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WHAT WERE THEY THINKING?

Getting to the bottom of a unique installation.

I was sent the picture to the right and after my “Oh my God!” reaction, I figured a review of its hydraulics is in order. First, a few comments on the picture:

- Obviously there was no pipe on the truck or in the parts room, but there were lots of swing joints;
- The course has a high budget as swing joints are more expensive than pipe;
- Pressure is high as friction loss is not a concern; and
- Whoever installed the sprinkler had lots of time on their hands to complete the work and thread all the swing joints together.

Designers are concerned with two things, friction loss and velocity. The sprinkler is most likely a 1-1/2 inch inlet, so all the swing joints can be assumed to be 1-1/2 inches, too. The average flow on a 1-1/2 inch golf sprinkler at 80 psi is about 38 gpm. We don't know the inside diameter of a swing joint, but we will go with 1.5 inches, which is being generous. Doing the math, the velocity through the swing joint would be 6.9 feet per second (fps). Velocities in PVC pipe are supposed to be limited to 5 fps, but a 1-1/2 inch sprinkler on a single swing joint is common at that velocity on most course irrigation systems. It is also for an 18-inch swing joint. This swing joint is somewhat longer – hard to say but looks like 6 to 7 feet at a minimum in a straight line, not including the elbows. The higher velocity at the longer length as well as the turns will make the water very turbulent and add to the water hammer potential when it's turned on and off.

The friction loss in a 1-1/2 inch, Class 315 pipe at 38 gpm is 3.67 psi per 100 feet. So at 7 feet that would be a friction loss of only 0.26 psi. That's not very much, but that assumes there are no turns. The Rain Bird website – it's a Rain Bird sprinkler and the color makes me think Rain Bird swing joints – says about 0.5 psi friction loss through their 1-1/2-inch swing joint. A normal swing joint has three turns; this one looks to have 25 turns, just a few more than necessary. So the friction loss through this mess is at least 4 psi, but given the configuration I am sure it is more like 10 to 15 psi.

When they calculate system hydraulics, most designers do their analysis through the mainline pipe and maybe the lateral piping. They would use a number of 1 or 2 psi for the swing-joint friction loss. So for a sprinkler operating at 80 psi they might assume a minimum pressure of 82 or 83 psi at the sprinkler base or because valve-in-head sprinklers are pressure-regulating more likely 92 or 93 psi. Remember, valve-in-head sprinklers require a minimum 10 psi difference in pressure for the sprinkler to regulate. In this case, with the excessive friction losses, the sprinkler is most likely not receiving the intended pressure and it may not be receiving the intended flow.

The picture makes you wonder if there if this is the only one, or are there more. Was this the original installation or a repair? If it was the original installation, then it is probably not alone. If that's the case, I would hate to see what else might be in the ground. If it was a repair, it is hopefully a one-time expensive occurrence.



So let's look at the installation aspects of this configuration. My first question is – why? What would make someone think of doing this let alone do it? Followed by; who is supervising the work? On golf course irrigation systems hydraulics are extremely important and their analysis quite detailed. The person who installed this elongated swing joint either had no idea how it would affect the sprinklers' operation or didn't care. It may have been done to get the sprinkler out from under a cart path, but that's no excuse.

Sprinklers are sensitive to pressure issues which affect both the distance of throw and the flow and therefore the uniformity. It's important staff and installer crews are educated on how their actions can affect the operation of the overall irrigation system and the individual sprinklers.

It's amazing what you see people do in the irrigation business, and this picture is proof. I'd say nothing surprises me anymore, but as long as there are systems being installed there will still be stupid things done to them. **GCI**

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