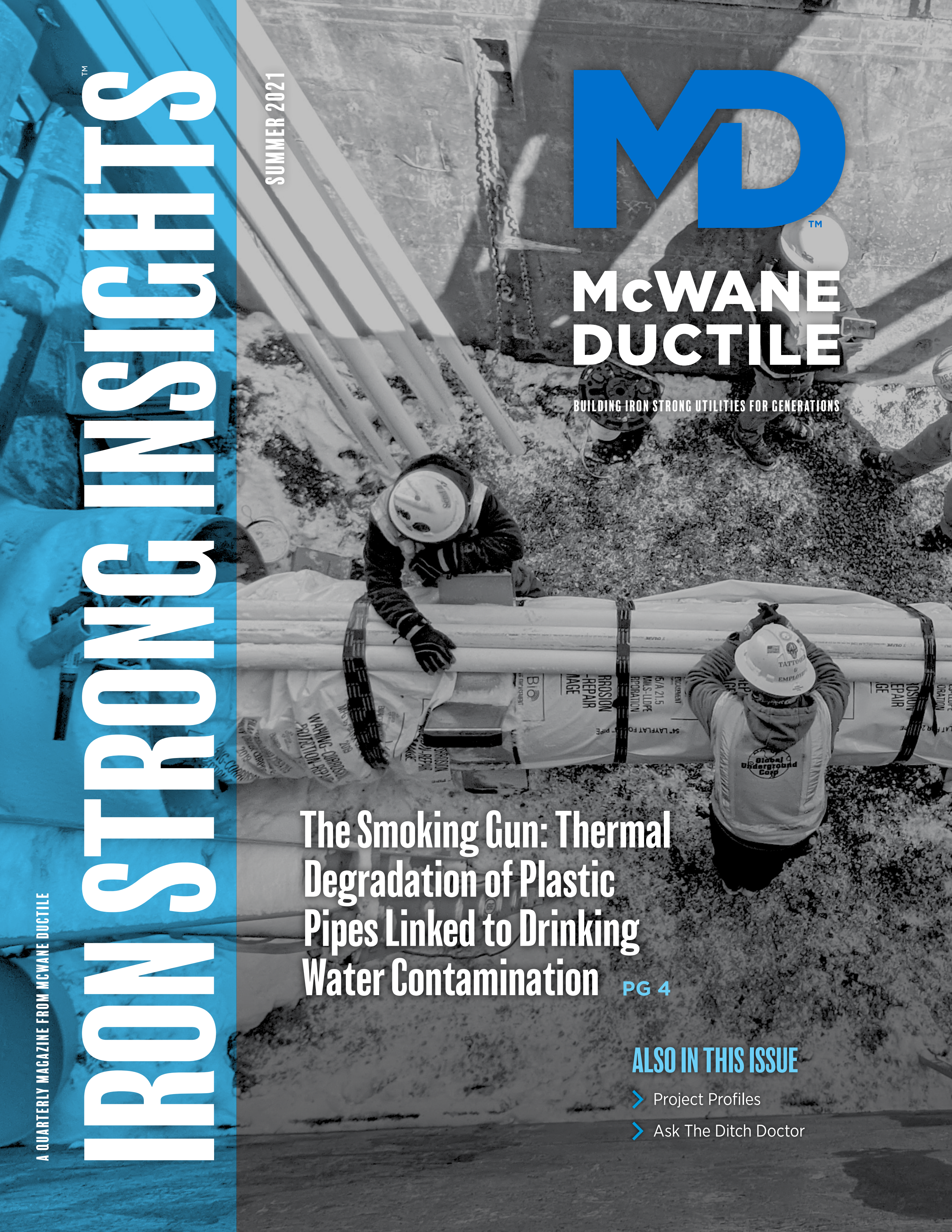

IRON STRONG INSIGHTS™

A QUARTERLY MAGAZINE FROM MCWANE DUCTILE

SUMMER 2021

MD™

McWANE DUCTILE

BUILDING IRON STRONG UTILITIES FOR GENERATIONS

The Smoking Gun: Thermal Degradation of Plastic Pipes Linked to Drinking Water Contamination PG 4

ALSO IN THIS ISSUE

McWANE DUCTILE

Contact Us: McWaneDuctile.com

Mike Dodge, VP Sales & Marketing
Stuart Liddell, Sales Operations Manager
Andrea Kubik, Marketing Manager

Inside

IRON STRONG INSIGHTS™

McWane Ductile has been an industry leader in the manufacture of water distribution and infrastructure products since 1921. With three U.S. foundries, McWane Ductile offers superior service while supplying Ductile iron pipe across North America and beyond, all while maintaining an unwavering commitment to safety and quality. Through continued innovation, it is our goal to meet the customer needs and industry demands of the future in order to Build Iron Strong Utilities for Generations.

PG 4 **The Smoking Gun: Thermal Degradation of Plastic Pipes Linked to Drinking Water Contamination**

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IN THIS ISSUE

Welcome to Iron Strong Insights™

Dear Readers,

Welcome to the Summer edition of Iron Strong Insights. For some of us, we have already had the chance to enjoy some vacation time away from work. I hope this also meant being able to openly travel to a favorite location or possibly even somewhere you may have never visited before. Either way, taking time away from work to reset and recharge is important. Often those memories made on family vacations are the ones that stick with us the most as we move through life and begin to experience those events with our spouses and children.

You do not have to pay too much attention to the daily news to know it is HOT outside. For many in the Western part of the United States and Canada, experiencing some never seen before high temperatures has proven exceptionally difficult. Just moving through daily life can prove challenging. Add to this the increasingly critical drought conditions and the recipe for wildfires is extremely high. In fact, there are several active fires already this season. The importance of having a resilient water system that can stand up to these extreme conditions will provide some measure of reassurance to residents in these affected areas. For more on that in this issue, please see "the Smoking Gun" article by John Johnson, where he details some of the adverse long-term impact wildfires have had on water systems in recent years.

Also, there is a very informative article by Ken Rickvalsky entitled "What Did I Dig Up?" Our sales staff gets this type of question regularly where a utility is trying to identify whether they have an older gray iron line or is a newer Ductile iron main. In the article, Ken runs through a brief evolution of cast iron pipe and provides some helpful clues in how you may know even when the product is still buried. There is also a companion blog to this article that goes into a bit more detail and has a handy download with a timeline of cast iron pipe manufacturing. Check it out at https://mcwaneductile.co/2UHM9o5.

As we continue to move along in the year, we have seen things become more open and accessible. Our Sales Operations staff has a pretty good list of upcoming trade shows where we will be attending and, in most cases, presenting topics of broad interest to the water and wastewater industry. Please see the back cover for more details on these events. At McWane Ductile, we continue to work hard to educate and assist our customers in Building Iron Strong Utilities for Generations.

Stuart Liddell
Sales Operations Manager
Sales Operations Department

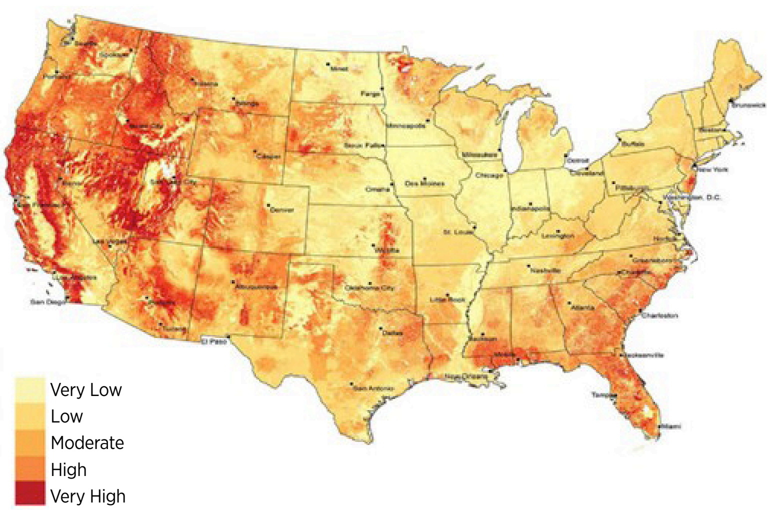
THE SMOKING GUN

THERMAL DEGRADATION OF PLASTIC PIPES LINKED TO DRINKING WATER CONTAMINATION

By John Johnson, M.ASCE, M.USGBC, ENVISION SP, NACE INTL Corrosion Technician

As of October 2020, more than 47,000 wildfires have occurred across 36 U.S. states. Drought is a major factor, as a large portion of the West is currently experiencing the most severe level of drought, dubbed "exceptional drought" by the U.S. Drought Monitor. Humans cause the majority of wildfires with negligence such as unattended campfires, discarded cigarettes or arson, followed by natural causes such as unusually long-lasting hot lightning bolts. (U.S. Drought Monitor, 2012)

WILDFIRE RISK

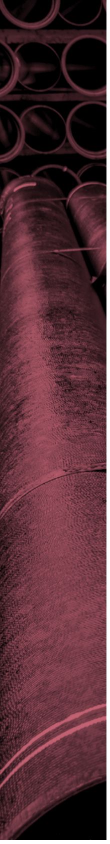


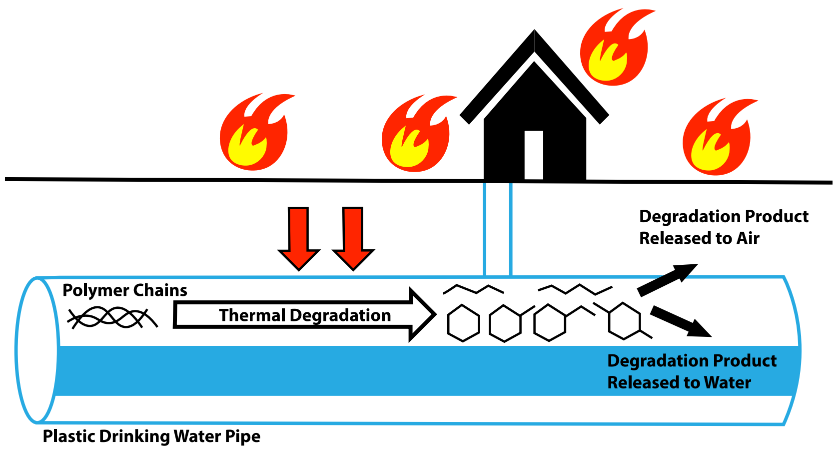
This is a general representation of risk associated with wildfires. It is not intended to predict wildfire occurrences. Source: U.S. Department of Agricultural Forest Service, Fire Modeling Institute

Recent research reveals new information on the dangers of drinking water contaminated by PVC (polyvinyl chloride), HDPE (high-density polyethylene) and CPVC (chlorinated polyvinyl chloride) plastic pipes as a result of many of these wildfires. This new research adds to decades of previous studies on plastic pipes documenting the significant environmental impact, lack of sustainability, shorter design life, higher pumping costs and dependence upon man-made petrochemical resins versus natural elements. This impact is in addition to the inherent risk of drinking water contamination from permeation through plastic pipes.

A research study published in "Environmental Science and Water Research Technology" by Andrew J. Whelton, Ph.D. et al. (2021) documents drinking water contamination from thermal degradation of plastic pipes, and it revealed an even greater danger to drinking water from plastic pipes. The results indicated that when plastic pipe materials are exposed to elevated temperatures, benzene, a known carcinogen, and other volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are leached into drinking water.

The heat from wildfires or structure fires can thermally damage buried plastic mains, resulting in water contamination. Not only does plastic pipe release hazardous contaminants into a drinking water system, but it also acts as a sink, absorbing benzene and organic contamination when negative pressures or main breaks draw smoke from the fire into the distribution system. The potential for watermain damage increases significantly because of the low melting point for PVC and HDPE pipe materials. Low melting levels also endanger a community's ability to combat fires when melting mains can no longer provide vital





firefighting flows. In addition, gaseous fumes from burning plastics have also hindered and obstructed firefighting efforts in certain circumstances. This article recaps key findings from the study and illustrates the real contamination dangers plastic pipes pose to drinking water quality.

WILDFIRES' IMPACT ON BURIED PLASTIC PIPE

"Over the years, wildfires have crept out of the wild and into urban landscapes, threatening more lives, property, and infrastructure than ever before, sometimes devastating communities."[2] In the aftermath of the 2017 Tubbs Fire in Santa Rosa, California, and the massive 2018 Camp Fire in Paradise, California, engineering experts from Purdue University and Manhattan College investigated the drinking water contamination of below-ground and above-ground drinking water infrastructure.

Tests of below-ground distribution systems revealed the presence of a variable mix of VOCs, including benzene, toluene, dichloromethane and styrene. Testing at Santa Rosa Water revealed benzene was found in concentrations as high as 40,000 ppb and at more than 2,217 ppb after the Camp Fire. In California, the maximum contaminant limit for Benzene is one ppm, and the federal limit is five ppm. Levels at or above 500 ppb are characteristic of hazardous waste.

Chronic exposure has been linked to various cancers as well as reproductive and blood disorders. Infants and children are extremely vulnerable and may experience health effects at lower levels than adults because of their smaller mass. Since some of the contamination is volatile, heating or boiling contaminated water can transfer the chemicals from water to air. Chronic exposure can occur through bathing, personal hygiene, drinking or cooking. For 11 months, Santa Rosa Water issued a do-not-drink/do-not boil advisory.

CONTAMINATION TESTING AND RESULTS

The Whelton study tested 11 plastic pipe samples across eight common brands in the waterworks industry, all NSF 61 approved. Samples were exposed to a range of elevated temperatures from 200˚C to 400˚C (392˚F to 752˚F).

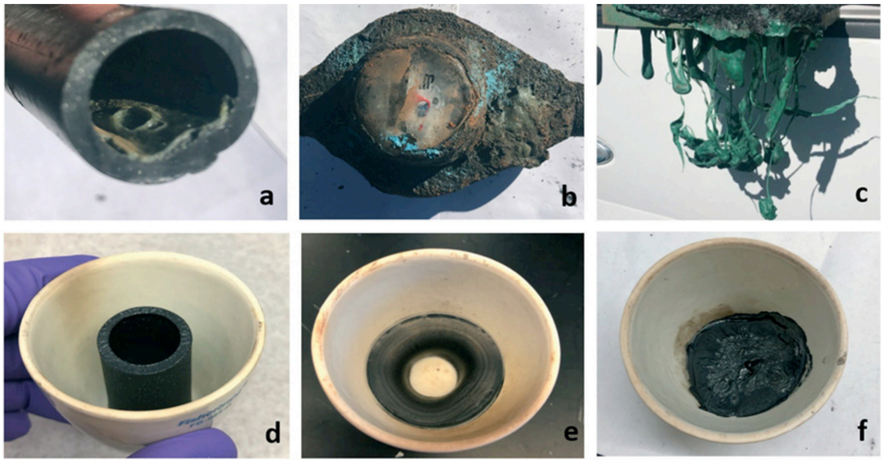
Results revealed the PVC and CPVC were more susceptible to thermal degradation than other pipe materials at 300˚C and 316˚C (572˚F and 600˚F). PVC showed the most significant measure of leaching at 300˚C (572˚F). HDPE showed significant degradation at 463˚C (856 ˚F) and greater than 478˚C (892˚F).

The general trend of compound concentration leaching across plastics was benzene > foluene > ethylbenzene > xylene. Benzene and toluene formed during the first stage of decomposition of PVC and CPVC materials. Ethylbenzene and xylene formed during the second degradation step. VOC released from HDPE also developed during the second degradation step. BTEX (benzene, toluene, ethylbenzene and xylene) was leached from 10 of the 11 samples, and greater BTEX concentrations were found as degradation temperature increased.

RESULTS OF THE STUDY

Results from the Whelton study document the direct link between commercially available plastic pipes and the generation of known carcinogens (BTEX) when exposed to elevated temperatures — in concentrations above short- and long-term state and federal limits. Further, BTEX that remains in cooled products ultimately leaches into drinking water, causing contamination. Remediation of contaminated plastic pipes is also problematic.

"According to models developed by the U.S. Environmental Protection Agency, it could take as many as 195 days of constant flushing to reduce 20 ppb to less than .5 ppb from a single HDPE pipe. Moreover, replacing certain pipes may be more effective in terms of cost and time than flushing contamination out, as both the City of Santa Rosa and Paradise Irrigation District (PID) discovered."



Images of fire-damaged water system components including (a) a HDPE plastic pipe, (b) a water meter, and (c) a water meter cover following the Camp Fire. Thermally degraded pipe samples in laboratory experiments include (d) PEX-c pipe degraded at 300 °C, (e) HDPE pipe degraded at 300 °C and (f) HDPE pipe degraded at 400 °C.

CONCLUSION & SOLUTION

The results documented by Whelton and other reputable research organizations provide the smoking gun that a serious problem exists with using synthetic materials for drinking water infrastructure. This problem threatens both the health and safety of our communities.

So, what is the solution? I highly recommend that those selecting pipe material dig deep into the pros and cons of each option. I am confident your research will ultimately lead you to data detailing Ductile iron's ability to "take the heat."

With 13 times the impact strength of other materials, greater flow capacity equating to 38% more energy efficiency and an anticipated service life of 100-plus years, the clear choice for a safe, resilient and sustainable distribution system is the proven pipe material forged by fire to withstand fire — iron strong Ductile iron pipe.

For more information on the advantages of Ductile iron over plastic piping, please visit McWane Ductile's Iron Strong Blog at McWaneDuctile.com/blog, where you can access these helpful articles:

- The Advantages of Ductile Iron Over PVC by Jerry Regula
- Differences that Matter — HDPE and DI Pipe — A Comparative Narrative by Ken Rickvalsky
- How to Protect Water Quality from Permeation Due to Contaminated Soils by John Johnson
- Why Should I Use Ductile Iron Pipe? Four Key Considerations by Roy Mundy

ABOUT THE AUTHOR

John Johnson, M.ASCE, M.USGBC, ENVISION SP, NACE INTL
Corrosion Technician

John Johnson is a Regional Engineer for McWane Ductile and assists Consulting Engineers and Water/Wastewater Utilities Value Engineering with pipeline design specifications as well as conducts educational presentations throughout the western U.S. about pipeline material selection to maximize seismic resilience, sustainability and energy savings from the utility and engineering perspective for CEU and PDH credits. John is also on the ASCE Seismic Design Committee developing a Seismic Resilience Pipeline Standard for the U.S. as well as on the AWWA A21 Ductile Iron Standards Committee.

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TR Flex® Bridge Installation, Des Moines, IA

THE BENCHMARK OF STRENGTH

There's one big reason why Ductile iron pipe is the standard against which other pipe materials are compared: **Iron is stronger**. Preferred for its durability, longevity and resiliency, McWane Ductile iron pipe's ability to withstand the elements means less repairs, less replacement and stronger infrastructure that outperforms the competition in nearly every category.

- 13xs the impact strength
- Able to withstand extreme stress and temperatures
- Pumping cost savings of up to 38 percent
- Made with 95 percent recycled materials
- Service life of 100+ years

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Available for **iOS + Android**
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WHAT DID I DIG UP?

GRAY IRON OR DUCTILE IRON PIPE

By Ken Rickvalsky, ENV SP, NACE CT, McWane Ductile National Product Engineer

So, the site plans say, "...connect to existing iron pipe." Now that we've dug down to the pipe, I can't tell if it is gray iron or Ductile iron pipe. How can I reliably identify the pipe without physically testing a sample?

A LITTLE BACKGROUND

Regarding iron pipe, the word "cast" is most appropriately used as a verb, as in the act of making pipe itself. All iron pipes are cast. The earliest were cast in a formed sand pit, while modern pipes are cast in a centrifugal casting machine. Graphite, a critical component of iron pipes, evolved from its flaky composition in gray iron to the nodular graphite now within the ferritic structure of Ductile iron pipe. This nodular graphite is the key to the resilient flexibility of Ductile iron pipe. An evolutionary timeline from gray iron to Ductile iron pipe is worth a look:

- **From the 1600s to about 1920:** All iron pipes were pit cast, typically in sand molds.
- **Early 1920s:** The centrifugal casting process of water-cooled molds spinning within a machine to create a pipe wall emerges in earnest.
- **1920s to mid-1950s:** The centrifugal casting of gray iron pipe dominates the industry. Pit casting of iron pipes as a commercial model phased out in the late 1940s.
- **Mid-1950s:** Arrival of the rubber gasket as the primary sealing mechanism for watertight joints in iron pipe. To this day, the most significant advancement in pipeline joints in the history of utility piping.
- **Mid-1950s to mid-1960s:** Ductile iron pipe begins to appear sporadically in the marketplace.
- **Late 1960s to early 1970s:** A confusing time for the iron pipe industry as both gray iron and Ductile iron were often produced by the same foundries in the same machines, sometimes on the same days. This was the time period where the textured peen pattern was introduced in the spinning molds to utilize inoculant dust essential to the manufacturing of modern Ductile iron pipes.
- **Mid-1970s:** Ductile iron becomes the preferred pipe material, virtually eliminating gray iron from active production.
- **Early 1980s to present:** Gray iron pressure pipe is no longer available as a stock item. Gray iron soil pipe, typically used for gravity drainage of sanitary or other fluids from buildings, remains available and widely used around the world.

Gray iron pipe installation, 1900.

CLUES AND CUES

Now that we've completed the Iron History lesson, let's list some of the visual **Cues and Clues** that might allow you to spot the difference in such situations:

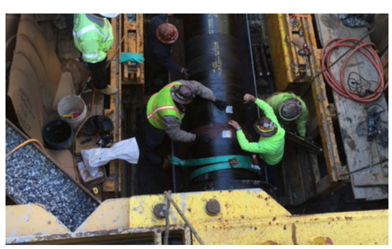
- **Peen:** All pit-cast and most centrifugally cast gray iron pipe had a smooth surface on the barrel exterior. All Ductile iron pipe has the distinctive presence of a textured surface, known as the peen pattern. This pattern is a raised and specific pebble-grain pattern on the barrel exterior. **NOTE:** Since gray iron and Ductile iron fittings are not centrifugally cast, they do not have an exterior peen pattern.
- **Outside diameter:** Pit-cast gray iron pipe had varying outside diameters, even along the same piece of pipe. Pit and early centrifugal-cast gray iron pipe often had shallow yet noticeable voids and other surface irregularities resulting from the nature of the manufacturing process. Today, Ductile iron has one nominal outside diameter per size, which is consistent with other modern materials.
- **Markings:** Embossed or raised markings, such as the maker's name on a pipe's exterior barrel, are a clear indicator that the pipe is pit-cast gray iron. Painted stenciling of product information on the barrel was common on late-term gray iron and Ductile iron pipe until the early 2000s. Modern DI pipe producers now typically utilize production stickers on each pipe for product information and quality verification.
- **Structure:** Gray iron pipe typically had a box-like hub/joint connection rather than the airstream-style contoured bell of modern Ductile iron pipe.
- **Jointing:** If there are visible packing materials in the joint, such as oakum — a tarred heavy fiber twine used to finalize the seal of the joint, it is gray iron. Ductile iron uses modern rubber gaskets to provide a lasting watertight seal for water or sewer systems.
- **Age:** Based on installation date — before 1965, it's likely gray iron. From 1975 on, it's likely Ductile iron. For pipe installed between 1965 and 1975, other clues are needed to reliably determine which material it is.
- **The ring-a-ding ding:** Some very experienced field veterans claim there is an audible difference in sound or pitch between the two materials when struck carefully with a metal hammer, with gray iron sounding more "ting-like" in response because it lacks the softer annealing oxide layer present on every Ductile iron pipe. This is much like biting down on a coin in the Old West to ensure it indeed was silver! However, this method is generally unreliable on even a partially buried pipe as the soils around the pipe typically muffle any discernable sound difference.

A PROUD & HEARTY INVITATION

With these pro tips, you should be able to distinguish between cast iron and Ductile iron pipe more readily in the field. Did we miss anything? If you know of any additional tricks or ways to non-destructively differentiate the two, please let us know at marketing@mcwaneductile.com. We'll be sure to share your input!

Warren Foundry gray iron pipe circa 1886 recently unearthed has a relatively smooth surface and raised lettering from pit casting.

Modern Ductile iron pipe has a distinct dimpled texture and an identification sticker.



Modern Ductile iron pipe installation, 2020.

PROJECT PROFILES

West

PROJECT PROFILE

The E-470 freeway runs just west of the Denver International Airport. Native Sun Construction was tasked with getting a 24-inch waterline buried under the busy road to feed new development. They worked with Global Underground to jack and bore an 810-foot casing pipe under the road and then pull McWane Ductile 24-inch TR Flex® Ductile iron pipe through the casing.

Native Sun had never worked with Ductile iron pipe before, so they requested that the sales rep, Aaron Loosli, be on site to guide them through the process. They attached a TR Flex® puller head to the spigot of the first piece and began pulling from the other side of the freeway with an industrial winch. They soon found their rhythm and were able to pull the entire line in just a couple of days. It was a unique, exciting and successful project.

Sales Region: West
Sales Representative: Aaron Loosli
Project Location: Aurora, CO
Project Owner/Utility: City of Aurora
Project Engineer: Martin/Martin Consulting Engineers
Project Contractor: Native Sun/Global Underground
Project Distributor: Colorado Springs Winwater

Types of Ductile iron pipe used on the project:

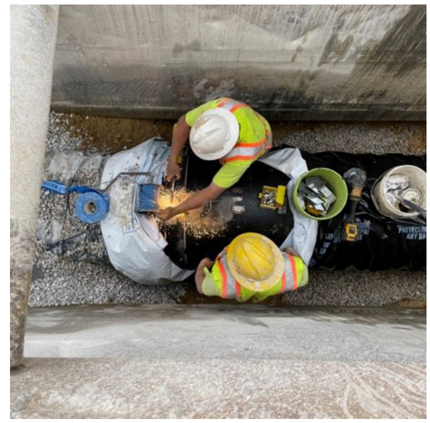
DIAMETER	JOINT	CLASS	FOOTAGE
24"	TR Flex®	250	942

“The project is going to provide safe drinking water for a community that needs it.”
— Jim Cobb, Black & Veatch Construction Engineer

The 30-inch Ductile iron sater supply pipeline will convey potable water from the City of Milwaukee, Wisconsin, to a booster pumping station and reservoirs in the City of Waukesha. Contract Package 2A includes approximately 8.5 miles of new water supply pipeline from the connection to Package 2B, located northeast of the intersection of Coffee Road and Swartz Road in the City of New Berlin to the connection with the Oklahoma Pumping Station located southeast of the intersection of Oklahoma Avenue and 76th Street in the City of Milwaukee. This pipeline will provide significant water infrastructure improvements for the current residents of Waukesha, and provide for significant population growth in the future.

When asked about the project, Adam Schultz, Project Manager/Estimator for Super Excavators, LLC, said, "Building a nine-mile pipeline through multiple communities in an urban setting certainly has its challenges, but everyone involved has risen to the occasion — especially our workers. Super Excavators, along with our subcontractors and material suppliers, plans to deliver a product of the utmost quality to bring the City of Waukesha a safe, sustainable alternative to its nearly depleted drinking water supply."

McWane Ductile fabricated a 20-inch flanged outlet pipe for this project, which allowed the contractor to save significant installation time at various points of the project. McWane Ductile has been a vital part of the project, from working with the engineers in the beginning phases of design to working with the contractors to provide pre-construction training and job site assistance.

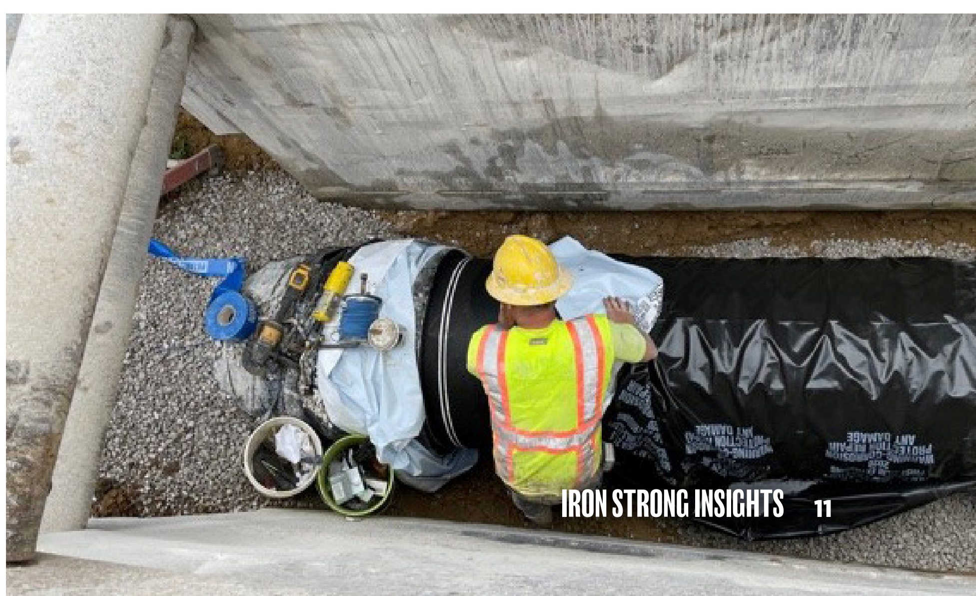


Sales Region: Midwest
Sales Representative: Shawn Smith
Project Location: Waukesha, WI
Project Owner/Utility: Waukesha Water Utility
Project Engineer: Greeley & Hansen
Project Contractor: Super Excavators
Project Distributor: Ferguson Waterworks

Types of Ductile iron pipe used on the project:

DIAMETER	JOINT	CLASS	FOOTAGE
30"	Tyton®	250	26,320
30"	TR Flex®	250	8,020
30"	Tyton®	55	5,440
30"	TR Flex®	55	3,020
24"	TR Flex®	55	480

PROJECT PROFILE
Midwest



South

PROJECT PROFILE

Recently, the West Harris Regional Water Authority engaged in Contract 36, a Ductile iron pipeline installation project located in Cypress and Katy, Texas. The project involved the construction of approximately 7,205 linear feet of 24-inch, 3,180 linear feet of 16-inch, and 5,110 linear feet of 12-inch water lines with all necessary valves and appurtenances, in addition to installation of meter and pressure/flow control stations at the West Harris County MUD 157 Water Plant No. 2 and No. 3 and the West Harris County MUD 105 Water Plant No. 1.

The water line installation consisted of open-cut construction, trenchless methods in subdivisions and at crossings of Harris County Roads and Harris County Flood Control District (HCFCD) drainage systems. Additionally, this work necessitated the partial removal and replacement of storm sewers owned and maintained by the HCFCD.

The Persons Services Corporation team, lead by Michael McEnery, did a superior job and completed this project within schedule. Many thanks to the Consolidated Pipe & Supply (James Shelton) and McWane Ductile (Scott Rhorick) teams!

Sales Region: South
Sales Representative: Scott Rhorick
Project Location: Cypress and Katy, TX
Project Owner/Utility: West Harris Regional Water Authority
Project Engineer: RPS Infrastructure, Inc — Houston — Sylvester Johnson, P.E.
Project Contractor: Persons Service — Humble, TX — Michael McEnery
Project Distributor: Consolidated Pipe & Supply — Houston, TX — James Shelton

Types of Ductile iron pipe used on the project:

DIAMETER	JOINT	CLASS	FOOTAGE
24"	Tyton®	250	5,274
24"	TR Flex®	250	1,776
24"	TR Flex®	350	142
16"	Tyton®	250	2,034

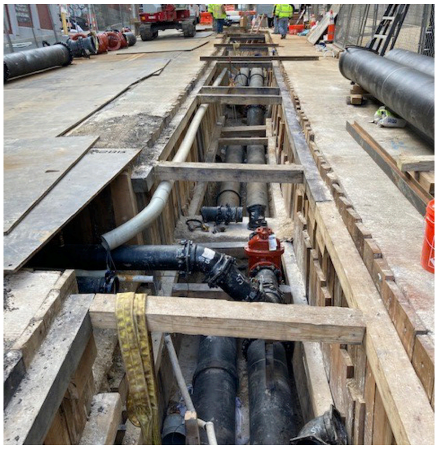
Sales Region: Northeast
Sales Representative: Benjamin Leonard
Project Location: Baltimore, MD
Project Owner/Utility: Vicinity Energy
Project Engineer: Vicinity Energy
Project Contractor: M&M Mechanical
Project Distributor: Wolsley Industrial

Types of Ductile iron pipe used on the project:

DIAMETER	JOINT	CLASS	FOOTAGE
18″	Tyton®	54	1,200
8″	Tyton®	54	200
6″	Tyton®	54	120

Vicinity Energy's underground network of piping distributes steam, hot water and chilled water to customers in the central business district and Harbor East while lowering the city's greenhouse gas emissions by nearly 30,000 tons annually. Vicinity supplies many downtown Baltimore business corridor buildings with reliable central water services, offering a cost-effective alternative to maintaining in-house cooling equipment. Vicinity's innovative system uses ice to augment electrical chilling capacity during the day. By reducing electricity use during peak demand, Vicinity takes pressure off the electrical grid when power usage is at its highest while also helping reduce customer costs.

Vicinity recently added Mercy Hospital to its customer list, requiring them to increase the chilled water line size to meet capacity. Vicinity increased a previously installed 8-inch chilled water line to an 18-inch line from North Charles Street east down to Route 2 in downtown Baltimore to meet the demand for Mercy Hospital. Vicinity continues to use Ductile iron pipe as their piping material for the chilled water line because of its longevity and proven strength. Vicinity continues to add more customers in downtown Baltimore and plans to replace more chilled water lines with Ductile iron pipe as their customer demand increases.



PROJECT PROFILE

Northeast

DEAR DITCH DOCTOR,

For more than two weeks after failing the hydrostatic test on a pipeline we recently installed, I've been digging and digging, but I just can't find the leak. I've tried everything I can think of, but no luck. We've even had the line pressurized to 150 psi sometimes during our digging…and nothing has showed up! We are up against the end date of our contract and facing serious penalties if we don't get this solved. What should I try next?

Sincerely,
Panicking in Pacoima

DEAR PACOIMA,

It's OK, to a point. No contractor should be good at "finding leaks." If they are, that could be quite worrisome…for so many reasons. Nonetheless, in keeping with the proven adage that "time is money," let's agree to start spending it more wisely, deal? Don't become a prisoner of the pressure gauge and waste days or weeks building both frustration and costs without any gain. When a failed hydrotest occurs and known diagnostics demonstrate that it's caused by a leak and not just trapped air, the best thing to do is alert your pipe and fittings supplier of the issue. They will contact the manufacturer on your behalf to help find a resolution. Although they may not talk about it much, manufacturers are exposed to a wide variety of unique situations across the country and can assist and problem solve in many ways. From their own expertise to associations with other professionals such as leak detection specialists, an expedient resolution is a mutual best interest. Obviously, a manufacturer or their technical representative cannot help you if they are unaware of your issue. And nobody can bring back time and money poorly spent. So do us all a constructive favor,"call the guy" when the pressure won't hold. Domestic pipe and fitting manufacturers care greatly about your experiences with their products. Give them a shot to assist — you might be pleasantly surprised. And hopefully get back quickly to profitable work instead of misery work!

Sincerely,
The Ditch Doctor

DEAR DITCH DOCTOR,

We are about half-way through installing several miles of a cement-lined Ductile iron pipeline for water distribution. Everything has been going great, but now the inspector on-site is rejecting a bunch of pipes because of "cracked linings," and he's even hinting at digging up some of what we have installed to check the linings. I simply don't see what he is worried about, as the things he calls cracks look more like fine white hairs on the black paint or faint spiderweb arrangements of white hairs. I mean, there's no measurable separation or depth to these lines on the lining's surface, and nothing seems loose. How should I handle the situation at this point?

Frazzled in Franklin

DEAR FRAZZLED,

Ironically, you're both kind of right. Certainly, a project inspector has the respected right to question anything that appears concerning, whether it's product or procedure. Anything that gives an inspector a cause to pause and look closer should be avoided if possible. And you are right to distinguish between what many call a "crack" that truly, in most cases, is inconsequential crazing. Surface crazing happens when cement surfaces cure, particularly to thinly placed cement such as that of a pipe lining. The talcum-like fines of the cement surface form what can appear as weaknesses in the lining, yet they are nothing more than a meaningless and temporary appearance on the lining's surface. In fact, crazing is largely described as a visual presence, and not a measurable item. These incidental surface fissures are proven to heal autogenously, which means when in continued contact with water, they reknit and essentially disappear. This occurrence is well documented in several sourced standards and other documents from ASTM, AWWA and DIPRA. The bottom line is that if the cement lining remains intact within the pipe, it is an assurance that the condition in this instance is a non-issue. Any true deficiency in the lining would cause it to detach from the pipe during the rough and tumble forces of handling and transport on trucks or trains to the job site. Simply put, if the lining stayed in, it is fit for long-term service against water and other non-septic fluids. Feel free to refer the inspector to the pipe and/or fittings manufacturer to assist you in these efforts. They are more than willing to help, as the truth of crazing is on their side!

Sincerely,
The Ditch Doctor

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From estimating to design, from production to installation, we take great pride in providing education to water professsionals. Check out our presentations offered at these upcoming events.

CONFERENCE & PRESENTATION SCHEDULE

SUMMER 2021

CONFERENCE	PRESENTER	DATE	LOCATION	TOPIC
Al/MS AWWA Joint Annual Conference	John Simpson	8/3/21	Mobile, AL	Ductile Iron Pipe Restrained Joints and HDD
ASCE-UESI Pipelines	John Johnson	8/3/21	Calgary, Canada	ASCE Seismic Task Committee
South Carolina Environmental Conference	John Simpson	8/10/31	Myrtle Beach, SC	Ductile Iron Pipe Restrained Joints and HDD
KWEA / KS AWWA Joint Conference	John Simpson	9/2/21	Topeka, KS	Basics of Corrosion and Protection for DI Pipe
NJ-AWWA Conference	Roy Mundy	9/2/21	Atlantic City, NJ	Managing Generational Differences in the Workplace
MI-AWWA Webinar Series	Roy Mundy	9/9/21	Virtual	Generational Attitudes & Total Cost Equation
NEWWA Annual Conference	Roy Mundy	9/9/21	Madison, WI	Basics of Corrosion and Protection for DI Pipe
Tri State Conference	John Johnson	9/12/21	Las Vegas, NV	Booth Only
NRWA Conf	John Johnson	9/13/21	Milwaukee, WI	How to Work with Civil Engineers
WI-AWWA Conference	Roy Mundy	9/22/21	Madison, WI	Basics of Corrosion and Protection for DI Pipe

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