

# Flushing and pigging: basic waterline maintenance

**T**he daily operation of a public water system involves different aspects of many separate business and technical disciplines. In the course of a normal workday, operators will take a minimum of one to as many as 10 or 12 water samples. They may look for a water leak somewhere in the distribution system and will talk to three, four or more system customers about a variety of subjects. Operators may change out or add a customer water meter, repair a water leak, discuss purchases with sales reps and recheck meter readings on customer meters because “they just couldn’t have used that much water.” They might also have discussions with the project

engineer about an upcoming project, and still make time to do some maintenance to the distribution system and equipment.

Speaking of maintenance, there are many different types of equipment maintenance.

They go by the more mundane maintenance monikers of “Before Operations Maintenance Checks,” or “During Operations Maintenance Checks” and the not to be left out, “After Operations Maintenance Checks.” There is also the entirely separate category of “Preventive Maintenance Checks.”

“Maintenance Shmaintenance,” it all means the same thing!

Maintenance has to be performed on trucks, cars, meters, pumps, hand tools, power tools. It must also be performed on computers, buildings, wells, towers, clear wells, clarifiers and just about every component in

pipelines are buried in the cool, dark, damp underground. It is the wish and hope of everyone involved that they stay there, causing no problems – in total silence.

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the entire system that has zero or more moving parts. Operators need to take care of system equipment if it is to provide long and reliable service.

In this article, the focus is on the part of the system that is nearly invisible and out of sight. It is the distribution system. These

Unwanted buildup on the inside of most water distribution systems has been going on since the day the first valve was turned, and water started to flow through the system. How does a system avoid this buildup or deal with it?

There are many things that can be done to correct this problem.



*Gary Armentrout  
Technical Assistant*



*A Fort Scott, Kan. city crew inserts a soft pig into a 4-inch ductile iron line.*



Some actions include changing the pH of the water, adding certain types of chemicals, and cleaning the inside of the pipe.

**Flushing, as a prevention**

The purpose of flushing of a water system is to remove any accumulated sediments or other impurities that have been deposited in the pipe. Flushing can also improve the flow of water, in effect, restoring the pipeline to its original capacity. Flushing is performed by



*Left: The before and after look of a soft pig in the hands of Fort Scott Water Distribution Supervisor Bill Lemke.*

*Above: Pigs in a row, 10 of 12 pigs used in a water line maintenance operation. The missing two pigs came out in pieces less than a quarter dollar in size.*

isolating sections of the distribution system and then opening flush or fire hydrants to allow a large volume of water to move through the isolated pipeline and scour out any sediment.

**Pigging, as a remedy**

Water mains may also be mechanically cleaned with the use of swabs or pigs, as well as a variety of other means. KRWA has published numerous articles on

the topic of pigging, describing the benefits of the projects from improved water quality to greater energy efficiency,

Pigs are devices that are forced through a section of line to scrape the accumulated

deposits off the inside of the pipe. Pigging is now routinely conducted at the time of installing new waterlines. While some might contend that a requirement to pig a pipeline adds to the cost, I respectfully suggest that if project circumstance were to prohibit a contractor from pigging, the cost should increase. It's been proven that pigging newly installed pipelines reduces water loss due

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*The concentration of buildup is evident coming from the inside of a ductile iron main. After years of operation and depending on water quality, excessive mineral deposits often build up inside waterlines. Pigging can often remove the deposits, improving water quality and flow characteristics.*

to flushing by 75%, to say nothing for the reduction of labor to complete the process of getting a new extension or pipeline into service.

line replacement. No matter what type of pipe is in the distribution system, there is a pig to do the job as needed. There are four basic types of pigs used today. Each pig

When there is a buildup inside water lines that cannot be removed by simple flushing, pigging is a cost efficient, effective and environmentally friendly alternate. Most important, it is an economical alternate to

is designed for a specific job. They are the polyurethane foam pigs, mandrel or mechanical pigs, solid cast urethane pigs and the high tech "smart pigs." If a system's water lines are cast iron or ductile iron, there is a very good chance of needing to pig at least some sections. The deposits in the pipelines can cause enough restriction that flow will be reduced. PVC lines normally are not subjected to the same degree of buildup as cast iron or ductile iron pipelines. PVC however will often have sediment at the bottom of the pipeline along with a thin coating covering the entire inside. A foam pig can normally remove this type of buildup. This type of pig can also be reused after traversing segments of PVC pipe. If, on the other hand the pig is used in a cast or ductile iron pipe, it is usually torn to shreds as it moves through the line. It is KRWA's experience that pigging small diameter iron pipelines may not be practical if there is a high degree of buildup. It may be impossible to remove hardened deposits from small diameter lines of one to four inches. KRWA techs have experienced pigging projects where a city system had some 4-inch pipeline with so much buildup that no daylight could be seen through even a 20-foot section.

Pipe maintenance is a very important part of the overall maintenance program of any water system. I suggest that systems practice flushing as a preventive measure and pigging as a remedy. If assistance is needed in setting up a maintenance program for a city or RWD, or there is a need to discuss flushing or pigging, contact KRWA at 785/336-3760 or e-mail KRWA at [krwa@krwa.net](mailto:krwa@krwa.net).



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