

Volume 55 No. 2 Spring 2003

# concretepipe**news**

The Magazine of the American Concrete Pipe Association

Gigantic T-REX Project Shapes  
Denver's Transportation Future

No **Bones** About It –  
Concrete Pipe is No Dinosaur!



- Force Main Replaced with RCP Interceptor Tunnel
- RCP Used on Mississippi River Flood Control Project



**This issue:**

Volume 55, Number 2  
Spring 2003

*Concrete Pipe News* is published four times each year by the American Concrete Pipe Association. It is designed to provide information on the use and installation of precast concrete pipe products for a wide variety of applications, including drainage and pollution control systems. Industry technology, research and trends are also important subjects of the publication. Readers include engineers, specifiers, public works officials, contractors, suppliers, vendors and members of the American Concrete Pipe Association.

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**Contract Editorial Staff**

A. Grant Lee  
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Executive Editor*

Gary Wilder  
*Wilder Studios  
Production*

**Published by:**

American Concrete Pipe Association  
222 W. Las Colinas Blvd., Suite 641  
Irving, Texas 75039-5423  
Phone: (972) 506-7216  
Fax: (972) 506-7682  
E-mail: info@concrete-pipe.org  
www.concrete-pipe.org



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### Don't Wander Off Too Far, Scott!

This issue of *Concrete Pipe News* is dedicated to Scott Olson, chairman of ACPA's Media Task Group for the past three years. Scott was responsible for overseeing the creative development, peer review and membership distribution of ACPA's quarterly magazine. Scott is a true concrete pipe professional, outstanding team player and all-around great guy – we will miss you!

*T-Rex dinosaur image on front cover compliments of Nimbacreations.com*

**Front Cover:**  
*Two excavators are needed to keep pace with the aggressive installation schedule of precast concrete pipe on this section of Denver's T-REX Transportation Project.*

**Front Cover Inset Photo:**  
*Over 2-1/2 miles of precast concrete box sections up to 12-foot x 8-foot (span and rise) are being installed on the T-REX Project in Denver.  
(Photos courtesy of Southeast Corridor Constructors.)*





*John J. Duffy*

## A New Strategy for the Concrete Pipe Industry

Our strategy for marketing the concrete pipe industry and members products is based on the realities of modern-day technology, changing workplace environments, expectations of purchasers and owners of reinforced concrete drainage systems, pure and applied science, and a sound knowledge of the performance of competitive products.

Automated production facilities with integrated plants and workstations are already evolving to levels undreamed of in the 1980s. These modern day facilities will continue to evolve to the point where the ratio of man hours per ton of output will be reduced to lowest possible levels.

Young managers and production staff will have high levels of mechanical, electrical and computer training. Because of safe, clean and challenging workplace environments, they will have satisfying long-term employment. Even

though consolidation of concrete pipe producers is likely to continue, people with skills in automation, management and maintenance will be in demand. Our strategy includes initiatives for raising plant quality with safe and exciting workplace environments to attract a new generation of employees.

The science behind pipe, production, and installation is being presented in universities and colleges as a revitalized and profitable career option. Young engineers are graduating with more knowledge about drainage products than in previous generations. The industry needs researchers and scientists to advance the knowledge of pipe and soil physics. The ACPA has instituted short course schools, outreach programs and research projects with universities and colleges across North America. Our strategy builds upon young minds and seasoned teachers.

Concrete pipe products have various shapes. The understanding of how round pipe performs is well advanced. Product improvement for all shapes of pipe will continue so that in all states and provinces, concrete pipe is the benchmark upon which all other materials are measured. New Standard Installations for bedding are being adopted by the public sector. Our new strategy advances the quality of concrete pipe and the understanding of Standard Installations.

New federal and state legislation is channeling funds into infrastructure and transportation projects. Trenchless technology is becoming more widely accepted and applied. Producers are developing new product applications for precast concrete components and helping develop standards and specifications that can be easily adopted by industry officials. ACPA is in the business of reviewing and developing standards with government agencies and professional associations. Our strategy accommodates this interest.

Competitors are relentless in providing

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## Philip L. Thompson, P.E.

Senior Hydraulics Engineer  
Federal Highway Administration  
U.S. Department of Transportation

Philip Thompson is the Senior Hydraulics Engineer of the Federal Highway Administration (FHWA), located in the Office of Bridge Technology (HIBT) at FHWA Headquarters. He is team leader of the FHWA National Hydraulics Team and team leader of HIBT hydraulics, geotechnical and computer applications engineers. He has been with the FHWA since 1969 when he graduated from Montana State University in Bozeman, Montana with a Masters degree. During his 34-year career with FHWA, he has been an Area Engineer in Illinois, a Hydraulics Engineer for Federal Lands Highway projects, a Demonstration Project Manager, Chief of the Engineering and Traffic Operations Group of the Demonstration Projects Division, Headquarters Hydraulic Engineer, and Chief of the Hydraulics and Geotechnical Branch. He is a Professional Engineer with license in Virginia, a member of ASCE, and the Secretary for the AASHTO Task Force on Hydrology and Hydraulics since 1989.

Mr. Thompson works with representatives of the concrete pipe industry on a variety of hydraulics-related engineering design standards. These are Mr. Thompson's responses



to a few questions posed by the ACPA.

**Q:** *The Federal Highway Administration (FHWA) has developed, and continues to develop and revise many publications on hydraulics during your tenure. Which publication would you say has had the most impact with respect to simplifying the hydraulic design of culverts for the practicing engineer? Please explain why.*

**Thompson:** The publication Hydraulic Design Series (HDS) No. 5, Hydraulic Design of Highway Culverts, consolidates information that was in various Hydraulic Engineering Circulars (HECs). FHWA publishes hydraulic procedures that are being developed as an HEC, the familiar blue covered manuals. Hydraulic Charts

for the Selection of Highway Culverts, HEC 5, 1965, was one of the first HECs. An HDS, a brown covered manual, is a mature design procedure that is not expected to change. HDS 5 was published in 1985 and the basic design procedures remain the same. HDS 5 has been updated to include the results of research on Manning's  $n$  and recently to include metric design aids. The current edition, FHWA-NHI-01-020 is available at: [www.fhwa.dot.gov/bridge/hydrpub.htm](http://www.fhwa.dot.gov/bridge/hydrpub.htm).

hydrpub.htm.

**Q:** *In addition to publications, the FHWA has worked with other organizations, including the American Concrete Pipe Association in developing software for designers of culverts. How do you believe the engineering community has benefited from these efforts, and does your department plan on developing more software?*

**Thompson:** The engineering community benefits from having standard procedures, like HDS 5, provided in software format. The soft-

ware provides results that are similar to the hand methods, reproducible and accurate. For example, the software HY 8, FHWA Culvert Analysis, provides the same results as the hand methods provided in HDS 5. Using the software, the designer is not limited to the design discharge, but can review a range of discharges. For structural design of culverts, FHWA published FHWA-IP-83-6, Structural Design Manual for Improved Inlets and Culverts, which provided example standard plans for improved inlets. As a part of the project, Tim McGrath produced two computer programs for doing the computations: BOXCAR and PIPECAR. Since the programs were not part of the project, they were not documented. Therefore, ACPA and FHWA partnered to have the programs documented. FHWA published Version 1.0 of the programs. The ACPA has further developed these programs, converted them to MS Windows and made them available on their Web site. We plan to continue to support the development of highway hydraulic software and make it available through our Web site: [www.fhwa.dot.gov/bridge/hydsoft.htm](http://www.fhwa.dot.gov/bridge/hydsoft.htm).

**Q:** *We understand you teach several seminars a year on hydraulics. Do you have any educational tools or methods that you find work better than others?*

**Thompson:** FHWA is updating its training courses to be more responsive to adult learning techniques. We have changed from the one-hour lecture format for training to a more interactive approach, which involves more workshops and group activities. FHWA train-

ing is provided through the National Highway Institute. A summary of hydraulics training courses is found at: [www.fhwa.dot.gov/bridge/hydtrain.htm](http://www.fhwa.dot.gov/bridge/hydtrain.htm).

**Q:** *Much of your work involves corresponding with the state DOTs and regional FHWA offices throughout the U.S. In what ways do you assist the states?*

**Thompson:** FHWA provides technical assistance services to State DOTs, as requested. A large part of this assistance is aiding in the implementation of our guidelines, software and training. However, we are also called on to assist in the preliminary engineering of complex hydraulic designs. The primary provider of assistance is now our Resource Centers, which are in Baltimore, Atlanta, Chicago and San Francisco.

Another service that we provide is similar to the service that ACPA provides through its Resource Directory; we act as an archive of all the FHWA highway hydraulic research and technology publications that have been produced over the last 40 years. All recent material is made available through the Internet. The re-

mainder is available for reference in the Office of Bridge Technology or at the TFHRC Hydraulics Laboratory.

**Q:** *You are enjoying a long and respected career with FHWA. To date, what do you consider your most challenging assignment? Please explain.*

**Thompson:** I represented FHWA in the NTSB



*Thompson's work includes this unusual 114-inch diameter reinforced concrete pipe diversion tunnel with a slope tapered improved inlet, debris fin, a riser and a hook energy dissipater. (See comments on page 14.)*

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## Gigantic T-REX Project Shapes Denver's Transportation Future No Bones About It – Concrete Pipe Is No Dinosaur!

Brian Schram, Rinker Materials, Hydro Conduit Division  
Denver, Colorado  
(303) 288-6677

When considering pipe performance and durability, concrete pipe is no dinosaur. Reinforced concrete pipe (RCP) and boxes continue to maintain their place in history as the most reliable product for storm and sanitary sewers in North America. In Colorado, RCP has always been the preferred choice among specifiers and designers, despite offers of lower prices by producers of thermoplastic drainage products. The largest and most ambitious design-build transportation project in the history of Colorado, known as T-REX, is providing the latest opportunity to test the confidence of specifiers and designers in precast concrete drainage products.

Metro Denver's Transportation Expansion Project (T-REX) is a \$1.67 billion combined freeway reconstruction and light-rail extension involving the simultaneous rehabilitation of 17 miles (27 kilometers) of I-25 and I-225 and construction of a light-rail extension and its 13 sta-

tions over a distance of 19 miles (almost 31 kilometers).

After the project began in the summer of 2001, the construction/design team Southeast Corridors Constructors (Kiewit Construction Co. and Parsons Transportation Group), approached Carter & Burgess (the project oversight engineer) about changing the storm sewer design from concrete pipe to alternate materials. The request was made to reduce project costs by specifying a pipe material that had a lower list price than concrete pipe. No consideration was given to the costs of premature replacement of alternate pipe products, bedding materials and labor costs, not to mention the hidden economic and social costs of premature roadway drainage repairs.

John Griffith, project manager, Carter & Burgess and Scott Leiker, hydraulics engineer, Colorado Department Of Transport (CDOT) Region 6 were charged with the task of mak-

ing recommendations to the overall T-REX project leaders on what type of piping materials should be used in various locations. They studied all aspects of pipe material characteristics including long-term strength and stiffness properties, hydraulics, service life, relative ease of installation, and the history of how the various pipe materials have performed in the region. Knowing concrete pipe's track record of performing well in harsh Colorado climatic conditions, and that it is used most often for CDOT storm sewer installations, Leiker and Griffith were confident in the specification of concrete pipe. In their evaluation, concrete pipe was held as the benchmark to which all other piping materials would be compared.

The final decision was made to allow only limited use of alternate materials in small diameters. Higher quality pipe bedding, tighter inspection, and deflection testing are being required where alternate materials are being used. Concrete pipe is the only pipe material permitted for installation under the mainline roadway. This is the result of the proven high performance level and extended service life characteristics of concrete pipe.

Griffith said that durability is a concern. "We know that concrete is good for a long time—much longer than anything else."

Once the project is complete, the underground storm drain system will be very difficult to access if repairs or replacement are needed. "We want the service life of the pipe to exceed the design life of the road," said Griffith.

The drainage improvements of T-REX represent no small element of the overall project.



*The installation crew gets ready for placement of the final section in grade transition box culvert line.*

Rapid residential and business growth has occurred over the past 40 years since the freeway was first built. Consequently, the existing system became woefully undersized and during the 1990s, flooding was serious enough to close the highway four times. In July 1998, I-25 had to be closed for several hours as it disappeared under four feet of water. Stranded motorists had to be rescued by boats.

The new drainage system is being designed and built to accommodate a 100-year storm. Many of the existing storm sewers will be relocated or removed to make way for the wid-



*Denver's T-REX Transportation Project includes 1,500 feet of precast concrete pipe that will be bored and jacked into position.*

ened roadways and light rail track bed. More than half the drainage budget will be used to replace the storm sewer in an area that is much more prone to flooding known as the Narrows.

The local supplier, Rinker Materials, Hydro Conduit Division, Denver, Colorado, is providing precast concrete pipe and boxes for the project. A long-time member of the American Concrete Pipe Association, Rinker Materials is delivering products to the contractor in a timely manner to avoid any construction delays. In all, 42,000 feet (almost 8 miles) of 18-inch to 90-inch diameter concrete pipe will be installed on the project. Of this quantity, 1500 feet will be bored and jacked. In addition, the project will require 14,000 feet (just over 2.5 miles) of precast boxes in sizes up to 12-foot x 8-foot (span and rise).

To meet the aggressive schedule (completion by 2006), new production equipment was purchased and equipment acquired from other Hydro Conduit plants across the country. Todd Milici, a Hydro Conduit representative, attends weekly project planning meetings to work out scheduling issues that occasionally arise on such a massive project. Geoff Parrington, production manager and Roger Sable, field coordinator also attend scheduling meetings and conduct site visits to assure timely delivery of product.

When buried drainage systems are critical components of a major transportation project, it is clear that designers prefer to specify concrete pipe because it has a tested and true performance history. On occasion, public works officials have unearthed ancient concrete pipe systems that are still functioning as first designed, with the same awe that an archeologist may express when discovering the remains of an historic creature or artifact.

In fact this has occurred on the T-REX project. Pipe that was installed with the original construction of I-25 in the late 1950s was removed to accommodate additional traffic lanes. The 44 year-old pipe was examined and tested. It was found to be in excellent condition. The excavated pipe, classified as Class I pipe, was D-load tested and was found to exceed the strength requirements of Class III pipe — and almost met the requirements of Class IV pipe! No visible signs of deterioration of

the pipe, inside or out, could be seen. The pipe was clearly ready for another 44 years of service — and beyond.

Today's pre-cast concrete pipe, manufactured with modern equipment, better materials and under stringent quality control methods, has the ability to last longer than pipe manufactured 50 years ago.

Indeed, the T-REX project demonstrates that concrete pipe is no dinosaur in the eyes of contemporary transportation, structural and hydraulics engineers. Manufacturers of some drainage products made of alternate materials may wonder if their time is limited, and extinction is a possibility. ☺

<b>Project:</b>	Transportation Expansion Project (T-REX), Denver, Colorado
<b>Partnership:</b>	Colorado Department of Transport (CDOT) Regional Transportation District (RTD) Federal Highway Administration (FHWA) Federal Transit Administration (FTA)
<b>Design-Build:</b>	Southeast Corridor Constructors Kiewit Construction Co., Littleton, Colorado Parsons Transportation Group, Denver, Colorado
<b>Management:</b>	T-REX Team CDOT RTD Carter & Burgess, Inc., Denver Colorado
<b>Quantities:</b>	42,000 feet of 18-inch to 90-inch diameter RCP 14,000 feet of precast boxes in sizes up to 12-foot x 8-foot (span and rise)
<b>Producer:</b>	Rinker Materials, Hydro Conduit Division Denver, Colorado Brian Schram

*Precast concrete box sections being positioned for installation as part of Denver's T-REX Transportation Project.*



Rinker Materials, Hydro Conduit Division has been manufacturing and supplying reinforced concrete pipe for the Denver area since 1964. The Denver plant manufactures round RCP and manholes up to 144-inch inside diameter, box culverts, flared end sections along with reinforced concrete elliptical and arch pipe. Florida-based Rinker Materials is a major supplier of construction materials, aggregates, and ready-mixed concrete throughout the United States. For more information on Rinker Materials, Hydro Conduit Division, visit [www.rinker.com](http://www.rinker.com).

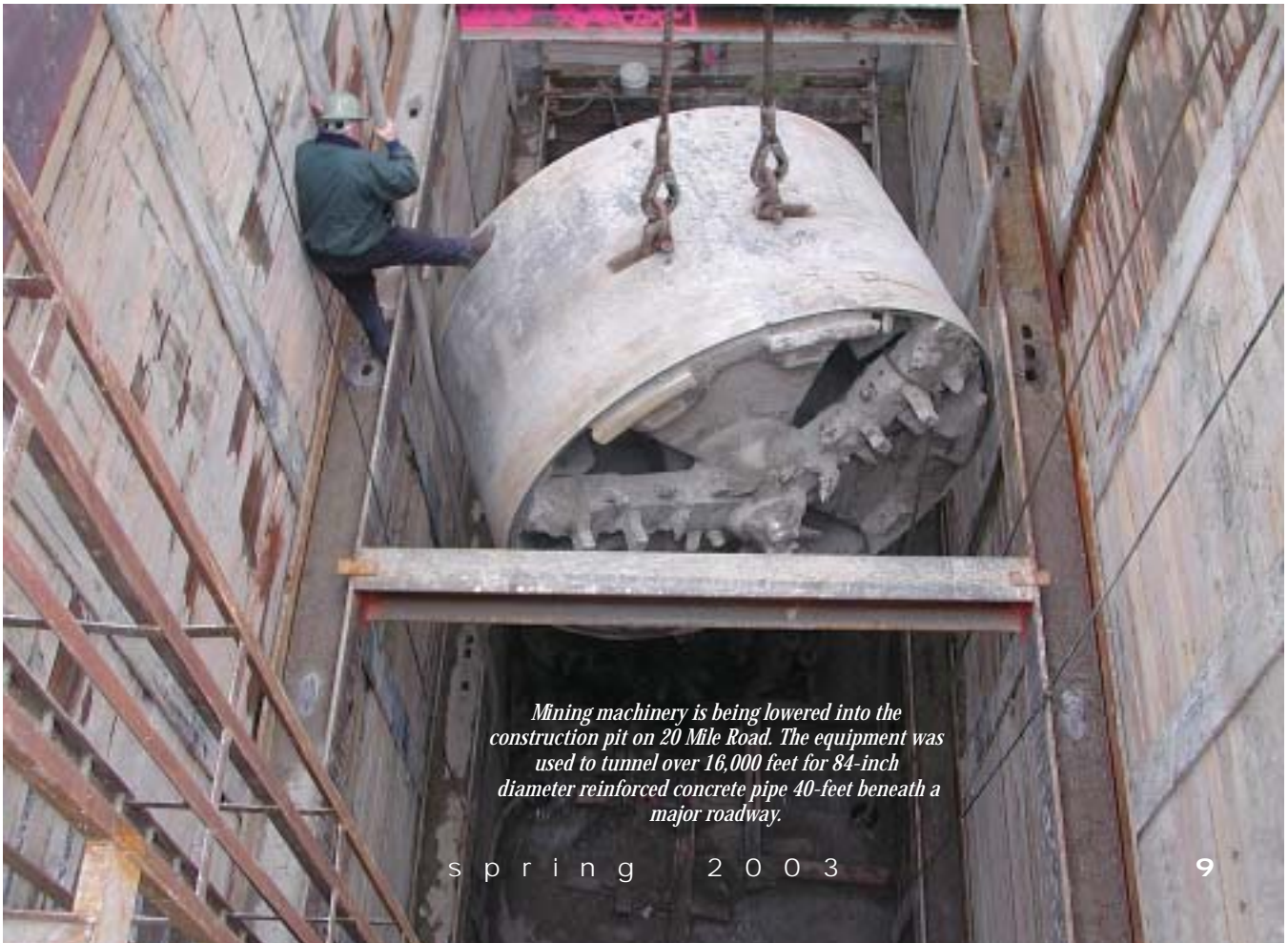


# FORCE MAIN REPLACED WITH REINFORCED CONCRETE PIPE INTERCEPTOR TUNNEL

By Robin Woodbury, Director of Marketing  
Premarc Corporation, Durand, Michigan  
(800) 968-2662

Three miles of 84-inch diameter gravity sewer has replaced three miles of 24-inch diameter force main in Northern Macomb County, Michigan. The new Romeo Arm Interceptor, along with two metering facilities, provides sanitary sewage collection for Shelby, Macomb and Washington Townships. By replacing the force main installed in 1974, there is now considerably more capacity to service this fast-growing area of the county. With less maintenance and the elimination of pump power outages, there is now reduced potential for system failure resulting in sewer backups and overflows. The new interceptor, completed in December 2002, provides energy savings, lower operational costs, and reduces odors.

Construction began in July 2000 when Jay Dee Contractors, Inc. of Livonia, Michigan, was awarded the contract for tunneling 16,108 feet of 84-inch diameter reinforced concrete pipe 40-feet beneath the heavily traveled Garfield Road. It was determined that open cut trenches would not be feasible due to excessive depths, environmental impact on the roadway, costs



*Mining machinery is being lowered into the construction pit on 20 Mile Road. The equipment was used to tunnel over 16,000 feet for 84-inch diameter reinforced concrete pipe 40-feet beneath a major roadway.*

of relocating existing utilities and the negative impact on residents and businesses in the area. The size of the interceptor was based on the flow requirements, the depth of the existing sewer at 18 Mile Road and the required elevation to meet existing sewers at 21 Mile Road.

Superior joints, competitive prices, as well as the ability to provide on-time deliveries prompted Jay Dee Contractors to choose the Premarc Corporation of Durand, Michigan to supply the reinforced concrete pipe. A major concern was the assurance of a soil and watertight joint for all pipe units. Stormwater inflow and groundwater infiltration had added to the sanitary flows that exceeded the capacity of the pump station in the old force main. Grinding the groove for the rubber compound gasket joint after the pipe has cured is one way to guarantee joint performance. The Premarc Corporation is Michigan's largest precast concrete pipe manufacturer and the only manufacturer in Michigan to grind all of its pipe joints for sanitary installations, thereby ensuring a soil and watertight joint.

By using diamond-tipped grinding wheels, Premarc is able to produce exact dimensional tolerances during the manufacturing of the gasket seating surface. In so doing, Premarc ensures dimensional control over the pipe joint. Construction crews are then able to accurately install gaskets and home the pipe.



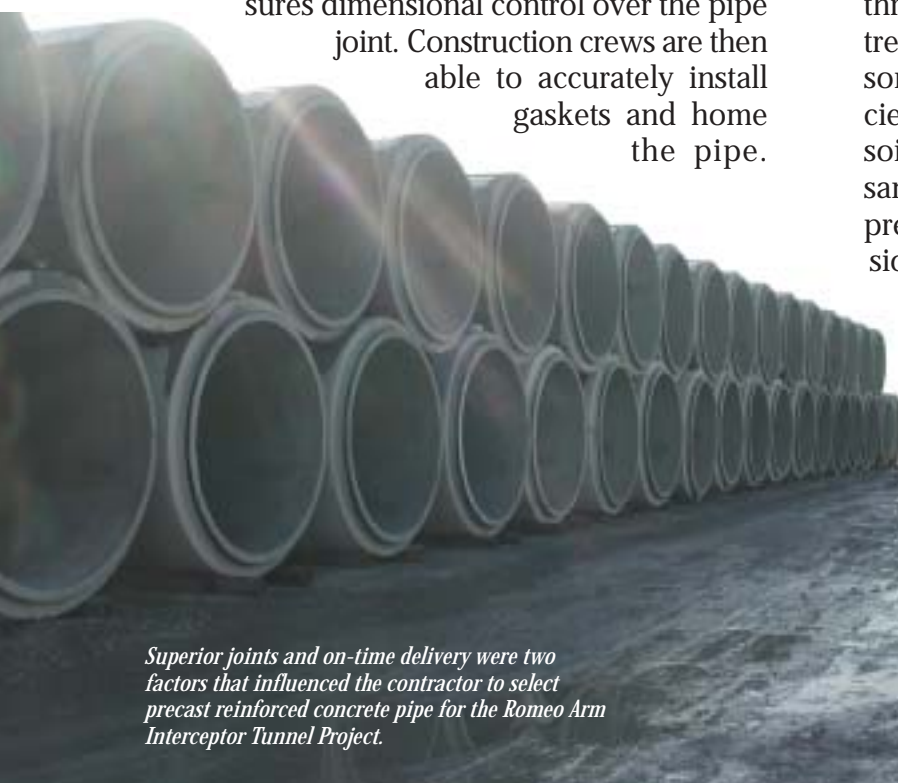
*Excavated spoils being loaded and removed from construction pit following bore for 84-inch reinforced concrete pipe.*

Mike DiPonio, Vice President of Jay Dee Contractors commented, "The pipe supplied by Premarc Corporation was excellent quality concrete pipe, and it should provide superior service to the Macomb area for many decades."

Construction of the interceptor was no easy task and designers of the sewer (Spalding DeDecker Associates, Inc.) had to overcome several challenges. The 84-inch diameter sanitary sewer was constructed by tunneling through difficult soil conditions created by retreating glaciers at the end of the last ice age some eight to ten thousand years ago. The glaciers left behind deposits of compressed clay soils nearly as hard as concrete, layers of fine sands that became charged with water under pressure, pockets of soft sticky clays and occasional boulders which had to be blasted for removal.

Underlying bedrock along the line and grade of the tunnel was a source of natural gas deposits that had migrated into the sand deposits. These methane gas pockets had to be vented during tunnel construction to prevent the possibility of fire or explosion.

In addition to the difficult soil conditions, there were other significant challenges that confronted the



*Superior joints and on-time delivery were two factors that influenced the contractor to select precast reinforced concrete pipe for the Romeo Arm Interceptor Tunnel Project.*

designer and contractor. The route of the sewer required complex navigation over three drain crossings including the Gloede and Utica Drains. Due to the heavy concentration of utilities on each side of the five-lane roadway, the decision was taken to align the sewer beneath the pavement. Neighborhood traffic, totaling 40,000 to 50,000 vehicles per day, limited construction during rush hours. To minimize the impact of construction on local traffic and businesses, tunnel alignment was adjusted to the center of Garfield Road. This enabled access manholes to be built within the center left-turn lane, which minimized traffic congestion. The location of each individual access manhole was coordinated with representatives of the local businesses so that customer access to these businesses was not impacted. The project staging area had to be relocated from a congested site to a more remote location. While this reduced the impact of the construction activities of the project to the general public, it required two miles of the project to be tunneled downhill. And this direction is the most challenging to a contractor when tunneling through water bearing soils.

The \$23 million precast concrete sanitary interceptor is a buried structure that will service the residents and businesses in Northern Macomb County for decades to come. During ribbon cutting ceremonies on October 1, 2002,

many of the stakeholders from the project were present to see their hard work acknowledged. Macomb County Public Works Commissioner Anthony V. Marrocco, who manages the county wastewater disposal district, commended the City of Detroit, Jay Dee Contracting, Spalding DeDecker Associates and the Premarc Corporation for doing “an outstanding job on a very challenging project.” A boulder pulled from the tunnel during construction was presented to Macomb County. On the boulder is a plaque which states the sentiments of all parties; “This boulder is but one of many impediments that were overcome by the determination and teamwork of the men and women who built the Romeo Arm Interceptor Tunnel on Garfield Road.” The boulder may also be viewed as symbolic of the durability and performance of the concrete pipe that is the interceptor tunnel. ☺

*Photos courtesy of Spalding DeDecker Associates, Inc.*

<b>Project:</b>	Romeo Arm Interceptor Tunnel
<b>Owner:</b>	Detroit Water & Sewerage Department
<b>Designer:</b>	Spalding DeDecker Associates, Inc. Rochester Hills, Michigan
<b>Contractor:</b>	Jay Dee Contractors, Inc. Livonia, Michigan
<b>Quantities:</b>	16,108 feet of 84-inch diameter RCP 29 manholes, 36-inch to 72-inch interior diameter
<b>Producer:</b>	Premarc Corporation Durand, Michigan



*84-inch diameter reinforced concrete pipe being set inside of the steel rib and wood lagging sets as part of the bore and pipe jacking operation.*

The Premarc Corporation is a leading manufacturer of concrete products for the construction industry. Founded in 1927 in Durand, Michigan by the Marsh family, the company operated primarily in the Flint and Lansing area. In the past 15 years, it has expanded its sales territory with facilities in Cadillac, Traverse City, Grand Rapids, and Clarkston. Premarc’s delivery fleet supplies the entire lower peninsula of Michigan and extends into Indiana. Premarc’s manufactured product line includes all shapes and sizes of precast reinforced concrete sanitary and storm sewer pipes, manholes, catch basins, wet wells, and pump stations. Bridge products include concrete box culverts, prestressed bridge beams and CON/SPAN™ bridge systems. For more information, see [www.premarc.com](http://www.premarc.com).

# RCP Used On Mississippi River Flood Control Project

Northwestern Tennessee took the brunt of Mother Nature's wrath in 2002, weathering heavy rains (more than 20 inches above normal through early November), flooding and close encounters with tornadoes. Despite the harsh and often unpredictable elements, work continued on a flood control project along the Mississippi River that would help manage flood runoff and high water elevations of "The Big Muddy." In addition to controlling local floodwaters, the structures are designed to benefit area farms that grow large amounts of soybeans, corn and cotton.

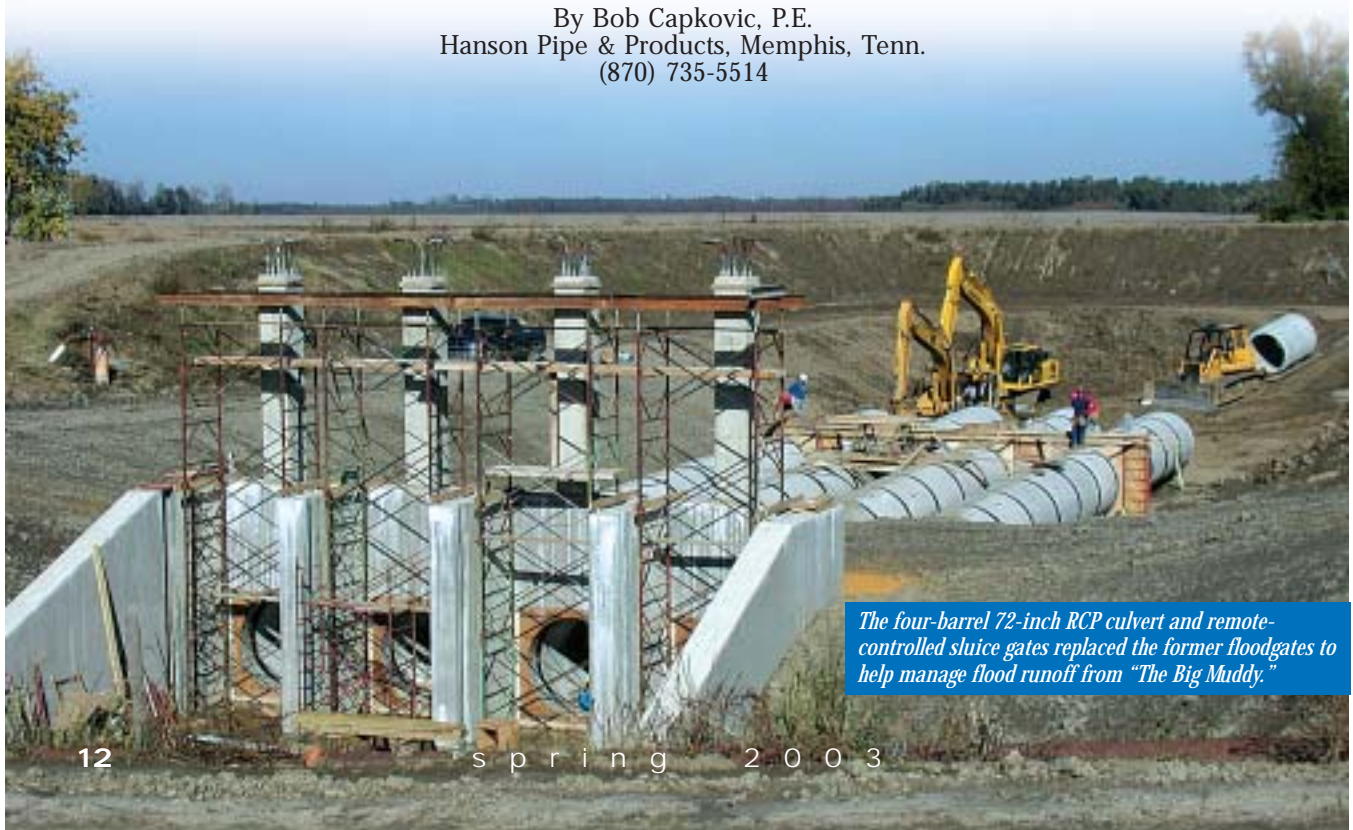
The Graveyard Slough Floodgate & Culvert Replacement Project in Tiptonville, Tennessee located on the Mississippi River levee near Reelfoot Lake involved the removal of old corrugated metal culverts and replacement with four larger-sized 72-inch diameter Class IV barrels of reinforced concrete pipe (RCP). A new outlet structure with remote-controlled

sluice gates replaces the former floodgates. The project was designed by the US Army Corps of Engineers (Memphis District) and contracted to Clifco Construction of Dyersburg, Tennessee. Clifco contacted the Memphis plant of Hanson Pipe & Products for supply of the required RCP, flared ends and sluice gate.

Despite awful local weather conditions and tight construction schedules, the contractor was able to complete 2002 requirements on time. The contract stipulated that no construction activity could take place between December 1 and April 1. It was important that most of the work be completed before the end of November. Even with the weather delays, the project is expected to be completed as scheduled by late summer 2003. By the 2002 shut-down date, the contractor had installed all of the pipe and flared ends, and had backfilled the installation to grade.

Clifco had to come up with an innovative

By Bob Capkovic, P.E.  
Hanson Pipe & Products, Memphis, Tenn.  
(870) 735-5514



*The four-barrel 72-inch RCP culvert and remote-controlled sluice gates replaced the former floodgates to help manage flood runoff from "The Big Muddy."*



▲ Four-barrel 72-inch RCP culvert being installed while crews form the concrete diaphragm. The pipe and diaphragm were later backfilled to carry Highway 21 across the levee.

▲ A steel sled was used to transport the 72-inch Class IV RCP from the levee to the pipe zone.

technique to move the pipe from the point of off-load to the construction area and a method of homing the pipe. The contractor built a steel sled to transport the RCP from the top of the levee to the pipe zone. Once in the pipe zone, a backhoe equipped with a “J” hook attachment pulled the pipe from the sled, positioned the pipe, and then joined it to the line of pipe in one motion. The four lines of culvert pipe were installed while crews constructed a con-



Frequent grade alignments and close joint tolerances help produce “rifle-barrel” smooth results inside the 72-inch reinforced concrete pipe culvert.

crete diaphragm over the installation for Highway 21, which crosses the four-barrel culvert structure and runs parallel to the levee.

The contract is valued at \$2 million including movement of 100,000 cubic yards of earth and placement of 9,000 tons of protective riprap. A temporary runoff diversion structure is in-service until the new outlet structure is completed. This was part of the contract.

“The Big Muddy” and Mother Nature are forces that no man wishes to take on alone. The flood control improvement project comprised of RCP and other precast concrete products reveals the complexity of design and durability of materials necessary to curb such potentially destructive forces. The use of reinforced concrete pipe demonstrates its value as a reliable product for the health, safety, and economic prosperity of a community. ☺

<b>Project:</b>	Graveyard Slough Floodgate & Culvert Replacement Tiptonville, Tennessee
<b>Owner:</b>	US Army Corps of Engineers Memphis District
<b>Designer:</b>	US Army Corps of Engineers Memphis District
<b>Contractor:</b>	Clifco Construction. Dyersburg, Tennessee
<b>Quantities:</b>	800 feet of 72-inch diameter Class IV RCP
<b>Producer:</b>	Hanson Pipe & Products Memphis, Tennessee

Hanson's Memphis plant (formerly Choctaw) produces a comprehensive line of precast products including concrete pipe, box culverts, manholes, and precast bridges. Hanson Pipe & Products, Inc. is a sophisticated, diversified manufacturer of concrete pipe and a variety of supporting products including manholes, drainage structures, box culverts, bridge components, retaining walls and concrete block. Its plant locations throughout North America enable the company to serve the most rapidly growing parts of the U.S. and Canada. Hanson is an international building materials company. It is one of the world's largest producers of construction aggregates, and concrete gravity and pressure pipe, precast concrete, and is the leading manufacturer of facing bricks in Europe. See [www.hansonconcreteproducts.com](http://www.hansonconcreteproducts.com) for details.

## President's Report

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specifiers with published information and sales material that may not have enough detail for decision-making. Our industry now understands the technology of competitive products, as well as their promoters and engineers. We must be vigilant in testing competitive products to prove performance claims and participate in the development of standards and specifications for such products. ACPA's joint venture with the Portland Cement Association on a North American promotional strategy will continue as a major element of its new direction.

This issue of *Concrete Pipe News* contains three case studies. The case studies testify to the trusted performance of concrete pipe. The largest and most ambitious design-build transportation project in the history of Colorado, known as T-REX, is fulfilling the confidence of specifiers and designers in precast concrete drainage products. In Tennessee, old corrugated metal culverts were removed and replaced with four larger-sized 72-inch barrels of reinforced concrete pipe as flood control structures. And in Michigan, a force main replaced with concrete pipe has considerably more capacity, less maintenance and reduced potential for system failure. All three projects attest to the preference of using reinforced concrete pipe when health and safety of large populated areas are at risk.

The Industry Spotlight with Phil Thompson demonstrates our commitment to work with federal and state officials to develop the best standards in the world, and implement them through proper product applications.

ACPA is blessed with the involvement of some of the nation's best concrete pipe industry professionals on its committees and board. With such guidance and planning by professionals, there is no doubt that the new strategy will guide us long into this century. ☺

## Industry Spotlight

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investigation that was published as "Collapse of the Northbound U.S. Route 51 Bridge Spans over the Hatchie River near Covington, Tennessee April 1, 1989," NTSB/HAR-90/01. Arriving at the site on April 3<sup>rd</sup>, I was able to witness first hand the consequences of a bridge failure. In this case, four passenger cars and one tractor-trailor plunged into the river. Eight people died as a result of their injuries. The NTSB recommendations from the investigation refocused FHWA's scour evaluation program that was just getting started in response to the collapse of the Schorarie Creek Bridge on I-90 in NY in 1987 due to local scour. I am happy to report that now over 93% of all scour susceptible bridges have been evaluated for scour.

**Q:** *What is the most unusual culvert that you have worked on?*

**Thompson:** In 1984, the West Virginia DOT replaced a bridge and a tunnel on I-77 south of Charleston with a 300-foot fill and an open cut. To drain the Four Mile Fork watershed that was upstream of this large fill, a 13-foot x 12.7-foot cast-in-place concrete arch culvert that was 1,940 feet long was proposed. The culvert design discharge,  $Q_{50}$  of 3,000 cfs, submerged the entrance with a headwater depth that was less than two diameters. The maximum measured discharge of 14,000 cfs created a headwater pool that was about 75 feet deep for about 3 hours. The anticipated rapid drawdown of this large pool required slope protection to mitigate the possibility of slope failure. The estimated cost of the culvert was \$3.4 million. An alternate 9.5-foot diameter diversion tunnel was actually awarded for \$2.2 million that included a slope tapered improved inlet. Because of debris carried by the stream and the steep slope, the culvert installation included a debris fin, a riser and a hook energy dissipator. ☺

## “Quality Cast” Certified Plants

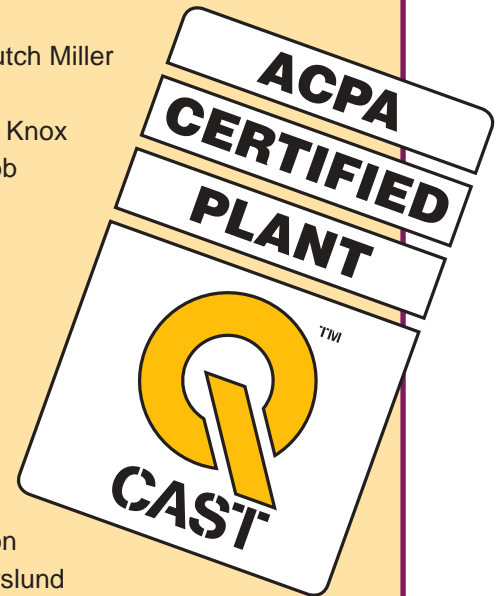
In an effort to improve the overall quality of all concrete pipe products, the American Concrete Pipe Association offers an on-going quality assurance program to member and non-member companies. Called the “Quality Cast” Plant Certification Program, the 124-point audit-inspection program covers the inspection of materials, finished products and handling/storage procedures, as well as performance testing and quality control documentation. Plants are certified to provide storm sewer and culvert pipe or under a combined sanitary sewer, storm sewer and culvert pipe program. The following plants are currently certified under ACPA’s Quality Cast Certification Program:

### Storm Sewer and Culvert Pipe

- Americast-Pipe Division, Inc., Charleston, S.C. - Bill Gary
- Atlantic Concrete Pipe, San Juan, P.R. - Miguel Ruiz
- Boughton’s Precast, Inc., Pueblo, Colo. - Rodney Boughton
- California Concrete Pipe (Oldcastle), Stockton, Calif. - Qing Lian Gao
- Carder Concrete Products, Littleton, Colo. - Tom Walters
- Carder Concrete Products, Colorado Springs, Colo. - Bruce Spatz
- Cayuga Concrete Pipe Company (Oldcastle, Inc.), Croydon, Pa. - Allen Reed
- Cayuga Concrete Pipe Company (Oldcastle, Inc.), New Britain, Pa. - Jim Savana
- Elk River Concrete Products (Cretex), Billings, Mont. - Milton Tollefsrud
- Elk River Concrete Products (Cretex) Helena, Mont. - Robert Ganter
- Geneva Pipe Company, Hurricane, Utah - Brent Field
- Grand Junction Concrete, Grand Junction, Colo. - Ben Burton
- Kerr Concrete Pipe Company (Oldcastle, Inc.), Hammonton, N.J. - Bob Berger
- Kerr Concrete Pipe Company (Oldcastle, Inc.), Farmingdale, N.J. - Scott McVicker
- NC Products (Oldcastle, Inc.), Raleigh, N.C. - Mark Sawyer
- Riverton Concrete Products Company (Cretex), Riverton, Wyo. - Butch Miller
- Sherman Concrete, Savannah, Ga. - Tom Yates
- Sherman-Dixie Concrete Industries, Inc., Chattanooga, Tenn. - Earl Knox
- Sherman-Dixie Concrete Industries, Inc., Franklin, Tenn. - Roy Webb
- Sherman-Dixie Concrete Industries, Inc.,  
Lexington, Kentucky - Darrel Boone
- South Dakota Concrete Products (Cretex),  
Rapid City, South Dakota - Jeff Ulrich
- South Dakota Concrete Products (Cretex),  
Mitchell, South Dakota - Andy Fuhrman

### Sanitary Sewer, Storm Sewer and Culvert Pipe

- Amcor Precast (Oldcastle, Inc.), Nampa, Idaho - Mike Burke
- Amcor Precast (Oldcastle, Inc.) Ogden, Utah - Tim Wayment
- Elk River Concrete Products (Cretex), Elk River, Minn. - Bryan Olson
- Elk River Concrete Products (Cretex), Shakopee, Minn. - Steve Forslund
- Geneva Pipe Company, Orem, Utah - Fred Klug
- Kansas City Concrete Pipe Co. (Cretex), Shawnee, Kans. - Rich Allison
- NC Products (Oldcastle, Inc.), Fayetteville, N.C. - Preston McIntosh
- Ocean Construction Supplies Limited (Inland Pipe), Vancouver, B.C., Canada - Ron Boyes
- Amcor Precast Company (Oldcastle, Inc.), Ogden, Utah - J. P. Connoley
- Rinker Materials-Hydro Conduit Division, Denver, Colo. - Ed Anderson
- Waukesha Concrete Products Company (Cretex), Waukesha, Wis. - Jay Rhyner





## ACPA'S WEB SITE PROVIDES WEALTH OF ON-LINE INFORMATION

The American Concrete Pipe Association's website, [www.concrete-pipe.org](http://www.concrete-pipe.org), continues to be a primary medium to provide consultants, engineers, public officials and other specifiers of drainage pipe products, with up-to-date information on precast concrete pipe products. The website also serves as a "gateway" to access member locations, related associations – even other DOT websites. From Design Data documents to Fill Height Tables to installation guidelines, the website provides a wealth of useful information.

During the past 12 months, the Association's website recorded more than 2.745 million "hits." While this number may seem impressive, a better measure of website usefulness is recorded by "visits." In 2002, the ACPA website was visited by over 55,700 guests. A "visit" is

considered a specific computer (with IP address) arriving at the home page, goes to at least one step further into the site, leaves the site and then returns 24 hours later. These visitors accessed over 200,000 pages of contents and downloaded over 21 Gb of files and records. Over 900 copies of PipePac 2000 were downloaded from [www.concrete-pipe.org](http://www.concrete-pipe.org), at no charge. Another 400 visitors requested specific information or consultation from ACPA staff or Association members.

What does this mean to you? That [www.concrete-pipe.org](http://www.concrete-pipe.org) is robust, active and informative. If you don't have it set as a "favorite" on your browser, you might not be taking advantage of all the resources available to you and your firm. Take a look at [www.concrete-pipe.org](http://www.concrete-pipe.org) today – you'll want to visit often!



American Concrete Pipe Association  
222 W. Las Colinas Blvd., Suite 641  
Irving, TX 75039-5423

[www.concrete-pipe.org](http://www.concrete-pipe.org)

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