

Stop Blaming Those Valves For Failed Sprinkler Systems!

By Jess Stryker, ASIC

It seems that every time I turn around lately, someone is talking about the problem of fast-closing automatic valves. These valves are allegedly the culprits that are destroying sprinkler systems throughout the nation. (Fittings and pipe have also taken more than their share of the blame for poor irrigation, but mostly the valves are blamed.)

While the need for a slower-closing automatic valve cannot be disputed, I would argue that in most cases the fault for these failed systems lies with the designers and managers of the systems, not the valves. A professional irrigation consultant will design the sprinkler system to accommodate whatever valve is used, regardless of its closing speed.

The real culprit lies in the phenomenon known as water hammer. When water is brought to a halt in a pipeline, it causes an instantaneous increase in water pressure (psi) known as water hammer, or a pressure surge. The amount of the increase is related to the quantity of water, the speed it was traveling, and how suddenly it was stopped.

Because of the hydraulic properties of a liquid, this pressure surge travels throughout the connected pipelines until it is dissipated or finds a weak point to break out. This is why the breakage may occur in a place far removed from the source of the water hammer.

The least expensive and most reliable way to control water hammer is through proper system design. All automatic sprinkler systems must be designed to withstand some degree of water hammer. Even with the slowest-closing valve possible, there will still be other things that could cause excessive water hammer in the system, such as the slam of a backflow-preventer check valve during back-siphonage.

The trick is to limit this water hammer to a minimum and design the rest of the system to handle it. When designing most small sprinkler systems to industry standards, you will seldom have a problem with water hammer. (I didn't say never!) The important thing is to know when to call in an expert.

These conditions indicate a potential for

excessive water hammer: static water pressures in excess of 100 psi at the site; pipe sizes larger than two inches required; elevation variations anywhere on the site; use of any type of a pumping system; water velocity over five feet per second; more than one valve operating at a time on a single mainline; multiple points of connection to water supply on a single mainline; and water temperatures of 75 degrees F or higher.

The presence of one or more of these conditions calls for the design to be performed by someone familiar with design techniques for minimizing water hammer. Then the system must be used in the way for which it was designed. But remember—proper design is vital, for the bottom line in avoiding excessive water hammer in your sprinkler system is to do it right the first time. ☺

Editor's Note: The author is an irrigation consultant and registered landscape architect whose firm is based in Fresno, CA. He has designed irrigation systems throughout California and several other states.

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