products.pdf
3. www.bargecauthen.com
4. www.sunrisecontracting.net
5. www.shermamdixie.com

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**
(detention, storm, retention, manifold, CMP, corrugated, metal, parking)
www.concrete-pipe.org
- **Concrete Pipe Design Manual**
www.concrete-pipe.org/pages/design-manual.html
- **Concrete Pipe News**
www.concrete-pipe.org/pages/cpnews.html

Photos: Courtesy of Mike Kusch



"Saddle-Tee" manholes in lieu of large precast junction boxes.



Four-barrel, 33,000ft³ detention system 96-inch C3.



Total precast manifold system.



Structural embedment for rigid products ends at the spring line of the pipe in Regina specification



Backfill and outfall structures completed by May 19, 2011.



Thirteen manholes supplied by Inland.

Installed Costs a Key Consideration for Specifying RCP

By Derek Light, P.Eng., Technical Sales and Marketing
Inland Pipe
derek.light@lehighhanson.com

Rigid and flexible pipe products¹ are designed to react differently in the field. When installation specifications accurately account for these differences, and are combined with a cost analysis of the pipe envelope², the result is the construction of a pipeline that will perform as expected. The Greens on Gardiner stormwater trunk sewer (Regina, SK) was completed in May 2011. The installation demonstrates how concrete pipe can be competitive with pipe materials with a less expensive unit price. Regina's specification for the construction of storm sewers is a well-researched document that recognizes that flexible and rigid pipe interact differently with the surrounding soil and have major inherent differences that must be considered in the design of a pipeline.

A rigid pipe is less installation sensitive than flexible pipe products. With rigid concrete pipe, a large portion of the soil-pipe structure is contained within the pipe itself, thereby relying less on the portion of the structure provided by the soil. This is not to say that you don't need to design for whatever product you use. Concrete pipe does, however, lend itself to the design of a sufficient soil-pipe structure regardless of the existing soil conditions.

The City of Regina specification states that the area of structural embedment for flexible products extended 300mm above the crown of the pipe. In comparison, the structural embedment for rigid products ends at the spring line of the pipe. The trunk sewer included a 1350mm section of pipeline at three to four metres deep. The consultant, Associated Engineering³ specified reinforced concrete pipe (RCP) due to a reduced cost of installation and contractor familiarity with concrete pipe. It was not possible for high density polyethylene (HDPE) conduit to compete with concrete pipe under the City of Regina specification, which clearly states that 150mm lifts are required to 300mm above the crown of the pipe. When installed according to the specification, flexible pipe products were determined to be more expensive.

It is a common misconception that certain diameters of flexible pipe products are cheaper to acquire and install. Many believe that specifications are the same for installing flexible and rigid pipe. This misconception can lead to premature pipeline failures and litigation involving the designer who signed off on the pipeline design.

The Greens on Gardiner is a new development in the south-east sector of Regina, covering 152 developable hectares. Included in the contract materials were approximately 37m of 1650 mm diameter RCP, 1045m of 1350 mm diameter RCP, 138m of storm watermain ranging from 300mm diameter to 1050mm diameter, 13 manholes ranging from 2100mm to 2700mm diameter, and 2 T-riser manholes.

Wappel Construction started construction of the sewer on March 25 and completed laying the pipe on April 29. Backfill of the sewer and installation of the stormwater outfall structures were completed by May 19. Product was shipped from Inland Pipe⁴ plants in Winnipeg and Calgary.

LINKS

1. www.concrete-pipe.org/brochures/Rigid-vs.-flexible-material.pdf
2. www.concrete-pipe.org/pages/pipepac-info.html
3. <http://www.ae.ca/>
4. www.lehighhansoncanada.com/products/pipe.aspx

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website** (installation, rigid, flexible, CAPE, PipePac, specification, liability)
www.concrete-pipe.org
- **Concrete Pipe Design Manual**
www.concrete-pipe.org/pages/design-manual.html
- **Concrete Pipe News**
www.concrete-pipe.org/magazine/2012fallcpnews.html
www.concrete-pipe.org/pdfcpn/CP-News-Winter-2002.pdf (page 12)

Photos: Associated Engineering

Pony Truss Bridge Replaced with Precast Boxes

By William C. Adams

Hancock Concrete Products

bill.adams@hancockconcrete.com

A pony truss bridge constructed in 1965 in Monona County Iowa was replaced with twin precast concrete boxes 47 years later. The county engineer let the bridge replacement project in August 14, 2012 near Mapleton, Iowa. He specified a [precast concrete box](#)¹ culvert with an alternative corrugated Multiplate® or Superspan®. Price was not the lone determinate in selecting material and product for the structure. A bridge condition survey attributed to the National Bridge Inventory reported in 2011 that the bridge was structurally deficient.

[Sundquist Engineering P.C.](#)² of Denison Iowa was retained by the county to design the structure because their design engineer had experience in designing precast box culverts for neighboring counties. The low bidder, using the Multiplate® or Superspan® alternate, made a mistake in his bid and was allowed to retract it. Subsequently, Nelson-Rock Contracting – a local Onawa contractor, who was the next low bidder, was chosen to install the structure. Nelson-Rock opted to install a twin (side by side) 14-foot x 11-foot precast box structure with boxes supplied by [Hancock Concrete Products](#)³.

This was the largest precast box culvert that Nelson-Rock had constructed. The location was deep and wet, and therefore a diversion channel for draining water away from the excavation had to be dug before installation. The base for the culvert was comprised of one foot of 3-inch macadam stone placed on engineering fabric and polymer grid with one foot of recycled crushed concrete placed and compacted on the macadam stone. Although the crew had 50 working days to complete the project, they completed it in half the time. The crew removed the old bridge, prepared the base, installed the two box culverts, backfilled, placed the revetment, and rehabilitated the channel which included seeding.

Farmers and area residents no longer have to contend with a narrow wooden decked bridge with guard rails and weight restrictions. Since the culvert is wider than the old bridge, guard rails are no longer needed. Subsequently, farm equipment and heavier loads have easier access, especially during planting and harvesting.

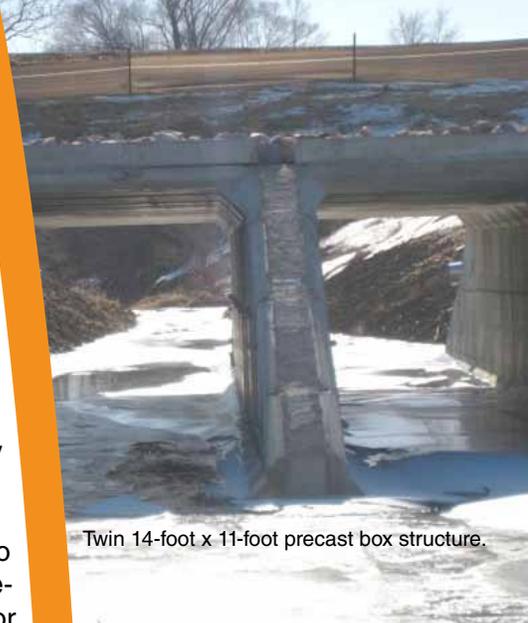
Tom Duncan, plant manager and Doug Schmidgall, dispatcher for Hancock Concrete's Lake View Plant coordinated delivery to the jobsite 50 miles away, where the contractor stockpiled the individual precast elements. After everything was stockpiled, a 220-ton crane from [Crane Rental and Rigging](#)⁴ in Sioux City Iowa was on site late one afternoon for preparation of the next day's installation. Approximately 1,367,000 pounds of concrete were placed in 9.5 hours.

LINKS

1. www.concrete-pipe.org/pages/boxcar-info.html
2. www.sundquistengineering.com
3. www.hancockconcrete.com
4. www.cranerent.com

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**
(box, culvert, twin, cell, metal)
www.concrete-pipe.org
- **Concrete Pipe Design Manual**
www.concrete-pipe.org/pages/design-manual.html
- **Concrete Pipe News**
www.concrete-pipe.org/pages/cpnews.html



Twin 14-foot x 11-foot precast box structure.



1,367,000 pounds of concrete were placed in 9.5 hours by Crane Rental and Rigging.



47-year old pony truss bridge replaced by twin-cell box culvert.

Photos: Courtesy of William C. Adams

Highway Storm Drainage Controlled with Pipe and Boxes

By Dustin Kruger, South Texas Area Sales Manager
Hanson Pipe & Precast
dustin.kruger@hanson.com

Hanson Pipe & Precast¹ supplied more than 6 miles (33,000 feet) of reinforced concrete pipe and over 8 miles (43,000 feet) of reinforced concrete boxes for [Segment E²](#) of the Grand Parkway project near Houston, Texas. These products will manage basic stormwater runoff between two major thoroughfares, Interstate 10 and Highway 290. The sewers and culverts prevent flooding and keep traffic flow moving during days of heavy rains. The 15-mile stretch from Katy Freeway to Northwest Freeway is designed for a four-lane controlled access toll road that serves as part of a larger loop surrounding the greater Houston area. Segment E will have a large impact on the growth and accessibility of Houston, and impact the viability of the area for years.

Hanson Pipe & Precast was selected by [J.D. Abrams, LP³](#) to provide project materials due to the economic benefits of concrete, as well as the proximity of their facilities to the project site. The project's use of reinforced concrete products provides the city with quality, pre-engineered products as a reliable, cost-efficient and sustainable solution for stormwater management. The products met the high structural integrity requirements that the Texas Department of Transportation set for the project.

Construction began in September 2011 and is to be completed by January 2014.

State Highway 99 ([the Grand Parkway](#)) is a proposed 180+ mile circumferential scenic highway traversing seven counties and encircling the Greater Houston region. The project has been shown on governmental planning documents since the early 1960s. The 19.5 - mile Segment D, from US 59 near Sugar Land to IH 10 near Katy, has been constructed and serving as a toll free road open to the traveling public since August 31, 1994. Phase I of Segment I-2, from IH 10 (E) to FM 1405, is an 8.8 mile section of the highway that was opened to traffic on March 25, 2008. Phase 2 of Segment I-2 (FM 1405 to SH 146) is under design. Other segments are in various stages of project development.

When State Highway 99 is complete, it will be the longest beltway in the US, and the third loop within the Houston–Sugar Land–Baytown metropolitan area, with Interstate 610 being the inner loop, and Beltway 8 (Sam Houston Tollway) being the middle loop. The proposed loop has been divided into 11 separate segments for construction and funding purposes. Only two of the 11 segments are complete. As of December 25, 2011, all segments except A have been fully funded.

LINKS

1. www.hansonpipeandprecast.com
2. www.westhouston.org/grand_parkway.htm
3. www.jdabrams.com

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website**
(storm, freeway, culvert, sewer, pipeline, box, Texas, TxDOT)
www.concrete-pipe.org
- **Concrete Pipe Design Manual**
www.concrete-pipe.org/pages/design-manual.html
- **Concrete Pipe News**
www.concrete-pipe.org/pages/cpnews.html

Photos: Hanson Pipe & Precast



Precast boxes supplied for stormwater management.



Precast boxes supplied by Hanson.



Transitioning from the special 5 sided structure to typical 48" diameter (ASTM C 478) manholes sections provides cost savings to the contractor / owner.

Manholes designed to accommodate the size and angles of connecting sewer pipes.

Two special 5-sided wastewater manholes.

Special Manhole for Speed and Performance

By John Dutschmann, Technical Resource Manager
Hanson Pipe & Precast West Region
john.dutschmann@hanson.com

[Precast reinforced concrete manholes](#)¹ offer significant savings in installed cost over cast-in-place concrete and manholes manufactured from alternative materials such as thermoplastics and fiberglass, and are universally accepted for use in sanitary and storm sewers. Precast manhole sections are available throughout the United States and Canada, and are generally manufactured in accordance with the provisions of ASTM C478 - 12a Standard Specification for Precast Reinforced Concrete Manhole Sections. The specification covers the manufacture and purchase requirements of products used for the assembly and construction of circular vertical precast reinforced concrete manholes and structures used in sewer, drainage, and water works.

Hanson's supply of two special 5-sided wastewater manholes as well as several additional manholes for 48-inch diameter sewer mains, demonstrated the versatility of precast concrete drainage products to be delivered on site, ready for installation – according to schedule. The manholes were produced in the company's Lorena (Waco, TX) precast concrete facility located less than 10 miles from the site of the new \$250 million [Baylor University football stadium complex](#)². The stadium is being built on a 93-acre site at the intersection of Interstate 35, one of the nation's busiest highways, and the Brazos River, the longest waterway in Texas.

Included in the design of the facility was the need to relocate sewer and electric transmission lines, along with water, sewer and drainage facilities to service the site. To accommodate the size and angles of connecting sewer pipes, and address the requirement of a small construction footprint, the engineer designed 5-sided manhole structures. The versatility of precast concrete allowed the contractor to connect the large diameter sewer mains using only one structure at each point of intersection. The contractor, [H&B Contractors](#)³ (McGregor, TX) was allowed a short 120 days to complete the installation of approximately 2400 feet of 30-inch to 48-inch diameter wastewater lines and its appurtenances. Working with the design engineer, [Walker Partners](#)⁴ (Waco, TX), [Hanson](#)⁵ provided preliminary designs of the special manholes and most importantly, estimated production times for building the structures. The fast turnaround times made precast concrete the product of choice for these unique structures.

LINKS

1. www.concrete-pipe.org/pdfdd/DD_20.pdf
2. www.baylor-stadium.com/news-updates
3. www.hbcontractors.com/abouthb.html
4. www.walkerpartners.com
5. www.lehighhanson.com

Learn More About Buried Infrastructure

- **Keyword Search on American Concrete Pipe Association Website** (manhole, fiberglass, PVC, flotation)
www.concrete-pipe.org
- **Concrete Pipe Design Manual**
www.concrete-pipe.org/pages/design-manual.html
- **Concrete Pipe News**
www.concrete-pipe.org/pages/cpnews.html



American **Concrete Pipe** Association
8445 Freeport Parkway, Suite 350
Irving, TX 75063-2595

www.concrete-pipe.org

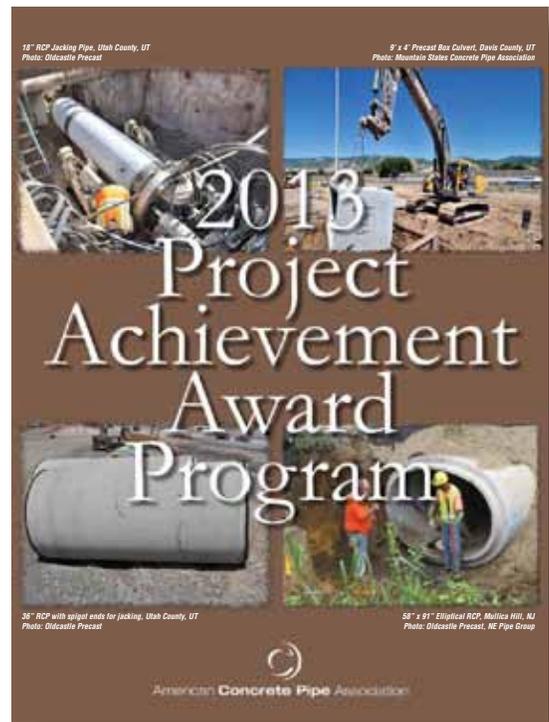
PRESORTED
STANDARD
US POSTAGE PAID
DALLAS, TX
PERMIT NO 1883

Submit a Project for the 2013 Project Achievement Award

The seventh Project Achievement Award Program will reward creativity and excellence in precast concrete pipe and box culvert design and installation. Any state DOT may enter the award program. State DOTs and ACPA members are invited to submit projects jointly or separately. ACPA members submitting projects separately must obtain the signature of the state DOT on their entry form.

The winning project will be based upon public involvement and education, use of new materials or large diameter concrete pipe, use of new technologies, innovation, complexity, cost effectiveness and environmental benefits. Projects may or may not involve all seven elements of the evaluation criteria.

Entry forms are due on March 1, 2013. Winners will be announced in May 2013 at the Awards presentation ceremony during the AASHTO Bridge and Structures Subcommittee meeting. The 2013 application is on the ACPA website www.concrete-pipe.org.



Save this link www.concrete-pipe.org/pages/cpnews.html to your favorites list to increase your knowledge about drainage applications and innovative ways to use precast reinforced concrete pipe and boxes to build structures that will last.