DIPRA CASE STUDY

Central Arkansas Water is all in with Ductile Iron Pipe

The success and durability of Ductile iron pipe continues to be seen across the United States. Jim Ferguson, the Director of Engineering at Central Arkansas Water (CAW) recently shared some of the reasons the municipality continues to predominantly use Ductile iron within their water system, versus other pipe materials. In the discussion with the DIPRA team, Ferguson highlighted the pipe's strength, longevity, standards, obtainability, and adaptability of the pipe when discussing its effectiveness. Although they consider themselves primarily a "Ductile iron pipe utility," they do have other pipe materials in use. Over the years, through consolidation and merger, they acquired various PVC water mains in the system, but they only allow new installation of PVC pipe in the more rural, low-pressure areas of their water system.

The CAW system consists of 19 separate pressure zones, with pressures ranging from 40 psi to 225 psi. Since they have found that the strength of Ductile iron is unmatched, they use it across all pressure ranges and always use Ductile iron pipe and fittings in the higher-pressure zones. They also believe the ductility of the Ductile iron pipe is another great advantage as it can absorb abuse that other piping products, such as PVC, cannot without damage, leakage, or breakage. The longevity of Ductile iron is evident within their water system, as they have cast-iron pipe that is 136 years-old and still in service today. They believe that the more modern "Ductile iron's longevity and durability is the same" as the cast iron pipe that has served their system so well.

Quality control and standards are key pillars to building and maintaining water systems. Jim Ferguson, Director of Engineering at CAW further stated that "they cannot remember the last time they received a Ductile iron product that was rejected due to poor quality." He also explained that "the product has well-defined dimension standards, ensuring that any production run or year of production will dimensionally match existing or new installations, regardless of the manufacturer of the product." He did point out that the same cannot be said for PVC pipe which has at least two-dimension standards, IPS and C900. When a PVC pipe needs to be repaired, the utility must first determine the dimension standard for that pipe and hope they have the necessary fittings and appurtenances in stock.

CAW has found that Ductile iron is also the easiest pipe to work with since it is not fragile and very rarely damaged between manufacture and installation. They pointed out that "whether the pipe is bell and spigot, mechanical joint, or flange joint, assembly is quick and easy, while also being watertight and pressure rated." At CAW, they pressure test to 225 psi with Ductile iron, but they are unable to pressure test that high with other materials like PVC or HDPE pipes. They also found that the number of accessories given to install Ductile iron pipe including "restrained joints, retainer glands, foster adapters, swivel adapters, repair sleeves, solid sleeves, etc.," help to ease installation and allow for in-the-field adjustments and changes.

When making the decision of which water pipes you want to use, Jim Ferguson expresses his position that a utility should not "let the initial cost be the prime factor in your decision-making concerning material choice and that these choices should be made based on performance, capability, and endurance." While the raw material cost of PVC may be cheaper, the added cost to install, poor performance and shorter longevity of PVC make its life cycle costs greater. CAW has found that "PVC breaks 10-12 times the rate of Ductile iron," so repair crew and maintenance costs are 10 times higher, which means more workers, equipment, hours, and money are needed to maintain a mile of PVC pipe versus a mile of Ductile iron pipe. The engineers of CAW are seeing the need to perform full replacements of PVC water mains that are only 30-40 years old, due to high leak and break rates on sections of the pipe. By choosing Ductile iron, CAW has seen their quality-of-service increase while reducing wasteful spending on repairs and replacements.

All of these are the reasons that Central Arkansas Water continues to proudly consider themselves to be a "Ductile iron pipe utility."

> **"CAW construction and maintenance personnel find Ductile iron pipe and fittings to be easy to work with and they do prefer working with Ductile iron over other pipes (such as PVC, HDPE, and concrete)."**
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> -Jim Ferguson, Director of Engineering, Central Arkansas Water

For more details on this case study or to discuss the benefits of Ductile iron pipe contact one of DIPRA's Regional Engineers at https://www.dipra.org/contact-dipra/ask-an-engineer