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On the Cover: Concrete pipe was installed while the HDPE was removed. Story on page 4.
Photo credit: Scott Hofer, Hanson Pipe & Precast

Editorial

ACPA's Role as Educator, An Industry Keystone

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

A keystone is the architectural piece at the crown of an arch, locking the other pieces into position. A keystone is very important structurally. So too, is the ACPA's role of educator to the structure of the concrete pipe industry. ACPA's mandate[1] is to provide members with research, technical, and marketing support to promote and advance the use of concrete pipe. Woven into the fabric of this mission is the obligation of ACPA to provide forums, facilities and instructors to pass along knowledge generated by research and development, new and conventional technology related to all pipe materials, and strategies and tactics used in contemporary marketing.

ACPA has been in the business of educating its members and industry throughout its 103-year history. ACPA representatives are affiliated with engineering schools of universities throughout the nation to share and support research, while assisting teachers with material and lecturers about concrete pipe technology. Even state and provincial concrete pipe associations rely on ACPA archives[2] and new releases to assist in educating members and industry officials about the nature of concrete pipe and alternate pipe materials. While resources in other organizations tend to ebb and flow for education, the funds for education at the ACPA remain constant and committed, decade after decade.

ACPA membership produces over 90 percent of concrete pipe tonnage in the USA. It spends millions annually on advancing the knowledge about concrete pipe and other pipe products, as well as marketing and education programs that are publicly shared. Over the past 20 years, ACPA developed annual short course schools for staffs of member firms. Those early education programs have become the "Pipe School"[3] that is held in association with the National Precast Concrete Association[4] conference and The Precast Show[5]. Many courses are eligible for professional development hours.

The Concrete Industry Management[6] program, established in 1996, is a partnership between the concrete industry and Middle Tennessee State University[7] to deliver a four-year B.Sc. degree in Concrete Industry Management. The program is available through Arizona State University[8]; California State University, Chico[9]; and the New Jersey Institute of Technology[10]. The goal of the program is to produce broadly educated graduates who are knowledgeable of concrete technology and techniques and promotion of products and services. ACPA is a strong supporter of the program.

ACPA's role as an educator is carved in stone. All of its actions are grounded in a knowledge-based industry that produces engineered infrastructure products. If ACPA were to abandon this role and fail to fund its ages-long education programs, the concrete pipe industry would suffer the consequences associated with a weaker industry.

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Bridging The Technology Gap

Capturing Thermal Energy from Fluids in Storm and Sanitary Sewers

By Grant Lee
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An enormous amount of heat energy is lost when wastewater flows into sewers. A technology that uses geothermal principles[1] and concrete pipe[2] to extract heat from under the ground has been developed by a Canadian consortium in Ontario. The technology incorporates standard reinforced concrete pipe, and a patented heat recovery system that extracts energy from the pipe effluent and adjacent ground, to heat and cool residential, institutional, commercial, and industrial buildings with an energy efficiency rating from 400 to 500%.

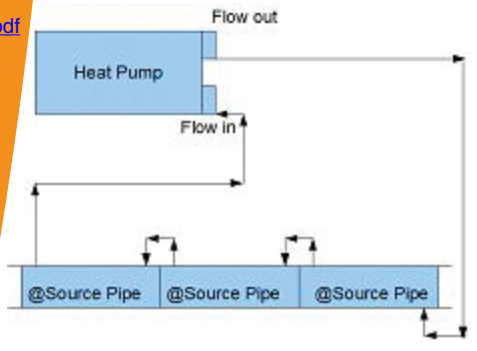
A heat pump in the building controls the system which pumps a mixture of water and ethylene through heat recovery tubes embedded within the concrete pipe wall. Initial design calculations indicate that fifty to sixty feet of sewer pipe will provide sufficient energy to heat a 2,000 square-foot residential building. The heat pump provides year round comfort in the building by heating in the winter and cooling the building in the summer. The heat transfer fluid does not come in contact with the pipe effluent.

Space for the piping or the boreholes required for a conventional geothermal system is not required. Instead, the technology uses what has to be placed in the ground anyway — the sewer pipes. In addition, the technology promises reduction of greenhouse gases[3] because it can replace traditional heating systems and energy demand generated by air conditioners. The technology has the potential of reducing and stabilizing heating and cooling energy costs of a building, whether oil, natural gas or electricity. While the cost of energy from traditional sources will continue to rise annually, the energy cost associated with this new technology will not escalate as rapidly, because increased energy costs are associated with running the heat pump only.

The new heat recovery system is being piloted in the 18-lot Garson residential subdivision in Sudbury, Ontario. The developer estimates that the energy costs for the houses will be 10 to 20 percent lower with the new technology rather than a conventional heating system. The *@Source-Energy Pipes*[4] technology was developed by Renewable Resource Recovery Corporation (R3C)[5], in cooperation with Rainbow Concrete Industries Limited[6], the first licensee to manufacture the new concrete pipe system. This technology was honored at the Ontario Concrete Awards Banquet, held at Concrete Canada, Metro Toronto Convention Centre, on Wednesday, December 2, 2009. For information, see www.r3c.info

Fifty to sixty feet of sewer pipe will provide sufficient energy to heat a 2,000 square-foot residential building.

Connection of @source pipe to heat recovery system.



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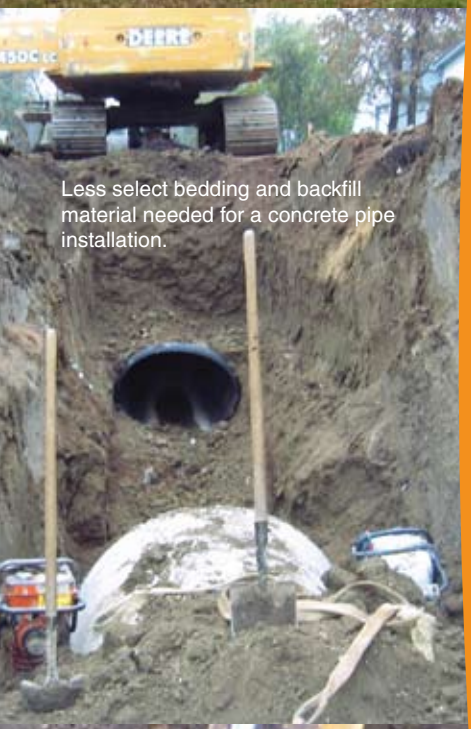
48-inch diameter RCP replaces HDPE storm sewer.



Less select bedding and backfill material needed for a concrete pipe installation.

Concrete pipe installed in a common open cut trench while the HDPE pipe was removed.

RCP Reduces Risk – Adds Value to Pipeline Asset

By Scott Hofer
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When concrete pipe[1] is specified for storm sewers, owners purchase an engineered structure that may run for miles below the surface, functioning as planned for the entire design life of the system. Choices must be made between rigid and flexible[2] products that have different installation requirements and design limitations. While it is true that units of HDPE pipe cost less than RCP, the installed costs per ASTM and manufacturer's standards actually favor RCP as the low-cost installed pipeline.

In 2007, a high density polyethylene pipe (HDPE)[3] storm sewer was installed by a contractor for the City of Tyndall [4],South Dakota. The City had used HDPE in the past on smaller storm sewer lines and officials assumed that HDPE would perform just as well in a deeper bury, for approximately 4,000 feet.

In 2009, an inspection revealed that deflection of the pipe[5] under load was causing distress to the pavement. The bonding company for the original contractor recommended H & W Contracting to make the repair using HDPE pipe. However, after the contract was awarded to H & W by the City, the contractor reviewed the specification for the replacement and convinced the City to use concrete pipe. Representatives from both Hanson Pipe & Precast[6] and Cretex Concrete Products West, Inc.[7] submitted independent proposals to supply concrete pipe. These proposals included cost savings over HDPE, because RCP requires less select bedding and backfill material.

The concrete pipe was installed in a trench while the HDPE was removed. Installation included 1,000 feet in a single line of 48-inch diameter Class III RCP and 3,000 feet of a twin line of 48-inch diameter Class III with gasketed joints. Cost savings were realized with the Standard Installations (SIDD)[8] Type 3 bedding.

Compared to the aggregate cost of the first flexible pipe installation, disruption of the neighborhood and cost of replacement, concrete would have been the right choice in the first place. Now the concrete pipeline has increased the value of the City's assets, along with the performance of its storm sewer system.

Full Story: http://www.concrete-pipe.org/pdfs/RCPReducesRiskAddsValuetoPipelineAsset.pdf

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  (Stormwater, SIDD, storm, sewer, bedding, backfill, asset, HDPE, failure, deflection)
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  http://www.concrete-pipe.org/designmanual.htm
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  Standard Installations
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Photo credit: Scott Hofer, Hanson Pipe & Precast

Precast Box Detention Structure A New-Age Space-Saver

By Mark Chinery
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Ponds are not always the answer to stormwater management, since they eliminate surface space in urban areas where intensification is now a preferred development option. CBL & Associates Management, Inc.[1], owner of the Oak Park Mall in Overland Park, Kansas, had to consider options for stormwater management to help with business expansion plans. The company wanted to add three to six buildings but was unable to provide the necessary space for parking and the buildings. The area occupied by an existing detention pond would provide the needed space.

Hydrologic modeling[2] performed by Pat Kullberg, P.E., LEED® AP of Shafer, Kline & Warren, Inc.[3] determined the required detention storage volume needed for the parking area and new buildings. After consultation with engineers from Cretex Concrete Products[4], the best solution was construction of a buried precast box detention structure. Precast boxes[5] were the ideal choice, since they can be designed to carry the loads of the mall traffic and minimize the fill required for installation. Boxes were the best cost-effective solution.

Six parallel runs of 12 foot x 9 foot single cell boxes was the optimum arrangement. The first four runs included twenty-four six-foot sections, and the final two runs required eighteen sections to obtain over 83,900 cubic feet of stormwater detention volume. Each of the runs was connected to its neighboring run by three 36-inch equalizing lines. A 48-inch manhole was positioned on the low end of the run, and a 24-inch vent at the high end. The manholes allow regular inspection and easy removal of debris. The vents improve hydraulics and allow for cross ventilation to help minimize the potential of a hazardous atmosphere.

Alysen Abel, P.E. of the City of Overland Park[6] reviewed the plans. L.R. Mourning Company[7] of Little Rock, Arkansas, the general contractor, retained the services of Cutting Edge Excavating[8] (CEE) of Louisburg Kansas for the site work and installation.

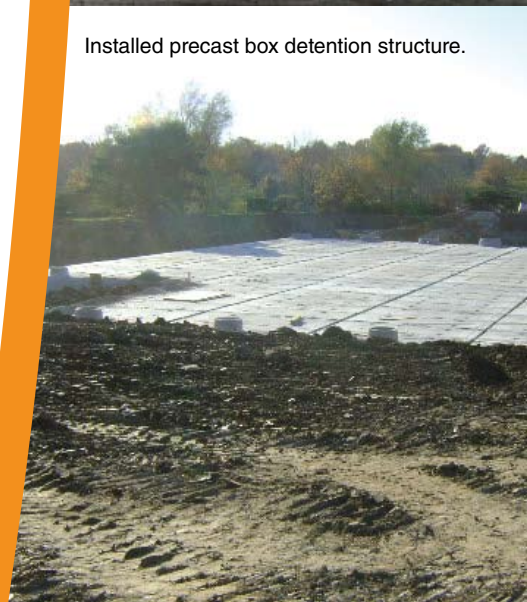
Although stormwater management ponds are still specified in many new developments, older ponds have shown that they are costly in terms of valuable surface space, costly to build and maintain, and pose health and safety issues. CBL & Associates Management was able to convert a surface stormwater management system to a buried precast system to accommodate business expansion plans and modern stormwater management technology. The detention structure was completed in 2009 to allow the construction of the first buildings in 2010.

Full Story: http://www.concrete-pipe.org/pdfs/PrecastBoxDetentionStructureaNewAgeSpaceSaver.pdf

Six parallel runs of 12 foot x 9 foot single cell boxes for detention structure.

Inside inspection manhole at low end of run.

Photo credit: L.R. Mourning Company



Installed precast box detention structure.

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  Hydraulic Efficiency
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RCP Used for Relief Interceptor Sanitary Sewer

By Tony Catizzone
Sales Manager for Northern California District
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Design and construction of the first phase of a gravity sanitary sewer in Concord[1], California included approximately 3,050 feet of 96-inch, 870 feet of 72-inch, and 540 feet of twin 48-inch diameter reinforced concrete pipe[2] (RCP) under Walnut Creek. The A-Line sewer (Phase 2A) was designed to eliminate the largest wastewater pump station (50-mgd) in the USA.

The concrete pipe was installed by pipe jacking[3] (approximately 3,050 feet), microtunneling[4] (approximately 870 feet), and open-cut trenching[5] (approximately 540 feet) across the Walnut Creek flood control channel. Due to the limited amount of pipe cover within the 350-foot wide Walnut Creek channel, the crossing and connection to the Concord pump station was by open-cut construction.

Concrete pipe and fittings were supplied by Ameron International Water Transmission Group[6] from its Tracy, California facility. Strength of the 96-inch RCP was Class 1350D for the tunnel and 1450D for the open cut to accommodate a maximum earth cover of 17 feet. The 72-inch RCP was Class 1350D for the tunnel and 2200D for the open cut to accommodate a maximum earth cover of 26 feet. Class 25 (ft) RCP, according to AWWA C302, was used for the open cut section of the project designed for a maximum earth cover of 26 feet. All pipe had 360-degree Ameron T-Lock lining. The 96 and 72-inch pipe had double gasket Carnegie steel bell and spigot joints with test ports. The 48-inch pipe was a double gasket concrete bell and spigot joint with test ports.

All pipe and ancillary products were supplied between April 2008 and March 2009. Carollo Engineers[7], DCM-Geo Engineers[8], and Bennett Trenchless Engineers[9] worked with the Central Contra Costa Sanitary District[10] and City to design and manage the construction of the interceptor. The microtunneling contractor was Nada Pacific[11] of Caruthers, California. The general contractor was Mountain Cascade Inc.[12] of Livermore, California.

Full Story: http://www.concrete-pipe.org/pdfs/RCPUsedForReliefInterceptorSanitarySewer.pdf

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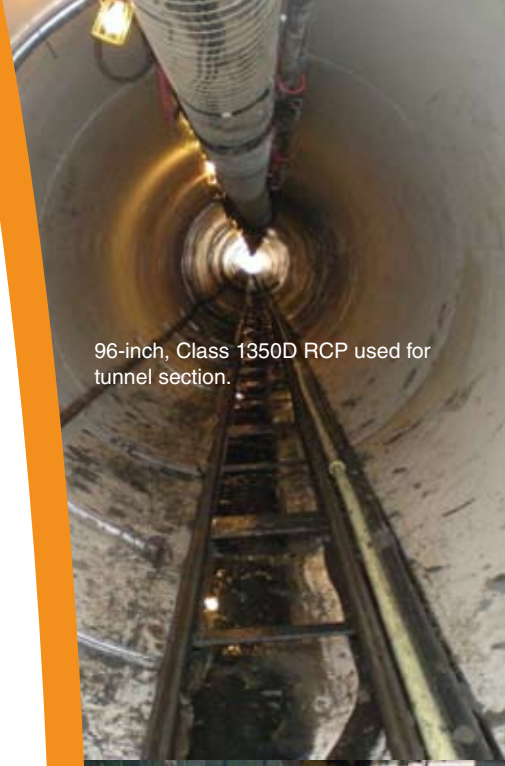
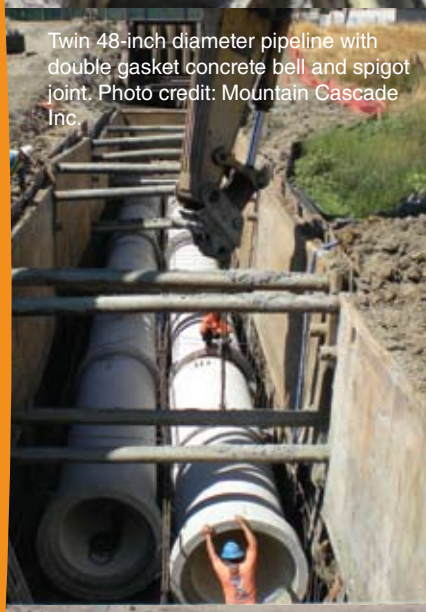


96-inch, Class 1350D RCP used for tunnel section.



Twin 48-inch diameter pipeline with double gasket concrete bell and spigot joint. Photo credit: Mountain Cascade Inc.

Pipe jacking site using 96-inch, Class 1350D RCP.

Photo credit: Tony Catizzone

8-foot x 7-foot RCB section transported for installation on access road along alignment of box-lined canal.

Box section installed from access road constructed on alignment of canal.

Custom elbows manufactured so that box conduit could fit into a narrow shelf in the canyon.

Precast Boxes Pull Structural Double Duty

By Randy Wahlen
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In Utah, the Davis and Weber Counties Canal Company (D&W) (1884), provides water to farmers for irrigation and urban residents for lawns and gardens. Seventy-seven percent of the water delivered by the 16.8 – mile canal from two mountain storage reservoirs is used for agriculture. Among the many challenges of managing the irrigation system are water loss, and landslides.

In 2009, contracts were awarded for Phases 1 and 2 of a project that included 2,150 feet of 8-foot x 7-foot reinforced concrete boxes (RCB)[1, 2] and 1,325 feet of 8-foot x 7-foot RCB respectively. This section lies in an extremely narrow and rocky section of Weber Canyon, where Interstate 84 and the Weber River leave little room for the canal. Cast-in-place boxes were considered in a section where the canal follows natural contours with little fall in elevation. However, construction of the canal improvements were limited to winter months, when there is no need for irrigation and the canal is dry. The precast boxes were a more viable option in areas of restrictive site access and utility corridors, than cast-in-place structures.

A separate construction access road along most of the project was not possible because of alignment of the canal through the narrow canyon and utility corridor. By using the backfilled boxes as an access road, trucks would reverse along the backfill-covered boxes to deliver loads to a track hoe that would backfill a single box and extend the road. The track hoe would pick up another section and transport it to the installation site, sometimes for half a mile.

The consulting engineer was J-U-B Engineers, Inc.[3] The contractor for Phase 1 was Bowen Construction, supplied with boxes by Oldcastle Precast (Amcor)[4] in Ogden. Whitaker Construction[5] installed the boxes supplied by Geneva Pipe[6] located in Orem for Phase 2 of the project. The precast boxes were manufactured to meet *ASTM C1433 Standard Specification for Precast Reinforced Concrete Monolithic Box Sections for Culverts, Storm Drains, and Sewers*[7].The box sections were used for two purposes in a single application, demonstrating the versatility of precast concrete boxes.

Full Story: http://www.concrete-pipe.org/pdfs/PrecastBoxesPullStructuralDoubleDuty.pdf

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Photo credit: Randy Wahlen, P.E., Mountain States Concrete Pipe Association

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Kyle Dickerson Receives Longfellow Award

The 2009 recipient of the Richard C. Longfellow Award was Kyle Dickerson, with Hanson Pipe & Precast, Grand Prairie, Texas. His article, *"Concrete Pipe and Boxes Entrenched in Cowboys Stadium"* was published in the fall 2009 issue of Concrete Pipe News.

Each year, a Concrete Pipe News author is honored with the award whose article most effectively demonstrates innovative and effective use of concrete pipe. The award is presented in memory of Richard Longfellow who had an outstanding career with Cretex Companies, Inc. based in Elk River, Minnesota.

Save this link http://www.concrete-pipe.org/cpnews.htm 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.