THINKING OUTSIDE OF THE BOX

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As a Circuit Rider for the New York Rural Water Association for over 16 years, locating water leaks in your distribution systems has always been a major part of what I do on a daily basis. Normally, the various standard leak locating approaches are successful, but occasionally and seemingly growing larger every year, we encounter a system that is made up of a mixture of Ductile Iron Pipe (DIP), High Density Polyethylene (HDPE), Asbestos Concrete (AC), and Polyvinyl Chloride (PVC). In these instances it is very difficult to locate a leak, particularly if it is between the curb stop and the meter in the building. What makes it hard is the fact that only the DIP pipe will both generate and carry a sound far enough along the length of the pipe that we can hear it with our listening equipment. The rest of the materials listed will lose any sound generated by the leak very quickly. Because of this, I had to figure out a way to locate these leaks using some other method. To do this, I decided to go back to my basic education when I started in this business, where I learned the simple formula that states: 2.31 feet of elevation creates 1 pound per square inch of pressure (PSI).

With this simple formula in mind, I simply found an app on my smart phone that would give me an elevation reading (I use an app called MY Elevation) and using these two pieces of information, I proceeded to one of the locations that I had been asked to help find a leak and tried out this new approach. For this to work, you have to be sure to turn off any pumps or other equipment that would cause pressure changes in the distribution system. With this done you can go to the storage tank and get an elevation reading as close as possible to the water level. Once you have this you would then go to the end points of the distribution system and take pressure readings and elevation readings at a hydrant (I say hydrant but you could use a house hose bib as long as they don't have pressure reducing valves installed), and record these numbers. You then take the elevation reading you had at the source (Tank) and subtract the reading you got at the hydrant – house (endpoint). Divide this number by 2.31 and you get the pressure that you should have at this point. Remember this is a proven fact as long as there are no unknown variables in the distribution system that you are aware of. A pressure reducing valve (PRV) in the system could alter your findings, however if you know about this you can go to the closest hydrant below this PRV valve and take your readings and use those as your stating point instead of the tank. If your findings are only a couple of pounds different, you should still keep looking as normal usage could be causing the change. If the difference is over 5 or 6 pounds, you may be in the right place to start looking for the leak. To do this, you simply go back hydrant by hydrant toward the source until you get a reading that will be very close to what it should be. Granted this method will not put you right on the leak, but I have found it to be very helpful to narrowing down a general location. Below are a couple of examples of how well this has worked for me.

Pictured are the pressure reading tools used.

I was asked to go to the Town of Poestenkill on July 15, 2019, to help find leaks. Their water distribution system is mostly made up of plastic pipe. The town purchases its water supply from Troy, NY, at a cost of $4.80/1000 Gallons. It is estimated that the cost of this leak has been over $700.00 a month. I found out after I arrived that the town had just had a leak detection survey done at a cost of over $3,200.00 that had virtually come up with nothing. >>>

Now, knowing this, I figured that I had nothing to lose by trying out this new idea and I proposed it to their Water Superintendent, Robert Brunet. I recommended that we try a "sectorization" approach based on "elevation and pressure" within the system. He was game and so we started by shutting down the pumps that fed his system. We then went to the storage tank on Hinkle Road and got the elevation reading for our base line. After going to the end of each section of the distribution system and gathering the readings, it was determined that only one area came up short on what the calculated pressure should be. We then narrowed this down to one road (Furry Street). I then started at the end of the street and went house to house listening to the curb stops. When I got to 12 Fury Street, I found the leak we were looking for. The main on this street was an 8 inch line and my first reading at the end was 120 psi. We had calculated that the reading should have been 127 psi. After shutting off the leak, which just happened to be on the customer's side, I rechecked the hydrant and the pressure was now 131 psi. It was the only pressure reading that was lower than the calculated pressure and we were able to find the leak with only a 7 psi differential.

I had previously used this method in the Village of Philmont and was able to find a leak in a swamp that the village had been trying to find for over a year with no luck. The pressure readings were able to narrow down the search to about a 1,000 foot stretch of pipe and then we walked the line and were able to find water bubbling on the edge of the road in the swamp. A couple of weeks after this find, I was again approached by the Water Superintendent of Philmont who thought his daily water usage was higher than it should be and wanted to try this method on his whole system to see if there were any other areas of concern. The result was very rewarding as a major leak on a 2 inch galvanized line was found that had gone unfounded for over three years.

So in conclusion, I don't think this is some miraculous discovery and some of you probably have been using a similar method for years, but for those of you who may not have thought this way of closing in on your hard to find leaks, I hope this helps. Anyone wanting me to work with you to try it, give me a call. Till next time, THANKS FOR LISTENING.

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