The predictable nature of cranberry motor maintenance

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.
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.
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, 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.”