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Dear Readers,

Welcome again to the Summer 2017 Issue of Modern McWane. We’ve enjoyed a Spring of warm-ups, from a Winter that was not too awful for most of us. During the Summer, we enjoy making memories with family and friends on Summer vacations, brace for the heat of July and August, and look forward to that refreshing occasional rain shower. Cookouts and outdoors are marks of Summer, as is the increase of construction.

We are back into the construction season, and this one is shaping up to yield a much needed increase in utility construction. Housing continues to recover, albeit slowly, and the need for water and wastewater infrastructure spending is increasingly be accepted by the general public. It is widely recognized that most of the utility infrastructure built more than 50 years ago was built with a design life of 50 years in mind. Much of this infrastructure has lasted two or three times its original design life, which is a testament to the operators, designers, and builders of that infrastructure. Frankly, their knowledge, skill, and commitment have led to such outstanding performance. Another major contributing factor to the extraordinary performance of these infrastructure systems was their use of Iron Pipe. The designers, managers, and builders of those generations knew what it meant to be Iron Strong, so that’s how they built those systems. They recognized the absolute value of long-term thinking, as well as the imminent failure of short-sighted, so-called cost-saving measures.

Today there is a major push by purveyors of substandard materials to have managers, designers, and builders completely ignore the long-term impacts of their decisions. They do this in a shameful effort to remove choice from those professionals, who have for so long designed and built this multigenerational infrastructure. The choice to consider operating costs and life expectancies in selecting materials is best left to those who know, understand, and can properly analyze these factors. The American Chemistry Council is supporting this effort with heavy lobbying in six target states (Arkansas, Indiana, Ohio, Michigan, North Carolina, and South Carolina). If you are opposed to this infringement on local choice, please contact your legislators and tell them how you feel about this unnecessary overreach.

Also, this time of year brings with it the upcoming AWWA Annual Conference and Exposition. This year we will be in Philadelphia, the City of Brotherly Love. Philadelphia, a city that had at one time used wood pipe, has been built Iron Strong since Iron replaced wood pipe in the early 1800s. In fact, I recently saw a report of an old wooden water main pipe (see picture) being unearthed during a project replacing an early 1800s Cast Iron Pipe. According to the report from philly.com, the wooden main had been installed around 1811 or 1812, and was replaced in 1831 by a Cast Iron Pipe. Like many other cheaper materials, the wooden main didn’t last long. Contrarily, the Cast Iron Pipe served reliably for nearly 200 years. In fact, in 1832, Philadelphia started using Iron Pipe exclusively, becoming an Iron Strong Utility for Generations.

We look forward to you stopping by our booth #2101 at AWWA/ACE in Philadelphia and seeing how we at McWane Ductile Build Iron Strong Utilities for Generations. You’ll see our newest products, as well as a piece of the oldest known Iron Pipe that had been in service for approximately 300 years at the Fountains of Versailles, France.

Mark Niewodowski
National Manager
Marketing and Specifications Dept.
Defining “Unaccounted For Water”

I have given several presentations wherein I have identified the distribution system of a water utility as The Forgotten City: Out of Sight, Out of Mind. Although the greatest capital investment for a water system is its pipeline infrastructure, many times it gets less attention than other components, such as pumps, motors, plant structures, pump stations, and even fire hydrants, all of which are visible to the eye. One mysterious component to some water utilities is that of Unaccounted For Water. Some say that, like death and taxes, Unaccounted For Water will always be present, with the only issue being the degree to which it pervades.

In its recently published Infrastructure Report Card for 2017, the American Society of Civil Engineers reported that six billion gallons of treated water is lost every day in the United States, which led to a D grade for the drinking water section of the report. Worldwide this estimate is 48.6 billion cubic meters per year (1 cubic meter is equal to 264.172 gallons). So how and why does this phantom still lurk with such magnitude in our water systems? This discussion may shed some light on the subject and how it is (or can be) addressed.

First, let’s look at some terminology that should be clarified. The terms Unaccounted For Water and Non-Revenue Water are not interchangeable. Unaccounted For Water is water that cannot be quantified either via metering or through reasonably accurate estimations of water use. On the other hand, some examples of Non-Revenue Water include: use of water for construction, known leakage, tank drainage, storage tank overflows, line flushing, fire protection, bleeding or blow-offs done in the winter or for taste and odor concerns, hydrant testing, and other municipal uses such as irrigation for golf courses and parks, street sweepers, among other things. All of these water uses are non-revenue producing, but should have estimated volumes to account for the water used. Another factor that is non-revenue producing in comparison to the volume of water supplied is slow meters. A water meter will rarely “speed up” over time, but is highly likely to “slow down” if not maintained or replaced over time. Therefore, in the case of a meter that has slowed, the true amount of water supplied to the customer is not recorded and falls into the category of unaccounted for water.

Now We’re Talking

There is a calculation that can be used in order to attempt to quantify Unaccounted For Water. It is total amount of water sold subtracted from the
total amount of water produced or purchased for the same period of operation, after subtracting the items of known or estimated non-revenue use from this differential. Over the years, the percentage of perceived acceptable water loss (or Unaccounted For Water) in a water system was fifteen percent. However, AWWA's Distribution and Plant Operation Division has recommended that non-revenue water loss should be less than ten percent, thus placing the actual percentage of loss for Unaccounted For Water at a significantly lower value. In fact, the recommendation is not to think of water loss in terms of a percentage, but rather in terms of actual gallons lost. That way, the utility can better understand the magnitude and cost that this element represents in their operation.

True Unaccounted For Water in a Water System

The loss of water in a water system after non-revenue sources have been identified is primarily due to leaks in the system. Leaks can occur as a result of many factors. Examples include: leaks at fittings and appurtenances, leaking joints due to improper installation, pipe failure due to excessive pressure or unsuitable laying conditions, frost heaving, excessive or consistent external loading due to traffic, etc. Service connections from the waterline to the meter are also subject to these factors. Many leaks become evident quickly, but smaller leaks that go undetected can actually create more water loss over time and cause extensive damage due to undermining of streets and roadways.

So Let's Go Find It

There are several sophisticated methodologies that can be used today to find leaks in water systems, including the Tracer Gas Method, Infrared Imaging, Camera Inspection, Ground-Penetrating Radar, and Microwave Remote Sensing. However, acoustic leak detection is probably the most common and one of the easiest forms of leak detection still used today. During WWII, the French used an early form of the sonoscope to listen for underground activity. This same principle of listening can be applied to water escaping a pipe under pressure caused by a leak. Such a leak creates a sound wave of energy that travels along the pipe walls and water column. Sometimes if the leak is large enough, the sound wave may be transmitted to the surrounding soil or pavement. Sound waves travel in a straight path, which is known as “Rectilinear Propagation”. Thus, sound waves become distorted when encountering pipeline fittings. Several variables contribute to the effective use of acoustic equipment: 1) Pressure - the higher the pressure, the longer distance traveled by the sound wave; 2) Soil Types, Water Tables, and Ground Cover; 3) Pipe Size - a sound wave's velocity slows as the pipe size increases; 4) Pipe Materials - metallic pipe can transmit a sound wave over longer distances (as many as 10 times the distance) and at a higher velocity than plastic pipe. Many water utilities have utilized a strategic approach to lowering the Unaccounted For Water in their system. Instead of waiting for the water to surface, addressing a customer call about low system pressure, or finding a sinkhole in the roadway, many utilities have enacted proactive measures in their water systems to find leaks. Full-time personnel are now assigned to this task, which would have been a task for part-time personnel in the past. Electronic enhancements utilizing acoustic technology are coming to the forefront through AMI and listening devices on meters and other facilities.

Is There a Point of Diminishing Returns?

Utilities must constantly evaluate whether the Financial Implications of Managing Non-Revenue Water are Worth the Cost of doing so? A key term commonly associated with addressing this issue is ELL, the “Economic Level of Leakage”. ELL is defined by the International Water Association as the level of leakage where the marginal cost of active leak control equals the marginal cost of the leaking water. According to this equation, some water utilities have allowed their unaccounted for water to be somewhat high. It is important to remember that water leaking in the street (if it is not bulk purchased water) represents a lower unit cost than the rate at which its customers are billed. However, missing from this equation are several considerations. First, there is damage to the surrounding environment that may be caused to roadways, etc. Second, our society has determined,
and rightfully so, that water is a precious commodity to be valued and conserved. Therefore, a growing number of water utilities now take an aggressive approach to not only find and fix leaks in their systems, but also to carefully review the materials they choose for pipeline installations.

How Can the Initial Selection of Pipeline Material on a Project Affect Unaccounted For Water?

In addition to the initial bid price of the pipeline material, there are many considerations that should be taken into account when properly selecting pipeline material. Establishing a trench that coincides with the required support strength (E') of the bedding is critical in deterring future leakage. As a result of the inherent strength of Ductile Iron Pipe, the E' value can be much less than that required for other pipeline materials, such as PVC. Consequently, native soil can be utilized for backfill with Ductile Iron. However, select backfill must be brought in and native soil must be hauled away when using PVC. Unfortunately, sometimes designs don’t allow for establishing this proper E' value or corners are cut by the contractor, thus causing leaks where the PVC pipe is connected. Additionally there have been documented cases where certain types of machinery, such as a backhoe, “pushed home” the spigot end of PVC pipe into the bell. This causes overbelling of the pipe, again creating a potential leak scenario at the connection. This overbelling cannot occur with Ductile Iron Pipe. Leaks have also occurred at valve and fitting locations where proper support is not placed underneath valves and fittings, thus allowing PVC pipe to bend under the weight. Once again, this issue does not take place when using Ductile Iron Pipe. In terms of the operational capability of pipeline material, Ductile Iron is far superior to most other materials, including PVC. Ductile Iron Pipe contains a 100 psi surge protection allowance, plus a safety factor of 2. Therefore, Class 350 Ductile Iron Pipe can withstand pressures equal to 900 psi, which is many times greater than that of other materials. This is important when unintended system surges occur. Such surges can create failure, and thus leakage, in other type pipelines. These factors were among several highlighted in a recent University of Michigan Research Study, wherein it was found that the frequency of main breaks in PVC pipe far exceeded that of Ductile Iron Pipe.

Another obvious factor that ultimately affects unaccounted for water is the estimated service life of the pipeline material itself. When the pipe comes to the end of its service life, leaks start to happen. The American Water Works Association, in its research report “Buried No Longer”, provides information in regard to estimated service life of varying pipeline materials for different sizes of pipe in various regions of the country. Ductile Iron Pipe is noted as having a superior estimated service life compared to other materials, in many cases by a factor of two. This AWWA research has been further validated by the University of Michigan research mentioned earlier, specific to Ductile Iron Pipe compared to PVC pipe wherein the service lives are estimated to be 100 years and 50 years, respectively.

Oil of the 21st Century

Clean drinking water has been labeled the Oil of the 21st Century. The quality of life of every community and every individual is affected by access to good quality drinking water. Individual health, economic development, and community vitality are all dependent on this key asset. Over the years, we have been blessed in this country with adequate water in most areas. However, population demographics have left some water supplies strained. Thus, one component among others to provide communities with an adequate supply of quality water is minimizing unaccounted for water.
In our industry presently, two essential components of a successful business include providing Water Professionals with outstanding sustainable products in a timely manner, as well as offering outstanding customer service. However, continued success in our business depends on the ability of a company to make continuous improvements. In other words, if we do not move forward, we not only stand still, but actually move in reverse.

While McWane Ductile has been manufacturing Iron Pipe for more than 90 years, the service life its pipe often extends well beyond 100 years. Although we are proud of our history, we are also not interested in resting on our laurels. In fact, we have developed a new means of improving our manufacturing procedures and our product development. That new means exists in the form of our new Universal Test Facility. It is located on the premises of McWane Ductile-Ohio. In this new Test Facility, Ductile Iron products are tested in order to ensure that certification compliances, such as UL, FM, NSF, and BNQ are maintained. The Test Facility also helps us ensure that customer expectations are both met and exceeded.

NEW PRODUCT DEVELOPMENT

We at McWane Ductile are consistently looking to improve and/or extend our product line in order to meet the demands of our ever changing world. The Seismic Flex Joint is a perfect example. It has been through extensive testing to ensure that the joint performance will exceed internal and external pressure standards. Seismic Flex Joints are rated as high as 350 psi. This level is tested, with an additional 100 psi for surge and a safety factor of two, resulting in a test pressure of 900 psi. In all likelihood, the vast majority of Water Professionals will never see a pressure test above 150 psi. However, our Universal Test Facility provides a safe environment to perform testing well beyond typical applications.

An additional benefit of the Seismic Flex Joint is that it is designed to withstand seismic activity. There have been countless catastrophic events throughout history that resulted in hundreds of thousands of people being
without potable drinking water. Many of our readers live in communities with daily earthquake concerns. Going to work every day knowing that, in addition to providing for your family, you are part of a bigger picture provides a great sense of accomplishment. The reality is that our testing of new products will help provide clean drinking water to millions of people, and that is an extremely fulfilling endeavor. Humans can live without many things but not without clean drinking water.

EXTREME CONDITIONS

The vast majority of waterlines operate at pressures well below 350 psi. However, a multitude of systems must be designed to operate at internal pressures well beyond 350 psi. Changes in elevations of 200, 500, or even 1000 feet may consequently increase pressures by 86.6 psi, 216.5 psi, or 433 psi, respectively. There are numerous Product Engineers and Technical Professionals within the McWane family who possess the knowledge that is necessary to assist Engineering Professionals with extreme design parameters. That knowledge is supported by the proof testing completed in the state-of-the-art Test Facility.

Each test completed in the Universal Test Facility is recorded and results are documented. Calibrated equipment provides the assurance that testing is accurate. For example, a Design Professional might consider ½ the rated deflection of a joint for design consideration. We utilize certified equipment in order to ensure that joints are tested at maximum deflection and maximum pressure. Therefore, when we state that a TR FLEX® Joint can be deflected to 5 degrees for a Horizontal Directional Drilling (HDD) project, a test has been completed in the Universal Test Facility to ensure that this information is correct. Upon customer request, remote access is available from virtually any location. Plant tours are available upon request, and may include a demonstration in the Universal Test Facility. Water Professionals of all levels are welcome for plant tours and instruction, which are approved for CEUs. In addition, safety equipment is provided for all visitors, as is a pre-tour safety session.

FIELD TESTING APPLICATIONS

A common complaint received from the field involves difficulty in passing a pressure test. In order to address this issue we at McWane Ductile have Sections of pipe joints sent (assembled as in the field) to the Universal Test Facility for root cause analysis. Often, joints are pressurized as received and hold pressure. Root cause analysis typically leads to trapped air within the system that was not properly expelled as the original issue. The test pit at the Universal Test Facility was specifically designed at an angle to ensure that ALL internal air is exhausted from the pipe prior to pressurizing.
The bottom line is that air can be compressed and water cannot. Crews in the field will often focus attention on psi. However, the key is the amount of make-up water used to pressurize the line. Installers sometimes take weeks attempting to pass a pressure test by utilizing a repetitive cycle of pressurizing and bleeding air. Each time the line is “exercised”, two things happen. First, air is expelled from the line. Simply installing an air release at one or possibly multiple locations may alleviate this issue. Second, the line moves each time it is pressurized. Although it may result in subtle movements, any movement of a line after being pressurized will result in a loss of pressure.

We recommend review of the ANSI/AWWA C600 Installation of Ductile Iron Mains and Their Appurtenances prior to the start of any project. Sometimes Design Professionals make sure that project specifications require the pipe manufacturer to provide on-site Installation instruction prior to the start of a project. We at McWane Ductile encourage these types of start-up meetings, and also offer them as a free service.

MCWANE DOUBLE BUMP TEST PROTOCOL

McWane Ductile has developed a diagnostic test to determine if there is trapped air in a line or an actual leak. That test is called the McWane Double Bump Test. It is based on the fact that air is compressible and that water is not. While not arguing nor ignoring the AWWA acceptance criteria where +/- 5 psi of the asserted final test pressure should be maintained while performing an AWWA proof test, it should be noted that pressure loss alone on the gauge is not a judge of pass or fail, but is merely an indicator. Being able to hold within +/- 5 psi simply indicates that all reasonable or measurable air pockets have been previously exhausted from the closed pipeline. Pressure drop is often mistaken for water loss, leading the contractor on a frustrating and costly hunt for something that may not be there.

The difference can be reliably ascertained using three short-term and increasing pressure tests designed to record the recovery volumes needed in each instance. Starting at the initial test pressure (typically presumed to be 150 psi), enact a 30-minute sit. Then, re-pump the pipeline to 150 psi and note exactly how much water was needed to get back to 150 psi. This can be done with a meter at the pump or by simply drawing recovery water out of a bucket or larger holding basin of your choice. Repeat the same 30-minute sit and recovery at 200 psi and at 250 psi.

Understanding that each pipe has already experienced a 500 psi hydro-test before leaving the foundry, the recovery volumes are the key. If the recovery volume at these pressures, whether its ounces or gallons, stays the same or decreases, you have a tight pipeline that is not leaking water but simply compressing a contained air bubble. This bubble expands when the pumps cease, indicating a (somewhat misleading) pressure loss on the gauge. As the bubble moves within and finds a spot (in a pipe or fitting, ARV, or corporation connection) to exhaust in whole or in part, the recovery volume decreases and will eventually reach zero. This occurs during natural movements of the transported water when in service. As there are 7.48 gallons of non-compressible water in each cubic foot of space, we are generally not speaking of a large bubble. For example, I have seen many cases where an air bubble the size of softball has “cost” 40 or 50 psi on a gauge. AWWA standards (design, manufacturing, installation, and testing) recognize and mandate a watertight joint, not necessarily airtight, which is why air can and does escape in points where water does not.

Contrarily, if the recovery volume at these increasing pressures increases substantially, that is a clear statement that the problem is not trapped air. Rather, it is a passing valve, a leaking joint, a defective item, or some other issue that must be further diagnosed, and ultimately repaired or replaced, in order to achieve the AWWA C600 post installation testing requirement. Experience with rates of loss and recovery volumes can indicate generally what aspect is causing the problem. However, until you know HOW MUCH WATER YOU’RE LOSING, you are only guessing and potentially being falsely led by a pressure loss alone.

CONCLUSION

Whether for research, compliance, or training, the Universal Test Facility is one of many ways in which McWane Ductile strives to exceed the expectations of Water Professionals. The Universal Test Facility is a state-of-the-art facility available for Water Professionals to partner with the McWane Ductile Team to BUILD IRON STRONG UTILITIES FOR GENERATIONS!
Josh Blount has accepted a new position with DIPRA as a Regional Engineer representing Region 3. Josh’s technical background, coupled with his time already spent at DIPRA, will be invaluable to DIPRA’s success in the western states.

We at McWane Ductile certainly wish to congratulate Josh on his promotion.

PIPE ECONOMY IS NOW AVAILABLE ONLINE!

One of the most storied waterworks publications of the past 50 years is back. Take a walk through the pages of history with Pipe Economy.

*This information is for historical reference only, and products in these documents are not necessarily currently available. For available product information, visit mcwaneductile.com/products.
# M ASD CONFERENCE & PRESENTATION SCHEDULE
## SPRING 2017

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<td>Roy Mundy</td>
<td>Lexington, KY</td>
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<td>Roy Mundy</td>
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<td>How the Selection of Pipeline Materials can Enhance ENVISION Designed Projects</td>
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Join McWane in Philadelphia for three days at AWWA's biggest event of the year. We’ll be in Booth #2101, sharing the latest info on everything going on at McWane. Visitors will receive a free carabiner for stopping by and can enter to win items from a long list of trade show prizes. ACE17 is almost here, so book your trip today.
Davidson Water gets its water from the Yadkin River, which begins in Blowing Rock, North Carolina. It starts out as a small stream running along Highway 321. Next it flows along State Road 268. Then it deepens as other tributaries feed into the Yadkin. Ultimately, the Yadkin River feeds into the W. Kerr Scott Dam Reservoir.

The folks at Davidson Water have 1800 miles of pipe in their system, which is largely comprised of PVC pipe. At present, they have 60,419 connections, and 53,510 of those are active. That number represents an increase of 519 from the prior year. Also, they have added 382 new water taps in the past year, which represents an increase of 60 versus the prior year. Davidson Water has not had a water tap number that high since 2008.

Figures listed above certainly indicate that Davidson Water is in a growth mode. Consequently, their master plan is to forecast future additional water lines. This particular project was moved up 20 years as a result of excessive splits in the PVC pipe. PVC pipe splitting has been an issue for Davidson Water for more than 10 years. Consequently, they have taken the proactive step of replacing 10 miles of PVC pipe each year with Ductile Iron Pipe, until all PVC pipe is completely out of their system. We at McWane Ductile are proud to be part of that process.
This project involved the installation of 900 feet of 24-inch Ball & Socket Pipe, crossing the Kanawha River. The new line replaced an old one that dates back to the 1970s. However, the decision to replace the old one was a very big decision, in light of the scope of its reach. Frankly, this is one of the main lines in the West Virginia American Water System. Therefore, taking it offline for a while is a pretty significant step.

Trench preparation was handled by Amherst Madison, which consisted of digging a trench just days before installation. Amherst also provided installation services on the job, which was no small feat. In fact, cranes were required, operating from barges. Additionally, the folks from Amherst provided a diver and carried out the river bottom preparation.

Tri State Pipeline took care of the system tie-ins on the project, which facilitate connections back to the system. In addition, they assisted Amherst in riverside preparation and execution.

We at McWane Ductile were pleased to be part of such an interesting project. It is always gratifying when those who have product choices make the decision to use McWane Ductile products. In the case of this job, we were fortunate to have such an endorser. His name is Thom Boggs, with West Virginia American Water. Thom prefers using McWane Ball & Socket Ductile Iron Pipe for river-crossing applications, and this project was certainly no exception. He refers to ours as the “Cadillac” of river-crossing pipe. That is certainly the type of endorsement of which we can be quite proud.
As a result of a steady increase in population and development, York County Utilities needed to replace its existing wastewater facilities, which would meet the County’s regulatory standards. The “New Heritage Wastewater, Pump Station, Gravity Sewer, & Force Main” project consisted of constructing a single pump station that replaced four outdated and deteriorating stations. In addition, the project entailed the installation of approximately 3.7 miles of Ductile Iron Pipe, comprised of 20-inch Force Main largely, and of 24-inch Wastewater Gravity Sewer to a lesser degree.

McWane Ductile supplied both the TR FLEX® pipe and the TYTON® pipe, as well as the fittings on the job. About 60 percent of the project’s footage was standard cement-lined, while the other 40 percent was lined with Protecto 401. In the interest of efficiency, the pipe and fittings were color coded and marked, in order to coincide with the provided lay schedule and line drawings. Completion of this project allows York County to continue to provide wastewater service to new and existing developments under the County’s regulatory standards, within the service area, and to convey the wastewater to the City of Rock Hill for proper treatment and disposal.

Bill Harworth, project manager for Layne Heavy Civil, summed up the project by saying, “McWane met all project gravity sewer and force main needs for the Fort Mill, South Carolina job. Each piece of pipe needed to be numbered and placed in the correct order due to the piping system design. Due to consistent changing between TYTON®, TR FLEX®, Cement Lining, Protecto 401 lining, and Polywrap throughout the 14,812 feet of pipe to be installed, it was imperative that a system be developed to ensure correct placement. McWane provided a color coding system and a numbering system that was reflected on the pipe laying schedule and line drawings, which helped save our company a lot of time and allowed us to be error-free during installation.”

We at McWane Ductile are quite appreciative of an endorsement like that one.
Representatives of the City of Belton, Missouri concluded that they needed some upgrades to their Waste Water Treatment Facility. Thankfully, we at McWane Ductile were chosen to supply Ductile Iron Pipe on the project. The job involves multiple combinations of pipe diameter, joint, and class. However, we at McWane Ductile are willing and able to provide pipe on Treatment Plant projects of this nature.

One element of this project involves the construction of a new Parallel Pump Station and Force Main. Also, there will be a new Head Works facility with new Primary Treatment equipment. In addition, the job provides a new Final Clarifier Basin, which represents the addition of a fourth Clarifier Basin into the system. Last, there will be a new SCADA system, which will enable more efficient and effective operation of the Waste Water Treatment Facility.

All in all, this is a significant step forward for the City of Belton. We at McWane Ductile are proud to have worked alongside Carollo Engineering, Foley Company, and Kansas City WinWater on the project.

### Types of DIP used on the project:

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**Sales Region:** Treatment Plant  
**Sales Representative:** Dan Henrie  
**Project Location:** Belton, MO  
**Project Owner/Utility:** City of Belton  
**Project Engineer:** Carollo Engineering  
**Project Contractor:** Foley Company of Kansas City, MO  
**Project Distributor:** Kansas City WinWater
Nestled in the Western slope of the Colorado Rockies is the historic town of Glenwood Springs. Glenwood is famous for its expansive hot springs pool, vapor caves, and the famous Hotel Colorado. The town was a major stop on the old Denver/Rio Grande railroad line, which brought numerous legendary and colorful figures from the Old West through town. Many of these famous people loved the area and came here to rest, play, hideout, and cure themselves of various diseases in the hot springs pool. Among these were Buffalo Bill, Al Capone, The Unsinkable Molly Brown, and others. President Theodore Roosevelt made the Hotel Colorado his headquarters when he came out West on hunting trips. The famous stuffed animal we know as the Teddy Bear was created at the Hotel Colorado in connection with President ‘Teddy’ Roosevelt. Famous Western gunslinger Doc Holliday is buried in Glenwood Springs.

Glenwood is the gateway to many busy snow skiing destinations, including the famous resort town of Aspen, Colorado. Geographically, Glenwood sits on both sides of the Colorado River. The Grand Avenue Bridge goes over the river and connects both sides of the town. In doing so, it gives access to multiple ski resorts. Recently, it was determined that the bridge needed to be upgraded. This was a huge undertaking, requiring the replacement and new installation of more than 3000 feet of Ductile Iron Pipe as a result of the new bridge construction. The scale of this job is significant, as evidenced by the fact that it will take multiple years to complete. We at McWane Ductile are certainly proud to provide Ductile Iron Pipe for this project, which has such rich history associated with the area.

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Help Me Ditch Doctor!

I’ve got this inspector demanding that I install a plastic-type liner into a recently installed Ductile Iron sewer line because some of the sealcoat is missing from the cement lining following a power-wash cleaning of the line. This is part of their post-installation acceptance procedure for all pipelines. What in the world should I tell this guy?

Sincerely,
Stymied in Stillwater!

Dear Stymied,

I would suggest, in this case and all others, tell him THE TRUTH. The truth is that the sealcoat and cement lining are essentially useless in sewer pipelines. They always have been and always will be useless in such situations. Cement lining is purposeful and necessary, in potable water Ductile Iron Pipelines, to prevent tuberculation (mineral deposition and attachment to bare iron surfaces, resulting in a reduction of the internal diameter of the pipe and the water quality it transports) over time. This is especially true when soft water chemistry is involved, as there is no true need for cement or other lining in a Ductile Iron Pipe or fitting in a sewer line unless the flow can or becomes septic or caustic in nature. If the flow were to go septic (have a cyclic or steady pH value below 4.5), the sealcoat (asphalt-based paint) and/or the Portland cement mortar lining would be gone in just a few months, if not weeks, of exposure to the same. If it would turn into a non-structural paste (just like gypsum wallboard or sheet-rock left out in the rain) and go bye-bye quickly under such conditions. The iron substrate would then be subject to damage that might take 15 to 30 years to truly evidence itself (as in a pipe failure) depending upon the severity of septic flow. So to focus on cosmetic damage to the sealcoat, or let’s even say some or all of the cement gets gone in a sewer line, is somewhat short-sighted. My response would be, “that which makes no difference is no difference.” Since it truly makes no difference, why bother to address or remedy it? There are concrete ways (pardon the pun) to determine if sections of any system might go septic over time, including content of flow, rate of flow (slow moving or still sewage likely to go septic), evidence of septic-related corrosion on manhole interiors or channels in existing parts of the system to which you are connecting. These are just a few of the many ways to decide, via proper design of a system, as to whether or not a special-lined Ductile Iron Pipe should be used and where. Epoxy-based lining, such as Protecto 401, may be appropriate in some circumstances, while the bulk of the Ductile Iron Pipe can be installed bare inside, if you choose. Don’t think this is limited to domestic household-generated sewage. To put it in real-word perspective, we can take a walk up the pH road from a nasty corrosive pH of 1.0 (battery acid), to lemon juice (near a pH of 2.0), through vinegar (pH of 3.0), up to acid rain (pH of 4.0), on to milk (at pH of 6.5), and then to potable water (pH of 7.0 = known as neutral and harmful to nothing). If we keep strolling up the pH road, we’d get to things like baking soda (at pH of 8.0), sea water (pH of 9.0), milk of magnesia (pH 10), ammonia (pH 11.0), and lye (pH 12.0). These are all the opposite of acidic or septic, known as alkaline, and can be just as damaging to product materials if not properly addressed. I hope this has helped you understand the reasoning behind my advice, and I wish you the best in your resolve through knowledge (politely delivered) to your governing inspector.

Sincerely,
The Ditch Doctor

Dear Ditch Doctor,

The county engineer is requesting that we dig up and replace sections of a newly installed Ductile Iron Pipeline as a result of comments or notations made by an internal video inspection camera operator. I’ve looked at the things he’s noted and can’t for the life of me make out what he’s talking about. Candy striping? Voids in the lining? Gaps in the joint? WHAT?? It all looks just fine to me. This seems like standard stuff that appears to bother this operator more than the others who’ve obviously seen similar things in other lines we’ve built. However, those others said nothing. What should I do from here? This could result in a whole lot of money spent and in a real disruption to newly paved roads for no good reason.

Sincerely,
Spinning in Springfield

Dear Spinning,

Unfortunately, your situation is not so unusual these days. It seems with the growing use of internal inspection cameras on pipelines in the past decade or so, there is just as much misunderstanding of what people think they see versus what really is or is not there. The bright lights used by these cameras and the confined spaces in which they are used, along with curved surfaces everywhere, is a perfect recipe for the birth of unintentional misinformation. This is especially true with the small diameter pipes commonly used in many water and sewer systems. The bottom line is that many of the camera operators have little or no experience, from a manufacturing perspective, with the products they are inspecting, making it difficult for them to decipher real problems from false perception. The “candy stripes” that you mentioned, also called spiraling in the paint or lining, are nothing more than the nature of the beast and can be seen in every centrifugally cement-lined pipe, given the right combination of lighting conditions and camera travel speed. You see, the cement lining is deposited in the pipe by a screw auger traveling the length of the interior while the pipe spins slowly. It is then set in place and smoothed out by rotating the pipe at much higher speeds once the cement delivery lance is removed. This compacts the cement lining to a fantastic degree, yet does not diminish the fact that it was originally placed “like a long ribbon”. This is the same situation for the sealcoat inside and the pipe wall itself. Should a Ductile Iron Pipe ever fail (under ridiculously high pressure, etc.) it would fail on the helix (along its unseen seam), much like a Pillsbury dough cardboard container when you pop it along the visible seam. That’s because the molten iron is delivered into the spinning mold inside a centrifugal casting machine. Don’t even get me started on things some call “voids” or “misses” within a pipe that when they are dug up and examined are typically no more than meaningless surface variations in localized places along the lining, which cannot be avoided at times given the nature of the fluid cement when it is placed and set in the pipe. To help your bottom line, and to preserve your working relationship with those who govern your projects, I would suggest involving an outside professional. Such assistance is typically available free of charge from the pipe or fitting manufacturer with whom you deal. That person can assist you in politely explaining the “that’s not what you’re seeing” situations to the inspector, to the engineer, or to others. Ask your salesman or supplying distributor. They can get you in touch with the person you need.

Sincerely,
The Ditch Doctor
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