Vol. 4 Issue 1
Engineer's Edition

Good Connections

Information on Watertight Storm Sewers

Proverbs About Water...

We never know the worth of water until the well is dry. *France*

A mule can swim seven different strokes but the moment he sees the water he forgets them all. *Armenia*

Even hard rocks can be drilled by persistent soft drops of water. *Portugal*

All water flows into the ocean or into the purses of the rich. *Denmark*

Don't spit in the well - you may need to drink from it. *Russia*

Fools grow without watering. *Italy*

FREE Newsletter Subscription

The Watertight Storm Sewer Group Newsletter, *Good Connections* is published semi-annually and is free of charge.

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WATERTIGHT CONNECTORS KEEP THE CONTAMINANTS OUT

New Jersey storm water project proves how "flexible" watertight connectors can be.

Installing new storm sewers in an industrial area where ground contaminants are rampant is major undertaking. Not only do you have to worry about creating watertight seals to keep the water in the pipes, but you also have to focus on keeping those outside contaminants away from the storm water traveling through the pipes. Facing that challenge recently, the New Jersey Department of Transportation (NJDOT) turned to flexible, watertight connectors as a viable solution.

Located on Doremus Avenue in Newark, the road-widening project required new trunk lines, new water lines and the replacement of about 1,800 feet of deteriorated storm sewer lines. The main trunk lines comprised 15-inch through 60-inch ADS HDPE pipe with smooth adapters that fit into the flexible connectors.

Specified by NJDOT, the connectors were used on 90 percent of the joints, for a total of 450 connectors ranging in size from 15 to 60 inches.

Making the project particularly challenging, says Hong Sun, highway design manager for global engineering firm The Louis Berger Group in East Orange, N.J., was a high groundwater level and the surrounding soil, much of which was contaminated with petroleum and lead deposits.

"The majority of drainage was below ground level, and surrounded by contaminated soil," says Sun, whose company designed and engi-

Continued Inside

THE JOB SITE

WATERTIGHT CONNECTORS... *(Continued from cover)*

neered the project. "Making it even trickier is the fact that the system discharges into the Passaic River, so we had to make sure that no contaminate whatsoever found its way into the drain."

PIPE DELIVERY

Sun, who has used flexible connectors on previous projects, says the DOT was particularly concerned about getting the pipe joints and connections "as tight as possible" - a requirement that the watertight connectors were able to fulfill with ease.

LUBING THE PIPE

Carbro Construction of Hillsborough, N.J. installed the pipe and manholes on the job, which took one year to complete and wrapped up in March 2004. Tom Tamashullo, supervisor for the construction firm says he's been using flexible connectors for the six years that he's worked for Carbro. On the Doremus Ave., project, he says the connectors solved the predicament of keeping water from infiltrating the storm sewer system.

Pino Carlomagno, vice president at Carbro Constructors, says the fact that lead was found in the surrounding soil (which was labeled ID 27, or "dry industrial solid waste"), made the watertight connections that much more critical. "NJDOT was more worried about those contaminants getting into the pipe and eventually into the river, than it was about keeping the system itself watertight," says Carlomagno. "It was a highly industrial area, with a high level of ground contaminants to worry about."

Jerry Donahue, sales manager at Tullytown, Pa.-based Atlantic Concrete Products, which precast the connectors into the manhole structures, says the fact that storm water ends up in drinking water and inevitably back in the nation's rivers, lakes and streams, the aquifer can be highly affected by any contaminants that make their way into a system like NJDOT's Doremus Ave., project.

"They don't want any of that getting into the storm drain systems for obvious reasons," says Donahue. So far, he says the connectors have performed as expected, with all connections serving their purpose by staying secure and watertight. "If the connections weren't watertight, the pollutants would find their way into the system when it rained," says Donahue. "There's also no danger of mortar grout cracking from vibrations or human error during the installation."

Tamashullo says the connectors also helped Carbro save the labor costs required to brick up and mortar joints in the field. Though some unexpected alterations had to made while working in the field (due to existing utility lines and other unforeseen challenges), Tamashullo says his crew simply "positioned the pipe, aligned it, backfilled it" and moved on. "Where bricking and cementing up a connection is time consuming and labor intensive," says Tamashullo, "once you put the pipe into the flexible connector, you don't have to touch it."■

COMPLETED WATERTIGHT CONNECTION

Ask about your application:

But What If I Want to Remove Groundwater?

Mark T. Kennedy, P.E., of Widmer Engineering, Inc., wrote to ask *"I have been reading your newsletters on the importance of using rubber gaskets to prevent extraneous water from entering the storm sewers. But what if I want to also remove the groundwater? Shouldn't I then use some kind of perforated storm sewer pipe to carry both inflow and infiltration? I am facing this situation right now and would appreciate your insight."*

For the Watertight Storm Sewer Group, Mike Miller responds:

Your question is: ***What if the engineer needs to remove existing subsurface water from an area around a storm/drainage system?***

There is a dramatic difference between the planned (and designed) collection of subsurface water and the unintended (and usually unacknowledged) collection that occurs in unsealed storm/drainage systems. Actually, limited subsurface collection is a common practice in many areas. Local codes for drainage systems under and around roadways frequently (although certainly not universally) require inclusion of subsurface drainage. In theory, these drains collect subsurface water and direct it into the storm system, thereby reducing potential flotation and heaving of the pavement due to this water. Usually this is done by laying 4-inch or 6-inch perforated piping under the roadbed and connecting this piping into the inlet structures.

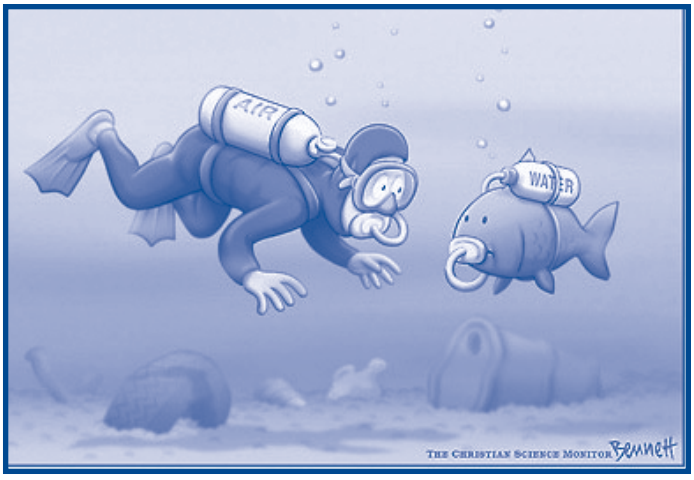
Why would anyone seal a perforated pipe?

So why would anyone bother putting a flexible seal on this pipe/structure connection when the pipe is perforated? The answer is simple: to make the pavement last longer. The best practice is to use *solid* piping within four feet of the structure and to seal the pipe/structure connection with a flexible rubber connector. This prevents surface water near the top of the structure from developing an infiltration path along the outside of the structure and through the unsealed pipe entry. Such an infiltration path can rapidly remove the soil support around the structure, resulting in failure of the nearby pavement. Drive down any paved road for a demonstration of this principle. By moving the subsurface collection points at least four feet from structures, surface water infiltration around the structure is eliminated and the subsurface water, with whatever fines it contains, is collected away from structures. Any loss of soil support then occurs at some distance from the structure, where pavement integrity is unbroken.

Planned subsurface collection is also used to "dewater" wet areas. This used to be a common practice when what we now call "wetlands" were called "swamps" and the only good swamp was a dry one. Times have changed, and we now have an appreciation for preservation of wetlands that is strongly supported by science and by regulation. Thus, we should remove existing water only when, where, and how we choose. Sealed storm and drainage systems are the only way to accomplish this.

Always watch out for unintended consequences!

The designer needs to be aware that any storm/drainage system left open to collect subsurface water is also, potentially, a shallow injection well. Under the right conditions, surface fluids easily find their way into the subsurface soils through the openings intended to gather subsurface water. An intention to drain this subsurface water can quickly become a route for underground fouling when contaminants enter the system. Again, sealing the system is the only sure way to prevent this.■



From the Editors…

From Concept to Practice: What Are You Waiting For?

We all know that we would never intentionally provide a collection system to a customer, any customer, that was less than what was best for them, given the usual constraints of time, budget, and design criteria. Even while working within the constraints of required designs, we would try to make it as efficient and enduring as we possibly could. It's not just a matter of making the customer happy. It is a matter of professional pride and satisfaction; doing the job with the kind of care and creativity that makes a real difference.

So how should we look at storm and drainage systems? First, let's look at it selfishly. What's best for us and our community? Obviously, we know that construction costs are going nowhere but up, and that we need to plan for the longest service life, lowest maintenance costs, and best performance from the systems we design. We also see the effect of environmental problems due to design practices that were acceptable in the past, but would be laughed at if proposed now.

When a better idea comes along, it is rarely greeted as such immediately. The entrenched forces of routine and skepticism blunt the force of even the best idea. A computer in the home? What would you ever need one for? The Internet? A playtoy for defense department geeks. E-mail? C'mon.

That's not to say that every new idea is a good one. Good ideas are those that have enough inherent possible worth to get people to try them. These ideas reward those who try them with results that show some improvement over the old ways. The best ideas go on to be accepted more and more widely until they become the standard.

The concept of watertight storm sewers is a case in point. One the plus side we have comparable construction costs, improved pavement life, reduced system maintenance, improved system performance, improved effluent quality, and establishing control over the water streams in and around the system. On the minus side, tradition and familiarity.

So how does one go about initiating a change? Actually, you're doing the first step right now; finding out more about the advantages of watertight storm sewers. Second, look for a small project to try it out on. We're always available to help with planning for a trial project. Finally, look for that municipality or contractor who is progressive and who wants to build better for the future. The staff at the Watertight Storm Sewer Group will be happy to meet with you the others to see how we can put these best practices into place. What are you waiting for? There's no time like now to get started.

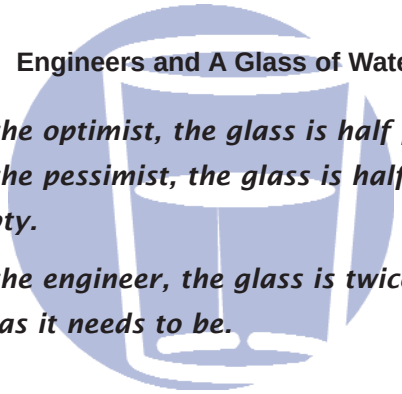
HOW TO GET STARTED...

Contact Us: The Watertight Storm Sewer Group is always happy to work with you and your local entities to introduce these improved methods.

Pick A Partner: Find a progressive municipality and/or contractor who wants to build for a better future.

Pick A Project: Find a project that will be a simple demonstration, or a project whose performance will be critical.

Get Ready For Success: See how easy it can be to start making your projects something you can be proud of, and something your community will benefit from far into the future.



Engineers and A Glass of Water

To the optimist, the glass is half full. To the pessimist, the glass is half-empty.

To the engineer, the glass is twice as big as it needs to be.

Did You Know?

Why is water especially good for people on a diet?

Water has zero calories and zero sugar, but a good drink of water can reduce hunger. Water also helps your body metabolize stored fats, helps maintain proper muscle tone, and helps rid the body of wastes.

Public water systems produce billions of gallons of drinking water everyday. What percentage of that is consumed by people?

Less than 1%. An average family of four in the US uses approximately 107,000 gallons of water a year.

The average person uses approximately how many gallons of water a day?

The national average is 123 gallons of water per person for daily use.

If you reduce your shower time each day from 15 minutes to 14 minutes, approximately how many gallons of water would you save a year?

Reducing shower time by 1 minute can save 2,000 gallons of water per year.

What does a person pay for water on a daily basis?

The national average is approximately 25 cents per person for water each day.

THE WATERTIGHT STORMSEWER GROUP

will be in

Booth #76

at

StormCon 2004

Desert Springs Marriott

July 26-29, 2004

to find out about the *free* lunch we have for you!

Looking for an interesting presentation to your engineering group?

Try our

"Watertight Storm Sewers Save Money"

Brown Bag

That's right! We'll come to your group of ten or more engineers, provide food, and leave you with a better understanding of why sealing storm sewer systems is the right thing to do.

The presentation will discuss the environmental and cost saving reasons for making storm sewers watertight along with design concerns, performance improvements, specifications, applications of flexible connectors, cost benefits and other tangible benefits. Our goal is to provide information on the environmental benefits and cost savings to everyone involved when using and or specifying flexible connectors in storm sewer designs.

All seminar materials are provided (including the lunch, naturally) and there is no charge. Continuing Professional Development units may be available for this presentation.

Contact information: E-mail: mailroom@frankgroupinc.com or mail to
Frank Group, Inc.
2536 Eastern Blvd., Suite 504, York, PA 17402

PHOTO GALLERY

Wanted: Road Damage Pictures
Reward: $100.00

The old-fashioned method of using bricks and mortar to join pipes into structures in storm sewer construction gives everybody problems, from the contractor to the customer. Now you can turn one of these cracked messes into enough money for a good dinner for two, just for sharing your photos with “Good Connections”. Each issue will feature photos of real-world problems caused by rigid brick and mortar joints. If your photo is selected, we’ll send you a check for $100, your reward for helping us educate others about using flexible connectors in storm sewers. Please e-mail your pictures to mailroom@frankgroupinc.com or mail to Frank Group, Inc., 2536 Eastern Blvd., Suite 504, York, PA 17402. Please be sure to reference the Watertight Storm Sewer Group.

Congratulations! This month’s winning photo was taken by Don Fisher, the president of Insight Engineering. "We were called to conduct an investigation to put together a proposal to fix a series of drainage problems. My visit was timely in that it began to rain while I was there and allowed this vivid display of what was happening. This is a photo of one inlet but there were several, maybe five, having the same infiltration/ exfiltration erosion problem. This was in an office complex that was barely four years old.” Thanks Don, your $100 winners check is in the mail.

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