Jim Peralta, head of the irrigation department at USC, adjusts satellite for drip system.

Irrigation Department Restores Control at USC

Universities are known for their tight control over spending, especially when it comes to campus turf and landscaping. Grants typically pay for planning and construction of new facilities. Our institutions of higher education then bear the long-term burden of maintenance.

Turf product salesmen will tell you it's tougher to sell to a university than a golf course or park. Every expense must be carefully justified before it is included as part of an overall physical plant budget. And, if the athletic department contributes to the grounds budget, the money is often tagged for specific needs agreed upon by the athletic director.

Even universities with huge endowments and powerful athletic programs operate in this frugal manner. The University of Southern California in Los Angeles, a frequent participant in the Rose Bowl, is no exception. The 101-year-old institution located in urban Los Angeles is facing a water crisis of growing proportions. As one of the largest users of water in the city, USC must also take a leadership role in conservation.

Rather than undertake a massive overhaul of its extensive irrigation system for the 27 acres of turf on the campus, the university chose to upgrade it gradually. They began by creating an irrigation department in 1983 and hired Jim Peralta to run it. Peralta had helped pioneer advanced irrigation control systems as the irrigation specialist at California State Polytechnic University in Pomona during the late '70s and early '80s.

"When I joined USC, two employees had been taken from the grounds shop and assigned to the plumbing shop to do irrigation maintenance and repair," Peralta reflects. "Any type of controller or valve problems were given to outside contractors. Contractors were also hired to install the irrigation during new campus construction. The resulting system was a patchwork of different types of heads, valves and controllers."

The two men and Peralta became USC's first irrigation department, which today has grown to six. "The first thing I did was look at the whole system to document each part with as-builts and an inventory" he says. "You could tell just by looking at the stock of repair parts that the system needed to be standardized. To make matters more confusing, we had a combination of hydraulic and electric controllers. The old hydraulic systems were much harder to maintain."

"We've had to redesign a lot of the areas because the original systems weren't engineered properly and they were very inefficient. Line sizing and system dynamics were not taken into consideration. Maybe six large impacts were running off a 1-1/4 inch line throwing over sidewalks in order to cover a large area. They weren't concerned about staying within the boundaries of the landscaping. Systems were just patched together when new landscaping was installed."

Peralta began to standardize the irrigation components on campus,replace old hydraulic and ten-station controllers with expandable electric controllers, reconfigure the heads and valves, and explore remote control. "It has been a slow progression," he admits.

All heads except those on the athletic fields operated at the pressure supplied by the city mains, about 65 psi. The systems for Howard Jones Field (football), Dedeaux Field (baseball), Cromwell Field (track and field), and the intramural fields have booster pumps.

Paralta started to replace old impact rotors around buildings with adjustable, low-gallonage stream and spray heads and to add drip to many of the plant beds. Zones were changed to match site conditions and pressure and flow requirements. Old valves were replaced with pressure-regulating versions in addition to flow meters. "We now have a fairly accurate record of the output and flow rate of each station," he says.

The next step was to reduce the number of controllers on campus from an unwieldy 65 to around 40. Peralta then hoped to link the field controllers (satellites) to a central computer. To do this he had to select controllers that could be connected to a central in the future and still fit into his budget. Until all controllers were set up with the central computer, he wanted his crew to be able to operate them by radio remote control for testing.

Scheduling is also a big problem on campus. Peralta can't always irrigate when he'd like to because he has to work around so many campus activities. To change a program for a special activity, and then change it back, is very time consuming. A central computer would enable him to make these changes from his desk in the office or from a terminal at his home.

After exploring his options, Peralta decided to begin the conversion using Valcon hardware and software. One or two controllers at a time were replaced with V3 satellites. Forty new satellites have now been installed. Each operates as a stand-alone controller until it can be tied into the central computer through phone lines. In the meantime, Peralta started using the computer to record data on all the separate systems on the campus.

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Even though only 14 of the school's 41 controllers have been tied into the central, Peralta has gained a grasp on the water he is using on the rest of the campus. As long as every component is maintained to specifications and checked frequently, he can predict his water usage. Eventually, flow meters will be installed on all primary valves for each area. This will give him the ability to compare his computer projection to what is actually being used. Another objective is to install pressure transducers, that will shut a station down when a pipe breaks, and moisture sensors.

Utilizing his staff efficiently is one of Peralta's biggest goals. He was one of the first irrigation specialists in the area to use remote control radio to operate satellites in the field. Instead of installing receivers on each satellite, he put permanent connectors on them. The crew has four receivers and four hand-held transmitters. After plugging a receiver into the satellite, one person can test each station as he walks the area by using the transmitter.

By staying on top of maintenance and repairs, Peralta is reasonably assured that there won't be major problems at night when the irrigation system is running. When all satellites are hooked up to the central, he will be able to see problems that occurred during the night on his computer screen. He will also be able to access that information and make any adjustments from the terminal at his home. If there is a problem he can't handle, Valcon can also call up the central to diagnose and correct problems.

"This university is like a small city," he says. "Managing irrigation around events and construction is a complicated task. An efficient irrigation system controlled by a computer is critical.

It took Peralta years to put all the pieces together, and he is always faced with changes and growth. But, he's almost there and he did it within the university's budget.

As Peralta has demonstrated, it is possible for universities to avoid a massive overhaul of their irrigation systems by creating an irrigation department to address the problems of water conservation and system performance on a consistent basis. It is an effective way for schools to control long-term maintenance costs and still have a well-landscaped campus and productive athletic facilities.