

The predictable nature of cranberry motor maintenance

Technology at Work

When a pump or motor fails at Sea Wind Cranberry Farm, farm manager Knute Andersson's business is at stake. An equipment malfunction could allow the farm's cranberry fields to cool just a couple of degrees, and on a cold night that can mean losing part of the crop. For modern cranberry farmers, properly functioning pumps, motors and sprinklers help ensure their berry yield will be high. Without them the berries are at the mercy of hostile climates that can cause crop-killing frost or destructive heat.

That's why Andersson needs an on-call electrician who can provide emergency repair service effectively and efficiently enough to save the berries, sometimes in the middle of the night. Even more importantly, Andersson needs an electrician who can ensure that many of these emergencies don't happen at all through effective predictive maintenance.

Andersson's electrician is Joe Buchanan, project lead man and safety chairman at Kyle Electric, North Bend, Ore.

Staying in demand

Buchanan has been in the electric business 33 years; "since I was a pup," he says. Throughout that career he has made safety and customer satisfaction his personal mantra. He began as a journeyman industrial electrician for an Oregon lumber company. His shift to inside wiring took him back to his apprenticeship, a five year program he completed in three and half years of intensive reading and studying. Learning is a priority for Buchanan, not something he plans to outgrow.



For that reason, Buchanan keeps his own and other apprentices' education alive as an instructor at the Coos Bay local Joint Apprenticeship and Training Committee, (JATC). "I teach at the JATC because I want to stay fresh. If you stagnate you're going to be left behind."

Buchanan emphasizes quality in his work as well as safety and versatility, three qualities he stresses as much to his apprentices at the JATC training program as he brings with him on troubleshooting and maintenance calls. "My approach is to give 110 percent on everything. I try to impress that on our apprentices. If our customer isn't happy, we won't get called back."

Buchanan help keep the customer happy by maintaining and repairing their equipment before it fails. Buchanan has worked with Andersson on maintenance of the Langlois, Ore., cranberry farms' pump system for about six years.

Berry particular

Andersson has 11 pumphouses, each with between two and five pumps and just as many motors for those pumps that range from 10 to 100 horsepower. All the fields have temperature sensors that relay back to the pumphouses. If the temperature goes too far up or down the pumps come on to start the sprinklers which then use water to adjust the air temperature in the bogs.

The equipment maintains the proper temperature of the fields 24 hours a day, 10 months a year. The cranberry vines must stay within 2 or 3 degrees of their ideal temperature, otherwise the crop is damaged and the yield is reduced. "If they get frosted, they freeze, that's a throw away," Andersson says. "If it gets too hot it will cook them and they'll rot on the vine. Yield is all about temperature control."

While high temperatures are less common in temperate coastal Oregon, often the air and water on early spring nights can dip dangerously low. If a motor fails then, when the ambient temperature is too high or low, Andersson could lose part or all of an entire field before the pump is back in action.

Since he started managing the farm in 1991, Andersson has been working on his pump and motor system to maintain the necessary temperature for the berries in his fields. Buchanan began helping him six years ago when he installed the farm's most recent pumphouse and its four 100-horsepower motors and pumps at a price of more than \$100,000. Each pump can move as much as 1,500 gallons of water per minute to provide frost protection, irrigation, weed control and flooding the bogs when necessary.

Water, water, everywhere

Mother nature not only provide hazards for the berries, it also can dish out abuse on the equipment. Buchanan has to keep those hazards in mind during maintenance of the farm's 27 motors; the salt air eats through insulation, and the constant presence of water slowly corrodes the motors and relays. "Windings fail faster, there's corrosion and insulation degradation ahead of schedule," Buchanan says. But equipment failure is not an option.

Buchanan has worked to eliminate failure by implementing a predictive maintenance plan. Each winter, he visits the farm for an annual inspection of motors, controls and pumps and checks for loosened terminals and connections and damage from moisture and age.



On each predictive call, Buchanan is looking for change in readings and checks the insulation and lining around the motor. "We want to prevent critical shut down," he says. To do this, he compares all his readings against those he measured last year at the same time. He also tests for any power dips, looks for any damage to the insulation or the lining of the motor, and ensures there is no feedback or deterioration.

"We've gone through it all and it's now pretty much trouble free," Andersson says. If a problem occurs in any of his pumphouses, most commonly, starters burn up or a relay fails.

The bottom line

Safety is Buchanan's number one priority and the right tools can make a difference, he says. "Use quality tools and be a good craftsman," these tips can not only ensure safety but keep customers coming back, Buchanan says.

New favorite tool

The tools Buchanan brings to the farm now include the new Fluke 1587, a digital insulation multimeter. "It's a sweet deal to have it all in one tool," Buchanan says. The 1587 provides all of the features of an advanced DMM, plus tests the integrity of insulation up to 1000 V and 2 GΩ.

"Carrying a combined tool will make you a better troubleshooter because you are less likely to miss a problem on your first pass through." The right tools also make maintenance more effective, Buchanan says, because, "If it's easy to check the insulation, you'll be more likely to do it. You can more easily work insulation test into your maintenance routines if the tool is more available to you and your team."

"Carrying an insulation multimeter saves you from going back to the shop to get a stand-alone insulation tester when you need one," Buchanan says. Because he's often called up to troubleshoot, he likes having the insulation tester available. "If it's a motor failure I do all the checks," he says, including the motor starter, breakers,

At all his jobs, Buchanan makes a point to offer predictive maintenance that saves the customer the downtime related to unexpected machine problems. Unlike preventative maintenance, predictive maintenance involves monitoring equipment based on the likelihood of its failure and costs related to failure, rather than simply following a straight schedule for all equipment maintenance.

The bottom line for Buchanan is that predictive maintenance saves money. "It's cost effective. You can spend a little bit of money keeping things on the line," he says, as opposed to risking huge expense if equipment fails. By offering the necessary maintenance, and using the best tools, Buchanan provides his own customers with the satisfaction that, "You're getting the optimum out of your machinery and keep production moving."

connections and the motor itself. If the problem's not obvious, that's when the insulation tester becomes crucial. "If I need further testing, that's when I like to have it," he says.

"Overall, the price and feature combination on 1587 is very reasonable," he says. "The diode test, capacitor test, low-pass filter and temperature probe feature on the 1587 aren't things you use every day, but when you need them they're important, and they're becoming necessary more often, as we see more solid state controls and variable frequency drives." Another useful addition is the autorange feature which smoothes out the reading if the user needs a specific Ohms measurement in an electrically noisy environment.

Most striking for Buchanan was its ease of use. He didn't have any questions related to the new tool's use and found the meter "very self explanatory."

At any call, Buchanan says of the 1587, "This is the thing I will pull out of my pocket. It has a digital read out, goes up to CAT IV 600 volts, it's an everyday tool, and it's safer than the older tools."



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