It's Time for Sharing

Remote Wireless IRRIGATION

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ver the past several years, I have written several articles related to research we engaged for automated control of irrigation by a soil moisture monitoring system. The automatic control, in broad summary, allows us to produce better plants with approximately one year less in the growing cycle. It also reduces water consumption and substantial labor costs. It's a really great system with proven outcomes.

In 2016 we had 12 irrigation zones out of 73 working well with the automated system. It dutifully turned on the water when the buried monitoring probes saw the soil water content at or less than 25% of volumetric capacity. It was



Soil moisture monitoring node informs us of need for irrigation

a joy to watch and to see how happy the plants were. However, the equipment manufacturer has been unable to deliver equipment other than prototypes. Imagine the frustration when one sees so many significant benefits but is unable to implement the system for lack of equipment. I saw the future of irrigation and based on all the positive outcomes, I wasn't willing to wait several more years for full implementation.

In August of this year, I set out to find an alternative system that would somehow allow us to mimic the fully automated system. There is no other system I am aware of that can deliver the same efficacy but came to understand we could do better than wait.

Thinking through the dilemma, I realized we could use the current soil moisture sensor system to inform non-automated irrigation delivery. This is how much of general agriculture manages their irrigation needs around the world.

The new system. I chose a remote wireless control system from Hunter Industries; Rainbird makes a similar system that is more cumbersome to work with. It is automated just the same as a wired system without the wire and central control. With the soil moisture probes left over from the previous system we can see on the computer when and how much irrigation is needed. It's not totally automated but with guidance from the soil moisture probes, it is the next best thing.

Soil moisture monitoring node informs us of need for irrigation

When we first built the irrigation system we installed the typical wired solenoid equipment to manage irrigation run times from a central location. This equipment was initially installed on the first 100 acres. It was a constant maintenance problem with miles of wire acting as a really great ground for lightening strikes. Eventually I abandoned the wired system and did not wire the second hundred acres. We have operated it manually for over 20 years.

The system we have now fully installed is designed for remote irrigation when electricity is not available. I understand some golf courses are now using this system or similar for the same reasons we abandoned our wired system. The new system is typically used by ranchers who irrigate remote rangeland for cattle. It is also used for highway medians and remote parkland or as an after thought to



Node on top of valve turns irrigation on and off

add irrigation after a wired system is built out.

It is very simple to install but in our case we expended a lot of labor to dig out existing irrigation boxes to replace old equipment and rework the plumbing. Each zone box contains a latching solenoid valve and a node, a controller device, to turn the valve on and off based on a programmed run time. A latching valve works differently from a standard valve in that it is turned on by a 9 volt battery and consumes no power when the valve is open. It then turns the valve off

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Node on left – WVC means Wireless Valve Controller and latching DC solenoid valve on right

(continued from page 49) after the elapsed run time with a single pulse of power. A traditional valve is energized continuously when open which requires constant power from a wired system. While rebuilding the zone boxes we installed more automatic drains as needed where we knew there were previous concerns from freezing. We also found and repaired various leaks throughout the irrigation system. We should be good for another 20 years or more.

The node controls a single valve box in our case. One node can operate up to four valves which require wire running to each valve – we don't want any more wire. The system cost is the same either way except for the cost of wire if installed that way. The node is securely made so as to be water proof and can be submerged without loss of function. We located the nodes high in the zone box to prevent being subjected to water. There is a battery operated hand held programmer that creates a program for each node in the same way one would set up a program from a central control. Initially, each node is assigned a unique identification code. The



Hand held programmer – WVP means Wireless Valve Programmer

controller can manage up to 999 nodes. It takes less than a minute to go through the steps to program a node. The controller, once programmed for the assigned zone, sends the information to the node wirelessly from up to 100 feet away. The node can also send the program information back to the hand held controller.

The functionality of the new system is the same as the fully automated system. We know from the prototype automated system, with our soils, each zone should run about 60 minutes per day to achieve the desired soil moisture level during a cycle of drought. Using the new system and watching the old soil moisture monitoring probes, we need to run each zone about one hour per day. A significant benefit during this persistently dry summer and fall was to maintain a high enough soil moisture level to be able to dig most of our shrub line of plants without the need to apply additional water to prepare the plants for digging. This is a huge labor saving benefit.

The cost of equipment for this renovation seems reasonable. The hand held controller cost \$209.00. We used PVG 1½" latching solenoid valves that cost \$59.00 each. The wireless nodes cost \$137.00 each. All equipment was supplied by Hunter Industries. Of course, 9 volt batteries were not included and according to Hunter, we should expect them to last one year. ♥

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