Reducing Irrigation Maintenance

By John Blevens

Like most other decisions, features selected for irrigation systems are based on the experiences of the person making the choices. You should realize very early in your career that a tremendous amount of experience from others is available, and tap it.

Over the years, I have sought out opinions from people in different facets of the irrigation industry to try to refine designs for better systems. I call on distributors for product reliability, for they are usually the first to know about a product problem and are very willing to share the information, so they have to deal with it as little as possible. Maintenance people are a good source of longer-term product reliability and assembly methods. The contractor is a good source for practical construction methods, including assembly techniques.

From these sources and my own experience, I have gleaned the following desirable and undesirable features of the various components in irrigation systems.

**Piping**

In the West, PVC pipe predominates, except for drip systems, and even then it is used for some drip/bubbl er systems.

Since my experience is largely confined to this type of system, I will restrict my comments to PVC pipe.

1. **Expansion.** Most everyone has seen the diagram showing piping...
"snaked" along a trench, to be used as a guide for the contractor to follow when installing PVC pipe to allow for thermal expansion. I have yet to see a pipe snaked in a manner that in any way resembles that type of diagram.

PVC material has a high thermal expansion coefficient, potentially making it a critical factor. In temperate areas, the temperature change 12 to 24 inches below grade is very minimal. Nonetheless, stresses can be created from temperature variations in long runs of pipe.

Large-sized main lines are almost always used in projects requiring long runs. Therefore, we specify gasketed pipe for main lines of 3 inches and larger to account for expansion. In situations where 2- or 2 1/2-inch pipes have abnormally long runs, gasketed pipe should also be considered. In most situations, lateral piping is not an issue.

2. Threads. Threaded connections should be avoided in most cases using PVC pipe, particularly in main line connections. Sprinkler risers (excluding valve-in-head) where leak-tight connections are not critical is an exception.

Plastic threaded connections create a dilemma, because tightening the connections to avoid leaks is highly desirable: disassembling connections, adding sealant and re-assembling the connection to stop leaks is a disagreeable, time-consuming hassle. But as a result, threaded connections tend to be over-tightened, creating stress. These connections are susceptible to cracking when additional stresses are introduced by water flow or by turning valves on and off.

3. Differential. Lateral piping should be sized for minimal pressure differential between the first head nearest the control valve and the last head at the end of the line. As a general rule, 10 percent is a maximum differential to improve uniformity and reduce coverage problems.

4. Trees. Trees surrounding a sports field can play havoc when PVC pipe is installed too close to their trunks. This problem seems to be more frequent as tight plant spaces increase. Aggressive roots can crush pipe.

Valves

1. Transition. Valve assemblies that crack at male adapters have been a persistent problem. This is a weak point in valve assemblies and should be eliminated.

Galvanized steel pipe is mechanically strong but corrodes in many soils and from elements carried in water. Brass is also a strong material, but is expensive. With either material, the transition from the plastic pipe to the threaded connections is still an issue.

The best solution is to use schedule 80 PVC nipples threaded one end (t.o.e.) — which increases the connection's strength and also makes the slip-to-thread transition effectively. These t.o.e. nipples are placed on either side of the valve and connected to PVC pipe using slip couplings. For larger pipes, of course, you should use an appropriate flange coupling adapter.

2. Shut-Offs. Often, not enough shut-off valves are installed in large projects. Maintenance is made easier when major sections can be isolated with these valves. In addition, they can be helpful in shutting down sec-
tions in emergencies or if construction is later done at a portion of the site.

3. Pressure Regulators. Sometimes pressure-regulating valves are also not installed when they are needed. Excessive pressure can significantly reduce the life of a system, especially when water-flow rates are high. Under high pressure, flow rates through sprinkler nozzles are often higher than the design flow, which in turn means higher rates in the piping. High flow rates cause water hammer and induce extreme stresses that can damage pipe, fittings and other system components. Proper pressure regulation eliminates these problems.

Partially closing gate valves or control valves is not the way to do it. In a few situations where the pressure is not too great or never varies, this technique can work, but generally is not recommended.

4. Quick Couplers. I suspect that a great many quick-coupling valves have been installed but never used, or have only been used to water-in plants during establishment. Those valves should be installed only in situations where they have a possible use.

Place them in a round box, set above grade by a minimum of an inch, to make them easier to find. Bracing them with angle iron will provide greater stability than rebar or galvanized stakes. When at the end of a hose and tugged, the angle iron will reduce the likelihood of joint loosening and leaking.

Control Valves

1. Connectors and Wires. There should no longer be any doubt as to the value of waterproof connectors, especially now that several good, inexpensive, easy-to-use brands are available. The type using heat-shrinkable tubing with an inner wall sealant, in my opinion, is superior to all the rest. But those types take a blowtorch to install.

Coiling the control wires at the valve makes finding the wires easier and is a compact way to store excess wire that may be needed if replacing solenoids becomes necessary.

2. Boxes. Valve boxes should be of ample size and centered above the valve for good repair access. Also, valves should be raised from the main line to within a few inches from top of grade for easy access.

3. Ball Valves. Installing inexpensive plastic ball valves in front of control valves is very handy for servicing and/or replacing solenoids and diaphragms. Some public agencies require that one or two unions be installed with the control valves. Since solenoids and diaphragms are the most frequently serviced items, I would choose the ball valves over union(s). Very seldom does the entire body of a valve have to be removed.

4. Gravel. Installing gravel beneath the valve not only provides a sump during manual bleeding or while servicing the valve, but also provides a barrier to gophers from getting to the valve and filling up the valve box with dirt. The gravel should be a minimum depth of 12 inches and at least two inches beyond the perimeter of the bottom edge of the valve box.

5. Threads. Just as you should avoid threaded pipe connections, so should you avoid threaded connections on the control valve assembly. If

---

Yes, Bannerman diamond groomers are changing a lot of ballparks—and what a difference it makes.
Better games, better players, and less injuries.

And another thing, you can really cash in on the home team advantage when you're playing at home. It only takes one person with a 18 h.p. tractor or higher to do a topnotch job.

When your diamonds are groomed regularly with a good groomer they stay in better shape. And if you do need some renovation and re-shaping the Bannerman groomer can do everything you need.

---

TOLL·FREE
CAN 1-800-325-4871
41 Kellofield Street, Rexdale, Ontario Canada M9W 5A3 • Telephone 416-247-7875 • Fax 416-247-6540

TOLL·FREE
USA 1-800-665-2696
threaded connections are necessary, I urge that you make, at the minimum, a slip connection at the tee joining the assembly to the supply line. A broken tee is a major repair project.

**Sprinklers**

1. **Height.** Selecting the appropriate pop-up height for the plant material being irrigated can avoid major problems as the material matures. This may include coordinating planting and irrigation plans so heads and shrubs/trees are not too close to each other. When this cannot be avoided, such as in tight areas with shrub masses, flat sprays shooting under the shrubs or bubblers to flood the root areas can be appropriate options.

2. **Hose.** Flexible hose with thread/insert adapters (and maybe one or two street ells) or the triple swing seem to be the most favored for riser assemblies. A quintriple swing assembly — mainly for part-circle rotor heads — allows the head to be rotated to the desirable location once it's set at the correct height. A good way to keep PVC pipe away from trees when irrigating them with bubblers is to use flexible PVC hose from the PVC lateral line to the rootball.

**Drip Vs. Overhead**

Drip irrigation is a good tool, but should be used only when appropriate. There must be access as plant material matures (except for temporary irrigation during establishment only), and sub-grade drip should not be used with groundcovers that have aggressive, invasive roots.

If a drip system is installed in an environment that prevents repair and maintenance access, it will be a failure — at least in the longer term.

On the other side of the coin, I have seen overhead systems used in narrow strips where drip would be much more effective.

Since this is an article about sports turf, I will not say any more about drip maintenance except that it is an article in itself. I predict that drip will play a larger role in irrigating sports fields in the future. Eliminating pop-up sprinklers, sub-grade drip is a safer system for athletic fields, and eventually it will be proven reliable in the long haul.

**Sensors**

Sensors — especially flow sensors — can obviously reduce maintenance work. I believe we will see, in the near future, a large increase in the number of stand-alone controllers that will be able to interpret flow-sensing input and react and report on exceptional flow events.

Rain sensors, for the most part, are easy to add and are a minor cost. In the spring and fall, they can save many trips to controllers for adjustments.

Moisture sensors have their place, but in many situations they have not been effective. Sports fields can be a good application, if scheduling issues can be satisfactorily controlled. Moisture sensors in more complex landscapes, from my observations, have not been successful.

John Blevens, a member of ASIC, is an irrigation consultant based in San Carlos, Calif. His phone number is (415) 802-8296.

---

**YOU COULD BE HONORED BY THE PROS!**

Why not enter your baseball field in the Beam Clay® Baseball Diamond of the Year Awards contest? You need not be a customer, member, or subscriber; and there is no entry fee. You could be featured in sportsTURF magazine and receive an official awards plaque.

The Awards are sponsored by Beam Clay®, sportsTURF magazine, and the Sports Turf Managers Assoc., in recognition of excellence and professionalism in maintaining outstanding, safe, professional quality baseball diamonds.

Entries will be judged in three categories: professional diamonds; college diamonds; and school, municipal or park diamonds.

Send the information below to enter:

1. Age of baseball diamond (year of installation).
2. Geographic location (city and state).
3. Description of maintenance program.
4. Operating budget for baseball diamond.
5. Irrigation: None _____ Manual _____ Automatic ______
6. Total number of maintenance staff for field.
7. Does baseball field have lighting for night games?
8. Number of events on baseball diamond per year.
9. Types and number of events on diamond other than baseball?
10. How many months during the year is the field used?
11. Why, you think this field is one of the best?
12. IMPORTANT: Send two sets of color slides or prints.

**Deadline for entries:** Entries must be postmarked no later than November 30. Selection of winners will be made by the Awards Committee of Four Major League Head Groundskeepers.

Mail entries to:
Beam Clay Awards
Kelsey Park
Great Meadows, NJ 07838

---

April 1997 29