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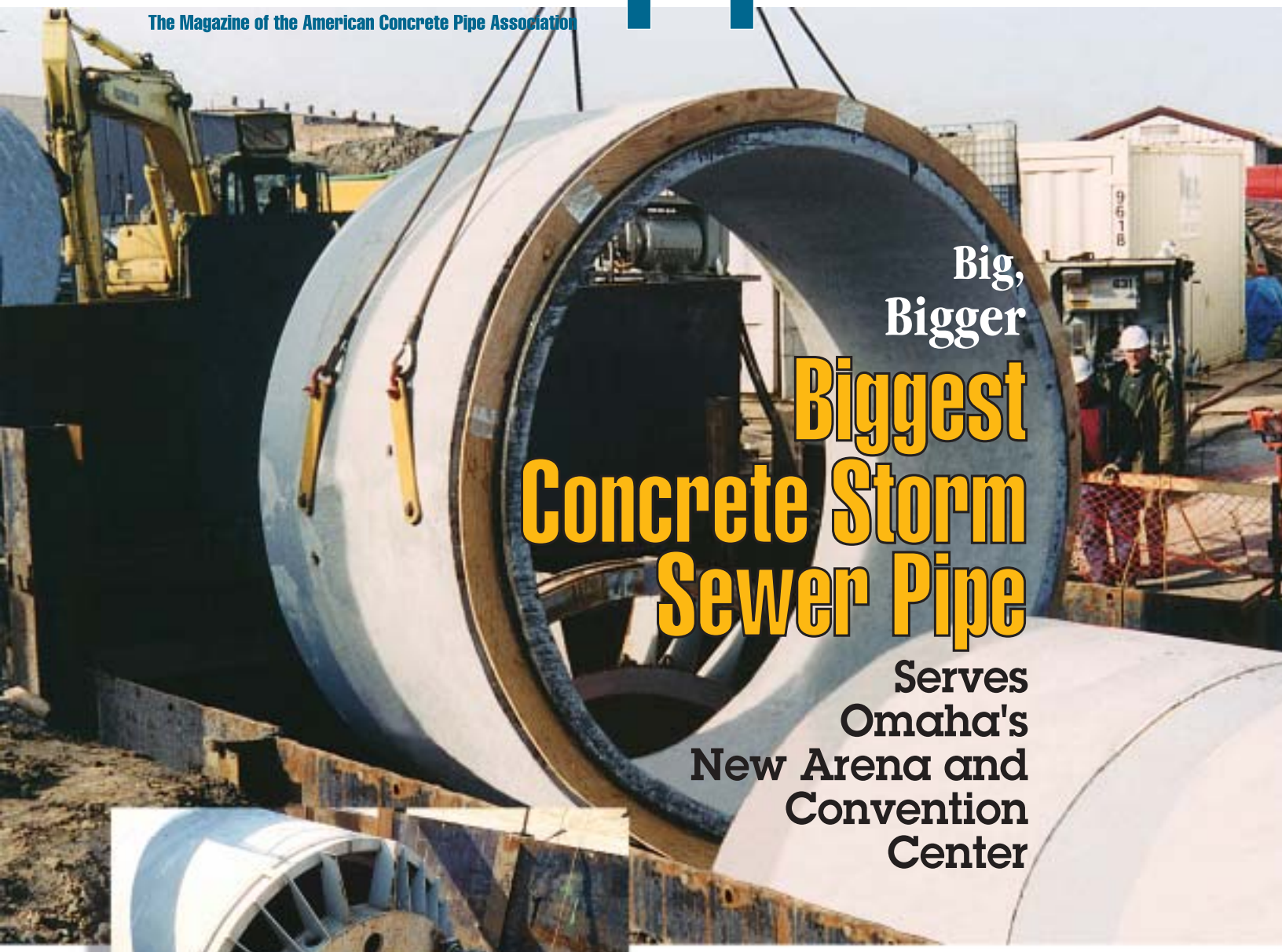

Big, Bigger Biggest Concrete Storm Sewer Pipe Serves Omaha's New Arena and Convention Center

- Precast Concrete Boxes Used to Secure Building Utilities
- Proper Installation Specifications are Elementary
- State DOT Pipe Usage & Testing Survey

This issue:

Volume 54, Number 1
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Concrete Pipe News is designed to provide a communication forum for the concrete pipe industry to facilitate the exchange of information regarding product use and applications, industry technology and trends among members of the American Concrete Pipe Association, contractors, engineers, vendors, suppliers and other interested parties.

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American Concrete Pipe Association

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John J. Duffy

Doing Business In A Knowledge-Based Society

Without doubt, concrete is the most versatile building material on Earth. Only one's imagination and laws of physics limit its application. Concrete pipe is not a new product, but the science that drives the industry in concrete mixes, reinforcement and installation technology is now a best practice for storm and sanitary sewers. This North American industry standard of quality has become the benchmark for alternative materials and products to match. It has been achieved through independent research and standards development, and good marketing principles.

The appeal of concrete drainage products is supported by the amount of advertising space in major industry magazines by manufacturers of competitive products. While marketing claims of these manufacturers are far ranging, consistently they compare the performance of their products to the performance of reinforced concrete pipe. In doing so they have acknowledged that the producers of reinforced concrete pipe have set the industry standard by which all other materials, and products made from them, are judged.

The North American concrete pipe industry has not stopped at looking at the science of its own material and products. Due in part to the fact that reinforced concrete products are often used in conjunction with HDPE tubing, PVC and corrugated metal pipe, the concrete pipe industry has expanded its research into the fields of competitive products. This has been done to improve the industry-wide knowledge of the mechanics of such products and their relationships to soil. Research undertaken by the concrete pipe industry has challenged claims by manufacturers of alternate products and exposed misinformation. The general public is the ultimate beneficiary of such research.

Three articles in this issue demonstrate the versatility of applications of reinforced concrete pipe, and the importance of understanding the science of pipe materials to achieve successful installations.

This issue's feature story highlights the installation of 1,125 feet of 144-inch diameter storm sewer pipe in open cut, and an additional 250 feet of jacked pipe to service Omaha's new $281 million Convention Center and Arena. This installation is the largest precast concrete storm sewer in Omaha, and a vital component of the city's sewer separation master plan.

The story that follows describes how precast concrete drainage products can be used in the structural design of buildings to accommodate cooling systems and to serve as chambers for air conditioning systems. As a supplementary use, these systems can be easily secured to limit access to buried services for easy maintenance.

The third story demonstrates that sometimes a little information does not go a long way, and that it is important to provide specifiers and purchasers of products with as much information as possible so that informed choices can be made. The case of the Windsor School storm sewer shows how an informed choice resulted in a change to a specification that resulted in a high performance storm sewer that will last for generations.

Our technical article focuses of the results of a research project conducted by ACPA on the usage and testing performed on concrete pipe, corrugated metal pipe and thermoplastic pipe products by state Departments of Transportations in the United States. Thirty-one states responded to our inquiry.

The success of the concrete pipe industry in having its science and products accepted by specifiers, regulators and contractors has not happened by accident. This industry is driven by research and the development of standards that set the benchmark for competitive products.

Industry Spotlight

Edwin Kling, P. Eng.

Edwin Kling is certainly a well-known personality in the concrete pipe industry. His quiet demeanor masks a sharp wit and inquisitive nature that has worked its way into complex engineering solutions to challenges presented in standards development, concrete pipe design, product installation, production automation, operations management, and marketing precast concrete products. For years, he has served continuously on the Technical Committee of the American Concrete Pipe Association and numerous task forces. In Canada, he serves on similar committees and task groups for the Ontario Concrete Pipe Association and is a past Chair of the Canadian Concrete Pipe Association.

Edwin's career started when he was completing secondary school and working for Best Pipe during summer vacation. While completing his Bachelor of Applied Science degree in civil engineering at the University of Waterloo, he worked for Standard Industries (later purchased by Lafarge) during his co-op terms. After graduation in 1976, he started work for Waterloo Concrete Products as a design engineer and later was appointed to operations manager. In the 1980s, he developed his business skills and graduated from Wilfrid Laurier University in 1987 with an MBA. Waterloo became Centennial Concrete Products in the late 1990s and most recently, Hanson Concrete Pipe and Products Canada, Inc.

It was no easy task to identify a corner of the industry where Edwin would pause and reflect awhile on a few questions, as his interest and expertise is so broad. He suggested automation and how it impacts health and safety, as an area that is receiving ever-increasing attention.

Q: *What should be considered when preparing to automate a plant, and what areas of the operations might first be automated to achieve immediate health and safety benefits?*

Kling: Each step of the plant's automation needs to be assessed on a cost benefit basis and return on investment. Among the first areas to be automated would be the point where concrete is fed into the forms. This improves quality and reduces operator fatigue. Areas that cost the company the most in increased Workers Compensation Board costs, lost production time, and areas of greatest risk to the employee's health and safety are prime for automation.

Q: *Do you believe there are shortcomings with the automation of the concrete pipe production process? If so, what are they?*

Kling: Automation needs to be reasonable for the circumstance. For example, the cost of automation versus the payback is an exponential curve. At the steep end of the curve, a high price is paid for very little gain in cost savings. Each manufacturer needs to find this point for its own operation to become profitable. And, you can over-automate. Sometimes, automation requires a manual override to maintain efficiency. You have to examine the critical path of operations, and recognize where automation is not needed, or is, in fact, a drawback to production. Most automation replaces activities that are repetitive. Safety requirements on new equipment prevent employees from getting in harm's way.

Q: *To have a plant with an enviable safety record, what procedures/elements have to be in place?*

Kling: To achieve an enviable safety record, you need a 100% buy-in by top management. First, you need to train all employees in areas

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LARGEST Precast Concrete Storm Sewer Pipe Serves Dual Purpose

By Rick Phillips, Rinker Materials, Hydro Conduit Division
Omaha, Nebraska
402-359-2111

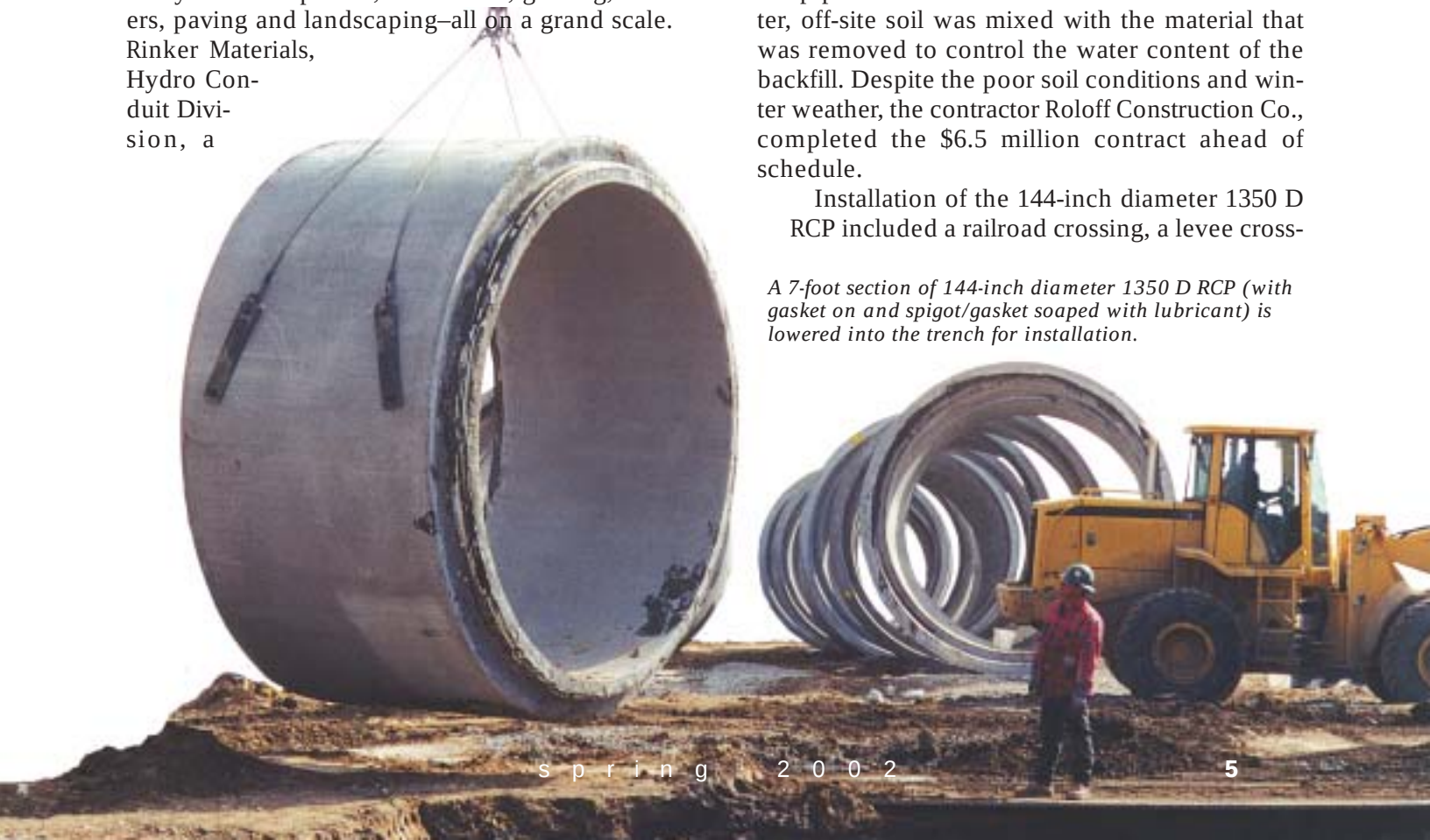
The Cornhusker state is known for the massive football linemen at the University of Nebraska and crop yields from cornfields that stretch beyond the horizon. Now they can lay claim to some mighty big reinforced concrete pipe. It's the largest precast concrete storm sewer in Omaha, constructed to drain the area surrounding the site of the city's new $281 million Convention Center and Arena. It also serves to reduce the city's combined sewers through its overall sewer separation master plan.

Located on the old Union Pacific Railroad yard at 10th & Abbott Drive, the site includes all of the elements of a major urban renewal project such as master planning, platting, coordination with many involved parties, demolition, grading, sewers, paving and landscaping–all on a grand scale. Rinker Materials, Hydro Conduit Division, a long-time member of the American Concrete Pipe Association, supplied the reinforced concrete pipe (RCP) for the storm sewer system from their plants in LaPlatte and Valley, Nebraska.

The storm sewer system consists of 1,125 feet of 144-inch diameter pipe in open cut, and an additional 250 feet of jacked pipe. The system includes 270 feet of 120-inch diameter pipe, 930 feet of 108-inch diameter pipe, and 2,400 feet of 30-inch diameter sanitary sewer with 425 feet installed inside a 48-inch steel casing.

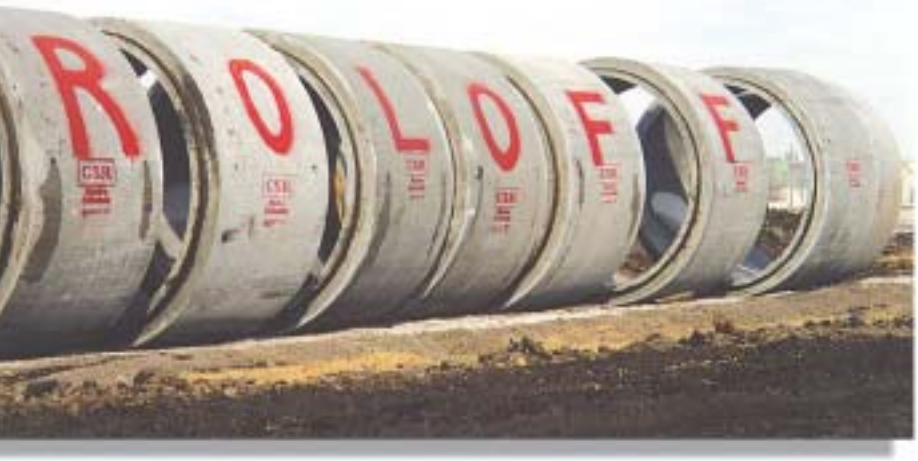
Unstable soil conditions and high ground water required excavation to bedrock and placement of riprap for bedding to support the pipe. Backfill included recycled concrete to the spring line of the pipe. Because the work was done in the winter, off-site soil was mixed with the material that was removed to control the water content of the backfill. Despite the poor soil conditions and winter weather, the contractor Roloff Construction Co., completed the $6.5 million contract ahead of schedule.

Installation of the 144-inch diameter 1350 D RCP included a railroad crossing, a levee cross-



A 7-foot section of 144-inch diameter 1350 D RCP (with gasket on and spigot/gasket soaped with lubricant) is lowered into the trench for installation.

ing and crossing under a bridge. According to Terry Atkins, P.E., the project manager of the consulting engineering firm, Lamp, Rynearson & Associates of Omaha, the most challenging part of the project involved tunneling and jacking 250 feet of the 144-inch diameter pipe under all three obstructions. With an outside diameter of 14 feet 2 inches, each 7-foot long section of 3000 D RCP jacking pipe weighed approximately 48,000 pounds. This is one of the largest jacked pipes to be installed in the Midwest. The 144-inch diameter pipe had to be trucked to the site one piece at a time on specialized multi-axle trailers. Horizontal Boring of Exeter, Nebraska was subcontracted to bore the tunnel for the jacking pipe.



Contractor employees seized the opportunity to promote their employer's name with a unique painted billboard at the job site.

The pipe was jacked with an Akkerman 170-inch outside diameter excavator tunnel boring machine under the Union Pacific Railroad, Abbott Drive, and the Corps of Engineers Levee (that protects the city from flooding by the Missouri River) to a cofferdam where the pipe outlet ends at the Burt-Izard Ditch. The Burt-Izard Ditch then empties directly into the Missouri River. The tunnel and jack clearance was just three inches over a 48-inch diameter pipe, one foot from the Abbott Drive Bridge pier on one side and one foot from an existing box culvert on the other side.

A 24-foot x 24-foot x 4-foot thrust block was made with 85 cubic yards of concrete to provide a pushing surface for the jacks. Each of the four jacks pushed with a force of 200 tons, together delivering 1.6 million pounds of force. Another 2.5 million pounds was added at intermediate jacking locations. With each push, the big pipes were moved six to eight inches, or about 28 feet per day. The entire operation, done non-stop around the clock, took nine days to complete. The final location of the pipe was only 1 3/8 inches lower than planned and two inches off horizontally.

A parallel 30-inch Class IV RCP sanitary sewer was also constructed and installed at depths up to 30 feet. This sewer also included a 410-foot bore and jack. The 60-inch pipe to be tapped at the end of the bore could not be located in advance, so the new casing was bored until the existing pipe was hit. After verifying it was the 60-inch pipe, surveyors went into the casing, located the pipe, then went above ground and staked its location. Because of the proximity to an existing building, the 96-inch diameter manhole servicing the 30-inch and 60-inch lines was mined down from inside the manhole. As soils were removed from inside the manhole, the unit was lower into position.

Rinker has just commenced shipment of 6,400 feet of 108-inch 1350 D RCP to second and third contracts servicing the site. The entire project includes construction of a 194,000 square-foot exhibition hall and a 17,000-seat arena. Visitors to the convention center and sports fans will enjoy generations of entertainment on a site built over reinforced concrete pipelines designed to last a hundred years or more.

Sources: Grandia, Curt; "Roloff Construction Co. installs the largest storm-sewer pipe in Omaha", in Midwest Contractor, May 28, 2001; Web site of Lamp, Rynearson & Associates, Company News; Reprint of "Omaha's Convention Center "Underground" in APWA Newsletter, Fall 2001)

A special double-drop "Low Boy" trailer was used to deliver each section of the 144-inch diameter reinforced concrete pipe to the Convention Center area.

Project: Omaha Convention Center/Arena

Owner: City of Omaha
City Engineer: Hank Vieregger
City Planning Department: Greg Peterson

Designer: Lamp, Rynearson & Associates
Omaha, Nebraska
Mike McMeekin, P.E., President
Terry Atkins, P.E., Senior Project Manager

Contractor: Roloff Construction Co.
Omaha, Nebraska
Larry Roloff, President
Bob Norris, Vice President, Project Superintendent
Dick Noble, Estimating Manager
Dwain Warriner, Pipe Laying Supervisor

Quantities: 1,125 feet – 144-inch diameter
1350 D RCP
250 feet – 144-inch diameter
3000 D RCP jacking pipe
270 feet – 120-inch diameter
1350 D RCP
930 feet – 108-inch diameter
1350 D RCP
2,400 feet – 30-inch diameter
Class IV RCP

Producer: Rinker Materials, Hydro Conduit Division
LaPlatte and Valley, Nebraska Plants
Jeff Arnold, General Manager

Rinker Materials, Hydro Conduit Division has been manufacturing and supplying reinforced concrete pipe for the Omaha area since 1965. The Omaha plants manufacture 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 information on Rinker Materials, Hydro Conduit Division, visit www.rinker.com.

The design, production and installation of the Omaha Convention Center/Arena precast concrete storm sewer system was a team effort. Shown here are (left to right) Rick Phillips, Jim McDill and Larry Mauck, Rinker Materials, Hydro Conduit Division; Brett Wawers, Lamp, Rynearson and Associates, Inc; Greg Peterson, City of Omaha; Terry Atkins, Lamp, Rynearson and Associates, Inc.; Bob Norris, Roloff Construction Co.; and Jeff Arnold, Rinker Materials, Hydro Conduit Division.

PRECAST CONCRETE BOX CULVERTS SECURE BUILDING UTILITIES

By Edward C. Page, P.E.
Eastern Regional Engineer
Hanson Pipe & Products, Inc.,
Roanoke, Virginia
804-233-5471, and
Scott Kirby, C.E.T.
Hanson Pipe & Products Ontario
Toronto, Ontario
519-622-7574

Few materials on earth have the versatility of concrete for uses in construction. When precast concrete products first became an option for speedy and standardized drainage systems, few would have thought that one day the same products would be used for housing utilities in buildings. Today, with high costs of construction and maintenance of utilities services, engineers and architects have rediscovered the use of concrete vaults and chambers to house services for easy access and lowered maintenance costs. The use of precast concrete products, like box units, for this purpose has expanded the market for precast concrete drainage products.

Four 8-foot x 9-foot precast concrete box sections were installed as a sub-grade building component for the building's heating, ventilation and air conditioning system.

The idea of enclosing utilities in underground chambers, or galleries, is not a new idea. Many buildings and structures have been built with concrete block and poured concrete galleries so that access and maintenance of utilities is more efficient. What is new is the use of precast concrete box units for housing conveyance pipes, telecommunications cables, heating and air conditioning conduits, and electrical services. The environment around these services can be controlled to extend their service lives, and the services can be more easily protected from potential intruders by various security devices built into the design of the galleries. With precast concrete galleries, efficiency has been extended to both yard use and construction.

Hanson Pipe and Products, Inc. of Salem, Virginia and Toronto, Ontario is chalking up successful projects where standard products were supplied for buried galleries. Two recent projects receiving attention are the Amfibe Building in Martinsville, Virginia, and an undisclosed (security reasons) private enterprise near Cambridge, Ontario. In Martinsville, the structure was required for heating, ventilation and air conditioning (HVAC) and in Toronto, the structure was used to accommodate coolant pipelines.

The Martinsville project required the structural integrity of a sub-grade building component to handle construction loads while the boxes were being assembled to form the buried gallery. Precast concrete box units with an 8-foot span by 9-foot rise placed in pairs, satisfied the sub-grade structural integrity and HVAC requirements. The use of box culvert sections for the gallery was found to be economical while conforming to the aggressive construction schedule. Steve Martin Trenching of Martinsville installed the HVAC structure quickly and accurately.

The construction schedule and HVAC alignments provided quite a challenge for Hanson. The Salem plant, headed up by Bobby Law, produced and shipped nearly 1,100 feet of the 8-foot x 9-foot box units in five weeks. This included 23 mitered bends, openings for 22 vertical shafts and several end-caps. In order to meet the tight produc-

tion schedule, Hanson made use of their Roanoke, Virginia plant, headed up by Larry Mueller, to "fit-up" and finished the majority of the miter bends after Salem produced and prepared the basic components.

Martin installed the 14-ton HVAC units in close proximity to, and between foundation piers and elevator shafts with remarkable precision. His forces constructed the vertical shafts with concrete masonry blocks. Upon completion, Steve Martin complimented Hanson on the quality of the product, and timely delivery for a successful project.

The main purpose of the structure in Ontario was for housing a piping system used for pumping glycol to a series of air-conditioning units. The buried gallery was considered an option because the air conditioning system for the building was to be located approximately 31 metres (102 feet) from the condenser units. Between the building and condenser units was a parking lot and shipping area. The piping system was proposed to be constructed below grade to have direct access to the condenser units with minimal impact on the daily functions of the building and yard operations. Had the original proposal of installing the piping in an overhead carrier frame been approved, the visual impact of the overhead support frame would have detracted from the architecture of the building, piping would have been less secure, and the supports for the frame would have impacted the use of the parking and shipping area.

The precast concrete box sections were installed on a "mud slab." Sand bedding was placed over the mud for leveling the boxes as they were installed.

The below-grade precast concrete box structure provides excellent security and convenient access to the HVAC piping systems.

The consulting engineering firm, Morrison Hershfield Limited, and engineering staff at Hanson Pipe & Products Ontario (formerly Centennial Concrete Pipe & Products), worked to finalize a design for the 31 meter-long (102 feet) "design-build" structure that included the use of standard size 3000 mm x 1800 mm (10-foot by 6-foot) box units. The gallery was designed to Ontario Highway Bridge Design Code live load specifications because of the truckload conditions of the shipping area, and the 0 to 600 mm (0 to 24-inch) cover requirement, depending on site grading.

Once the installation contractor had been retained by Cityscape Contracting Limited (general contractor), the completion date for the entire project was moved ahead to the first week of July 2001 to meet the client's business plan. Subsequently, the installation of the precast concrete box units for the gallery became critical as the gallery had to be completed before piping and other essential works could be installed. Cityscape required delivery of the box units within 10 days of placement of the order. Hanson was able to adjust production of the units to the new schedule, and delivered the product to the site within the 10-day window.

The box units were installed on a "mud slab" base that included sub-drain piping that drained to the sump pump pit located below the box floor. Sand bedding was placed over the mud slab for

leveling the box units as they were installed. Because certain units were delivered with openings on top, they had to be installed with lifting points located on the sides of the units, instead of the roof slab. Six units were installed on the first day, but further installation was delayed to permit other work to be completed near the gallery. Two days later, the remaining nine units were installed, allowing installation of the condenser unit pad and glycol piping system. A waterproofing membrane was applied to the outside surface of each box unit upon installation, and butyl tape was installed prior to delivery to ensure that the joint treatment of every unit was applied properly to restrict leakage. The gallery was backfilled immediately to limit disruption to construction traffic.

Jim Stadelman of Cityscape noted that by using precast concrete box units, costs were easily predetermined and installation time reduced. He said, "By engineering this tunnel for piping, and choosing precast concrete products, we have built a structure that will become more common in buildings and site servicing. Precast concrete galleries will be used outside and within buildings to house technology needed to regulate the environment required for safely operating computer systems. Such structural systems that facilitate maintenance make our clients very happy."

Buried galleries using precast concrete box units are now an option for servicing buildings, or groups of buildings in urban centers, or for servicing high security installations. The efficiencies gained in conserving on-site space for complementary uses, and construction costs are worth consideration. Galleries are being considered seriously by municipalities throughout North America for reducing the impact of preventative and emergency maintenance on buried infrastructure on local economies. And now, the private sector has revived the use of an old technology with precast concrete products for enhancing the value and security of its capital assets.

	Hanson Virginia Project	Hanson Ontario Project
Project:	Amfibe Building Martinsville, Virginia	Glycol Coolant Gallery Toronto, Ontario
Owner:	Amfibe, Inc., Martinsville, Virginia	Confidential
Designer:	Smith & Beasley, P.C. Architect / Engineer Martinsville, Virginia Rayford B. Smith, P.E.	Morrison Hershfield Limited Toronto, Ontario Ernie Chan
General Contractor:	Frith General Building Construction Martinsville, Virginia	Cityscape Contracting Limited Edmonton, Alberta Jim Stadelman
Sub-Contractor:	Steve Martin Trenching Martinsville, Virginia Steve Martin	
Quantities:	1,100 feet (335 m) – 8-foot x 9-foot reinforced concrete box units	31 meters (102 feet) – 3000 x 1800 mm (10-foot x 6-foot) reinforced concrete box units
Producer:	Hanson Pipe & Products Salem, Virginia Bobby Law	Hanson Pipe & Products Ontario Cambridge, Ontario Nick Vinski

In January 1999, Gifford-Hill became Hanson Pipe & Products, Inc. The name change strengthens the company's identity both in the U.S and abroad, and unifies the pipe and precast operations with the rest of the Hanson organization. Hanson Pipe & Products added LOC PIPE, Whitby, Ontario to its family in 1999, and Centennial Concrete Pipe & Products, Cambridge, Ontario in 2001. Hanson's broad range of building materials includes concrete pipe, and precast concrete products for sewers and storm drainage. For more information visit www.hansonpipeandproducts.com.

Using Proper Installation Standards

It's Elementary, My Dear Watson!

By Tony Russo
Sales Representative
Independent Concrete Pipe Company
St. Louis, Missouri
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The names of the fictional Sherlock Holmes and his inquisitive sidekick, Dr. Watson, are synonymous with detective work and revealing the unexpected. Similarly, the front-line sales representatives of the concrete pipe industry can help end-users of buried pipeline products become super-sleuths by giving them the tools to ferret out hidden installation costs and to recognize the long-term risks associated with HDPE products when preparing their project specifications. Educating users has become a vital element of marketing and selling precast concrete drainage products. Through education, representatives can dispel the persistent misimpression that cheaper first-cost alternative products work just as well as concrete. A recent situation in Jefferson County, Missouri highlights the importance of educating users.

Windsor Elementary School, located 15 miles south of St. Louis, was undergoing an expansion to accommodate growth in the area. The expansion called for a new 48-inch diameter storm sewer to drain the site and discharge stormwater directly into a nearby creek over a distance of approximately 260 feet.

Independent Concrete and Pipe Company ("Independent"), a long-time member of the American Concrete Pipe Association, reviewed the speci-

Student safety was a major consideration with the open-cut pipe installation.

48-inch diameter Class III RCP ready for shipment from Independent Concrete Pipe's St. Louis, Missouri plant.

The RCP storm sewer is gun-barrel straight and performing as expected at Windsor Elementary School.

Installation of the RCP at the school site went smoothly in spite of poor soil conditions.

When all the options were considered, the choice of reinforced concrete pipe for the Windsor School District project become clear.

fications for the new storm sewer in preparing its bid for the contractor, Mahn Plumbing. The project specifications called for HDPE pipe, but the Independent representatives noted that the specifications were not in accordance with the installation procedures recommended by HDPE pipe manufacturers. For example, HDPE pipe manufacturers' specifications call for a 91-inch trench width with compactable rock placed in six-inch lifts, compacted until there is one foot of cover over the top of the pipe.

The Windsor Elementary project specifications, however, did not follow the manufacturers' guidelines and failed to protect against certain long-term risks. The Windsor Elementary specifications merely called for rock to the spring line, no compaction, and no mention of trench width. Moreover, the project specifications made no allowance for the exposure of the HDPE pipe outfall to sunlight that can impact the integrity of the product. Neither did the specifications appear to recognize the flammability of the HDPE product because the specifications made no provision for the inclusion of combustion retardants in the product. These omissions from the specifications would likely have resulted in the school district bearing additional costs.

Concerned about presenting an accurate bid on the project and recognizing the need to follow industry-approved and accepted installation specifications on all projects, Independent questioned the contractor about the apparent omissions. The contractor then went to the assistant superintendent of the school system, who, understandably, cared most that the installation be done correctly. Recognizing that the responsibility for the installation carried through to all parties, including the supplier, contractor and consulting engineer, the decision was made to change the storm sewer to reinforced concrete pipe, as there was little doubt about its long-term performance, structural integrity, installation specifications, and non-flammability.

Installation of the reinforced concrete storm sewer went smoothly despite poor soil conditions in the wet winter of 2001. Using 48-inch diameter Class III precast concrete pipe that arrived on-site with most of the structural integrity already built into the product provided value-added benefits by allowing the school district to avoid the greater costs that could have been incurred in the installation of the HDPE product. For instance, poor soils and wet conditions would have caused extra work for the contractor to ensure construction of a proper soil structure to accommodate HDPE pipe. Further, the contractor had to consider the soil integrity of an existing sanitary sewer line, and construction activities within a fenced construction site in close proximity to an occupied elementary school and the outdoor activities of children. The contractor, Mark Mahn commented, "It is very important to fully understand and apply the pipe manufacturers' recommended installation procedures of their products in constructing drainage systems that will perform to the expectations of clients."

The Windsor Elementary School project is just another case where once the client, the contractor, and the consulting engineer considered all the facts, the choice of product for the application became clear. If Sherlock had been on the case, he might have said "Why . . . Doctor Watson, using proper installation standards is elementary."

Owner:	Windsor C1 School District Imperial, Missouri Dr. Borman Assistant Superintendent
Designer:	Metropolitan Engineering
Contractor:	William Mahn Plumbing St. Louis, Missouri Mark Mahn
Quantities:	260 feet – 48-inch diameter Class III RCP
Producer:	Independent Concrete Pipe Company St. Louis, Missouri

Independent Concrete Pipe Company has seven plants located in Kentucky, Indiana, Missouri and Ohio. Established in 1912, the St. Louis, Mo. Plant supplies reinforced concrete pipe, precast concrete box units and Hy-Span™ bridges to the growing metropolitan area of St. Louis.

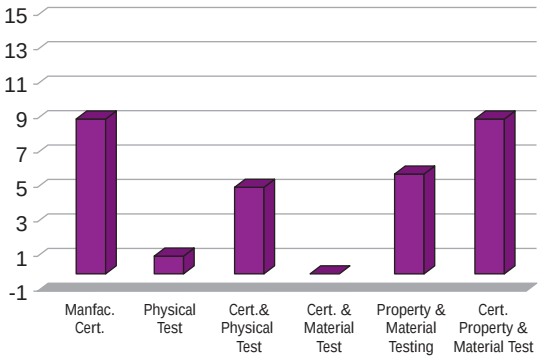
Results of the DOT Pipe Usage and Testing Survey

Compiled by Iraj Kaspar, Consultant and
Josh Beakley, P.E., Director of Technical Services
American Concrete Pipe Association
972-506-7216

In the spring of 2001, the American Concrete Pipe Association's AASHTO Task Group, with the help of Iraj Kaspar, former engineer with the Illinois State DOT, developed a survey questioning the usage and testing of pipe products by the State Departments of Transportation. ACPA worked with its members, and state concrete pipe associations to hand deliver the surveys to representatives of the State Departments of Transportation. Thirty-one of the fifty states responded.

The survey had three pages, one for concrete pipe, one for corrugated metal pipe, and one for thermoplastic pipe. The questions for the pipe materials were all similar. In general, the surveys asked for the basics of the testing performed on the pipe products. Are physical and/or material property tests performed on the pipe? Are records kept? Does the state perform the tests or are they done by a third party? How often are tests performed? And, does the state perform installation inspection?

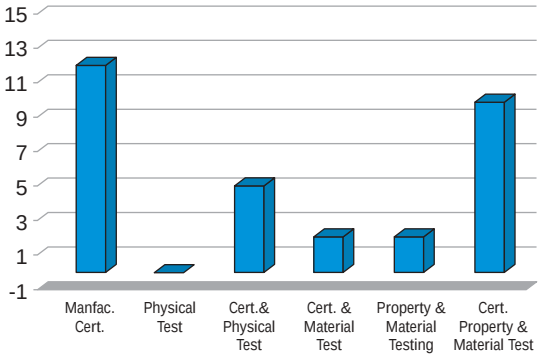
Basic Acceptance - Concrete Pipe



When states were questioned to determine whether the basis of their acceptance of a pipe product prior to installation was based on Material Testing, Physical Testing, or Manufacturer's Certification there was no single overwhelming answer for concrete pipe. Nine states required all 3. There were also nine states that indicated acceptance by manufacturer's certification only. This seems to be in line with the perception that states are desirous to get away from certifying products. There were no states that performed material testing without also performing physical testing of the final concrete pipe to verify the finished product.

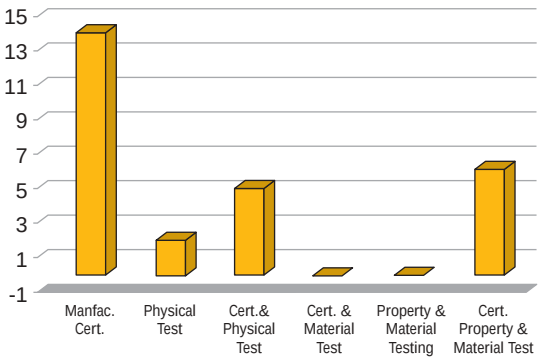
With metal pipe, the states appear to allow more manufacturer's certification (12), and where they did perform their own testing, they still required manufacturer's certification. Unlike concrete pipe, it appears to be more of an all or nothing approach (either utilize material and physical testing along with the manufacturer's certification or simply allow manufacturer's certification).

Basic Acceptance - Metal Pipe



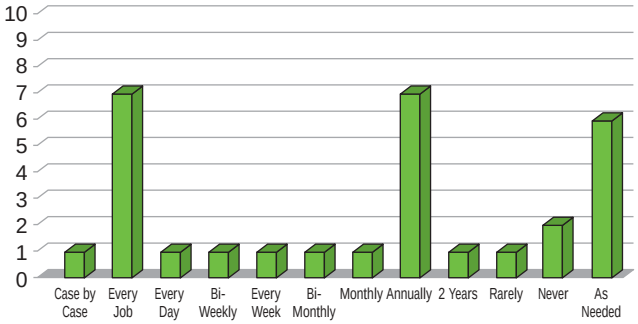
Only 6 states performed any material testing, of plastic pipe. This verifies the need for the National Transportation Product Evaluation Program (NTPEP) that AASHTO has developed to evaluate HDPE pipe materials as well as the finished product. A large percentage of states allowed manufacturer's certification (14). There appears to be a trend toward allowing more manufacturer's certification for the newer pipe products. States would rather not spend their own manpower on testing drainage pipe products. It appears that if they were not already involved in the testing of the product, then there is not a major effort to get involved when the product is introduced. Limited budgets allow little room for increased testing and inspection.

Basic Acceptance - Plastic Pipe



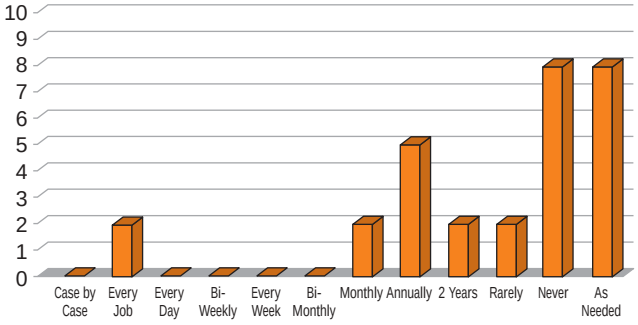
When it comes to testing frequency, the majority of concrete pipe fits into three categories: Testing for every DOT job (7), tested annually (7), or as needed (6). The definition of "as needed" may mean different things to different people.

Testing Frequency - Concrete Pipe

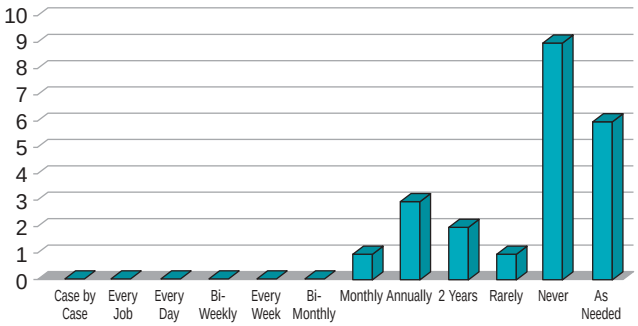


Never, or as needed dominated the frequency of testing for metal pipe (8 responses for each) and plastic pipe (never (9) and as needed (6)). It would seem that some of the responses for basis of testing the pipe become irrelevant if the pipe is "never" tested.

Testing Frequency - Metal Pipe

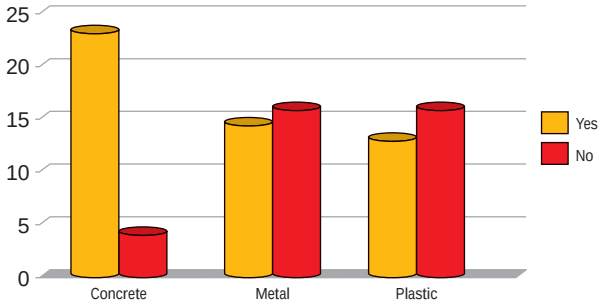


Testing Frequency - Plastic Pipe



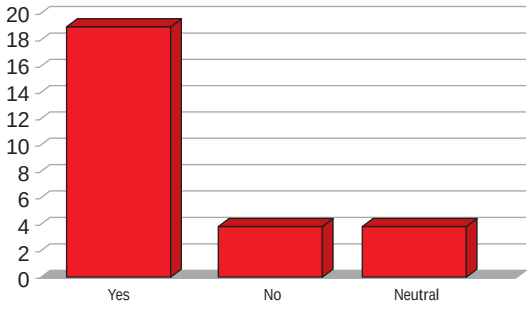
The states were asked if they required any inspection after installation. Time frame was not specified here, so the inspection could occur immediately after installation, 30 days, one year later, etc. The amount of states that inspect concrete pipe is somewhat surprising when compared to the inspection efforts on other pipe types. Being the least installation sensitive would suggest that concrete pipe would be the least likely to require installation. Competing pipe materials would lead you to believe that concrete pipe is never inspected after installation, when in fact it appears to be the most inspected product. Perhaps this is because they have confidence in what failure mechanisms they are looking for, verses field anomalies such as deflection, cracks, etc where the definition of unacceptable becomes unclear.

Inspection After Installation?



This may also be the reason why many states would like AASHTO to develop guidelines & procedures for mandrel testing. Mandrel testing would be a valuable means of evaluating the installed condition of flexible pipe to ensure that it has not exceeded its deflection limit.

Guidelines & Procedures for Mandrel testing?



It seems clear that the State Departments of Transportation are getting away from testing drainage products prior to installation. Many DOTs are going to warranties, where the product must last a set amount of years or be replaced by the manufacturer. While most drainage projects have a design life of 50 to 100 years, the warranty times are usually much shorter. Warranties work well if field inspection is performed prior to the expiration of the warranty to ensure that the pipe is functioning appropriately and will last for at least the design life of the project.

Edwin Kling

continued from page 4

that affect them – at least on an annual basis. New employees should go through safety training before they go near production equipment, and then only with an older employee with experience (buddy system) until the new employee is deemed competent.

Remarkable safety records should be rewarded on a per plant basis. Small perks, such as lunch on the employer, should be extended to employees for achieving outstanding safety records. Normally, the most efficient plant is the safest plant. In most instances, work-related injuries are not accidental. They occur when people take shortcuts. Automation of certain areas of the plant operation, contributes significantly to the bottom line of safety records and compensation costs.

Q: *Any closing thoughts on automation and plant safety?*

Kling: I firmly believe that automation throughout the concrete pipe industry would lead to a safer workplace, and one that attracts young people who are comfortable with today's computer-driven technology. Without automation, it will be more difficult to attract young people to our industry to produce our products and advance the science of reinforced concrete pipe. The mechanics of automation is intriguing to many, and this will attract career-driven people. Such highly motivated employees will ensure that our industry has plants with safe and healthy workplaces.

"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

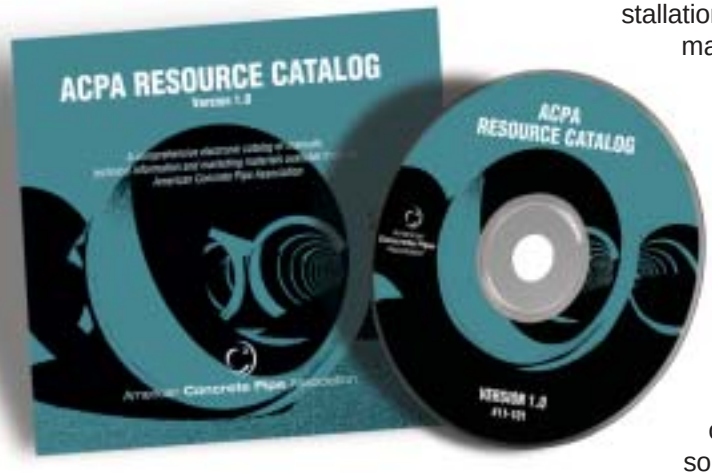
- Cayuga Concrete Pipe Company (Oldcastle, Inc.), Croydon, Pa. - Allen Reed
- Cayuga Concrete Pipe Company (Oldcastle, Inc.), New Britain, Pa. - Jim Savana
- Elk River Concrete Products (Cretex), Billings, Mont. - Milton Tollefsrud
- Elk River Concrete Products (Cretex) Helena, Mont.
- Kerr Concrete Pipe Company (Oldcastle, Inc.), Hammonton, N.J. - Bob Berger
- Kerr Concrete Pipe Company (Oldcastle, Inc.), Farmingdale, N.J. - Scott McVicker
- South Dakota Concrete Products (Cretex), Rapid City, S.Dak. - John Link
- South Dakota Concrete Products (Cretex), Mitchell, S.Dak. - Andy Fuhrman
- Riverton Concrete Products Company (Cretex), Riverton, Wyo. - Butch Miller
- Sherman-Dixie Concrete Industries, Inc., Chattanooga, Tenn. - Earl Knox
- Sherman-Dixie Concrete Industries, Inc., Franklin, Tenn. - Roy Webb
- Americast-Pipe Division, Inc., Charleston, S.C. - Bill Gary
- Amcor-White Company (Oldcastle, Inc.), Hurricane, Utah - Brent Field
- Carder Concrete Products, Littleton, Colo. - Bryan Dixon
- Carder Concrete Products, Colorado Springs, Colo. - Bryan Dixon
- Grand Junction Concrete, Grand Junction, Colo. - Ben Burton
- California Concrete Pipe (Oldcastle), Stockton, Calif.

Sanitary Sewer, Storm Sewer and Culvert Pipe

- Advanced Pipes & Cast Company, Abu Dhabi, United Arab Emirates - Nasser Kammar
- Amcor Precast (Oldcastle, Inc.), Nampa, Idaho - Mike Burke
- Amcor Precast (Oldcastle, Inc.) Ogden, Utah - Tim Wayment
- Atlantic Concrete Pipe, San Juan, P.R. - Miguel Ruiz
- Elk River Concrete Products (Cretex), Elk River, Minn. - Bryan Olson
- 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
- NC Products (Oldcastle, Inc.), Raleigh, N.C. - Mark Sawyer
- Ocean Construction Supplies Limited (Inland Pipe), Vancouver, B.C., Canada
- Amcor-White Company (Oldcastle, Inc.), Ogden, Utah - J. P. Conn
- CSR Hydro Conduit, Denver, Colo. - Ed Anderson
- Waukesha Concrete Products Company (Cretex), Waukesha, Wis. - Jay Rhyner

Resourcing Becomes as Easy as A-B-C with ACPA's CD!

In today's information-intensive work environment, knowing where to obtain detailed information about a specific subject is of paramount importance. That axiom certainly holds true when it comes to technical and marketing information regarding precast concrete pipe.



The American Concrete Pipe Association (ACPA) has made it easier than ever to access their extensive library of technical and marketing information on the specification, use and installation of precast concrete pipe – with an all-new CD-ROM containing the Association's most frequently requested resource items. The CD-ROM contains easily searchable electronic files of reference materials using Adobe Acrobat Reader® software. A visual reference is provided for most software programs, hardcover manuals and books, Design Data documents, installation guides, as well as other materials. A printable order form is included on the CD-ROM.

Make sure you have up-to-date information on precast concrete pipe by obtaining a copy of ACPA's Resource Catalog CD-ROM. You can request a copy next time you contact ACPA's Resource Center at (800) 290-ACPA (2292). Ask for Resource Item #11-101. Or contact the ACPA office via email (info@concrete-pipe.org) and we'll send a Resource Catalog CD-ROM to you right away.

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