Jips to conserve irrigation

By Heather Kraus

ater conservation through efficient irrigation is not just an environmentally sound practice, it can actually provide greener turf. The goal of any irrigation system should be one that uses just the right amount of water to achieve uniform green grass results. To achieve this goal, turf managers need to know the basics of good irrigation design, installation, and maintenance for their sports fields as these factors can mean the difference between a water-wasting system and one that uses just the right amount. By making sure the basics are in place, you are on your way to a field that is not only adequately irrigated, it's also conserving water.

The principles of good design dictate that

turf receives uniform water coverage across the field. Uniform coverage is achieved through a combination of system design and product selection.

Spacing

Be sure that your rotors are spaced to achieve "head-to-head" coverage or more. Head-to-head coverage is when the distance of throw of one rotor reaches the next rotor. If you will be irrigating at a particularly windy time of day or your area receives persistent wind, consider reducing the head-to-head spacing by 15 to 20 percent.

When heads are spaced further apart than the distance of throw it is called "stretched spacing." Stretched spacing can cause you to have dry spots and then to over-water in pursuit of making those spots green. Getting the head spacing right is a critical component of creating a uniform application of water.

Be sure that you are achieving matched precipitation, which is the uniform application of water across the irrigated area. Matched precipitation can be achieved in several ways. The first and most effective way to match precipitation is to zone/valve your quarter, half and full head patterns separately. If your heads are spaced evenly, you will choose the nozzle that performs for the given distance of throw. You will run your half patterns twice as long as your quarter patterns and your full patterns four times as long as the quarter patterns. In this instance, you would run your quarter





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zones for 10 minutes, your half pattern zones for 20 minutes and your full pattern zones for 40 minutes. Zoning your head patterns together prevents them from running for the same amount of time. If you were to run all your rotors for the same amount of time, you would apply four times as much water on your quarter pattern turf area than your full pattern turf. This would be an egregious waste of water!

If you do not have the benefit of separately zoned rotors, nozzle selection is your next best solution. Manufacturers provide performance charts that are readily available through the catalog, a distributor or online. While you won't be able to achieve true matched precipitation when using different nozzle sizes, you can approximate it by choosing a nozzle for a quarter pattern that has half the flow of the half pattern it is zoned with. Some manufacturers sell matched precipitation rate nozzles that are easy to use across several radius and arc patterns.

Pressure

Pressure is often overlooked as a water conservation tool. However, in order to get matched precipitation, head pressure should be constant or at least not vary too widely between heads. Proper pipe sizing is a key to reducing pressure loss due to friction between the heads and zones. Too much pressure and the spray of the rotor will atomize and the water will evaporate or blow away. Too little pressure and you will also have poor nozzle performance. Unbalanced pressure will lead to mismatched precipitation between rotors on the same zone. Manufacturers' charts indicate the appropriate pressure for the rotor and nozzle. The optimum pressure is generally in the middle of the performance range for the rotor.

Depending on what activities take place on the field, the field most likely sees more use at its center. In that case, you may want to consider

zoning your heads in the center of the field on a separate valve. This way you have more control and flexibility over center field irrigation.

Slope of field

Because many field designs incorporate a crest or crown in the field, consider placing your heads along the crown or spacing them so that there is even coverage of the crown. Anticipate which way and how quickly your field might generate runoff; this may affect your spacing or run times. Consider your soil type as you design for this situation.

Product selection is an important component to the design but can also help if you are trying to retrofit a poorly performing field irrigation system. Products turf managers can use to improve irrigation efficiency include self-adjusting controllers, heads with even distribution performance, and rain and soil moisture sensors. Some manufacturers also offer damage-resistant heads. These models offer non-strippable gear drives and a feature that returns the rotor arc pattern to its pre-set pattern if its arc setting is twisted, eliminating wasted water from a head that is out of adjustment. In addition, pressure-regulating products, such as pressure regulating swing joints or pressure regulating dials on the valve, can even out pressure for more uniform results.

Maintenance and troubleshooting

All systems require proper maintenance. While there are many paths you can take to optimize the performance of your field, the first thing to consider is an irrigation audit. From the audit results, you can determine the overall performance of your system, which may help you decide your next steps. An audit may show you performance issues that are not easily spotted by simple observation. Small fixes like straightening heads or replacing nozzles can make a big difference in how well your turf is irrigated.

For older systems, turf managers should consider re-evaluating their systems' performances since significant development changes in the area may have occurred since the irrigation system was installed that would affect water pressure. Turf managers should validate their water pressure to ensure it's not too low or too high. Be sure to measure pressure at the time you normally run your system as water system pressure can fluctuate depending on the demands at specific times of day in your area. If you have stretched head spacing, you may need to adjust the location of some of your heads accordingly to optimize irrigation coverage.

In addition, check controller zone run times to ensure your controller is running the zones for the appropriate length of time and don't hesitate to replace a product if it's not performing properly.

By sticking to the basics of good design, product selection and maintenance, sports turf managers will not only conserve precious water resources, they'll be rewarded with greener, healthier turf. ■

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Venerable Beaver Stadium improves irrigation system



Photo by Steve Manuel

here are always good reasons why customers upgrade their irrigation systems. In the case of The Pennsylvania State University's football stadium,

the reasons cover a lot of unique circumstances. The Penn State Nittany Lions have a long,

impressive history in college football, with a proud reputation and a huge fan base. PSU's

home games are played in front of 100,000+ people at Beaver Stadium – the fourth-largest stadium in America – and the games are televised for millions of other viewers. Given that high-profile level of exposure, you might assume that the school's turf-maintenance decisions are motivated by the field's appearance.

"The aesthetic value is important, but to us, that's only secondary," said Bob Hudzik, the stadium and athletic field supervisor at Penn State. "The playability of the turf is far more important here. I always tell people that our top priority is for the field to play well. Sometimes when you make the turf greener and more lush, you can increase the potential for slippage."

That emphasis on performance doesn't mean appearance is sacrificed, because Beaver Stadium's field is beautiful. There's much more

to it than great looks, though. "Turf has to have a good root system for the rhizome system to withstand the punishment it gets from these big athletes," Hudzik said. "It has to have the sheer strength where a player with cleats on can push off without tearing it quite as easily."

Reasons to upgrade

Maintaining such a high-quality playing surface at Penn State often created additional challenges and demands, many of which directly influenced the staff's irrigation practices. Until the recent decision to install a new irrigation system, all the watering at Beaver Stadium was done by hand, using traveling hose wheels.

"They had to make three moves every time they used those traveling sprinklers," said Bob Capranica, Irrigation Sales Manager at E.H. Griffin, the company that installed Penn State's new Toro 640 system. "They had to wheel them out and then wind them back in, and somebody had to go out there and turn them on."

"That was a big headache," said Herb Combs, assistant groundskeeper at Penn





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State. "With the water wheel, you always had to have somebody out there just to make sure it's working."

In addition to the time-wasting inconvenience of all that manual watering, the process didn't allow for accurate distribution of irrigation.

"Our ability to syringe the turf is critical, but there was no such thing as a syringe cycle with those big traveling sprinklers," said Hudzik. "You ended up putting down too much water."

Another complicating factor for the irrigation was the shape of Beaver Stadium itself, because the structure would create long shadows across the field when the sun is lower.

"In the fall, in the shaded areas, you knew the turf wouldn't be drying out as much, so we wanted to be able to back the water off in those places," said Combs. "The shadowing also meant the frost stayed out longer in those areas."

Preserving playability

Even though Hudzik and his team had a list of good reasons for needing more control and



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flexibility with their watering, there was another issue to address. Since Penn State puts such high priority on the playability of its turf, there was some concern that in-ground sprinkler heads could be a problem for the athletes on the field.

However, it turns out that a Toro 640 system had actually been installed on one of Penn State's practice fields a few years earlier.

"They used that field all season and never even realized it had the irrigation system in it," said Hudzik. "And we never had any complaints."

Based on that success, the athletic department agreed to install in-ground irrigation at Beaver Stadium. After a careful bidding process, the Toro 640 was selected. The new system went into place last May with minimal disruption of the playing surface, using a narrow trenching tool and strips of replacement sod.

"You wouldn't even notice it had been installed," Hudzik said. "The heads are below grade, and you get grass blades growing over them. If you walk across the field, you'd have a tough time even seeing them." In addition to the 32 heads placed in and around the playing field, Penn State's new system features an ET-based Sentinel central control system. By monitoring the site's ET (evapotranspiration) levels, the Sentinel controller automatically shuts itself off when enough moisture is present. Now the Beaver Stadium grounds crew has complete flexibility to finetune irrigation on an as-needed basis.

"The system works great," Combs said. "I mean it's phenomenal compared to the way things were done before. Now, if I just want to water across the south end of the field, or just water from 20 to 20 (yard lines), I can do it without watering the rest of the field."

"Overall, it's a tool that's going to help us perform a better job," said Hudzik. "We wanted the individual head control because we end up with a lot of hot spots from all the shade at different times of the year. With the 640 system, now we can just cool off those spots with a syringe cycle. I can go out Friday night before a game and put on like a tenth of an inch." That ability to apply precise amounts of water also helps Hudzik promote the playability of the field. "The moisture level is really critical in a football game," he explained. "You can get very good footing with just the right amount of moisture."

"Now we can syringe it or water it deeply with just the touch of a button, even from a mile away," said Combs. "Then if we have rain, the rain sensor in the controller will shut the sprinkler off."

Canyon Communications in Mesa, AZ, supplied this article.





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