

High-tech sprayer controls show the way

BY JEFF IRISH
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Applying chemicals with a boom-type, self-propelled sprayer is a little like walking a tight wire blindfolded. You know where you want to end up, but without visual reference it's easy to make a mistake that will throw your entire spraying program out of balance.

Even with a properly calibrated sprayer and an experienced grounds crew, application errors as high as 30 percent are not uncommon. When an operator is done spraying, it is easy to calculate how much chemical was applied.

But does he know where it went?

Unfortunately, the cause of over- or under-application can seldom be traced to a single source, but is a combination of a number of variables, including inconsistent ground speed, gremlins in the equipment and a lot of on-the-go guesswork.

Considering the high cost of chemicals, potential turf damage, extra time and expense for respraying, and increasing pressure for greater accountability of the type and amount of chemicals sprayed, few golf courses can afford to carry on a hit-and-miss spraying



A sprayer control system is handy to the operator's seat.

program.

This is particularly true in light of the fact that there are now available a variety of cost-effective, easy-to-operate electronic sprayer monitoring and control systems that may be easily installed on standard golf course spraying equipment.

Two companies — Micro-Trak Systems, Inc., in Mankato, Minn., and Raven Industries in Sioux Falls, S.D., make these systems for turf spraying.

These systems fall into two basic categories: monitors and controllers.

Monitors, ranging in price from about \$200 to \$1,000, are passive instruments that provide varying levels of information.

A basic monitor includes a wheel- or drive shaft-mounted speed sensor and an electronic display console. With the push of a button the operator can monitor ground speed, distance or area worked.

More sophisticated monitors add a flow meter for monitoring gallons applied per acre and total gallons sprayed. On even ground, where it is easiest to maintain a constant speed or in less critical spraying operations, a monitor may be adequate.

However, under varying conditions, an operator must manually regulate the chemical flow rate or constantly monitor and adjust his speed to maintain a uniform application rate.

Sprayer control systems, ranging in price from approximately \$1,000 to \$2,500, are instruments that virtually eliminate the guesswork from spraying. A controller not only displays information for the operator, but automatically adjusts the flow rate as speed changes, to maintain the desired application rate.

A full-featured controller will provide the operator with a wealth of information including speed, linear feet, area sprayed, pressure, gallons applied per minute, gallons per acre and total gallons sprayed.

Some controllers also feature a percent error readout that shows the amount of deviation from the desired application rate and/or an alarm light or signal to warn the operator when the speed or flow rate exceeds the control limits of the system. A typical control system includes a wheel- or drive shaft-mounted speed sensor, flow sensor, servo valve for regulating flow rate and the control console.

Conversion factors also make it possible for some systems to display square feet as well as acres.

The performance of both monitors and controllers depends heavily on the accuracy of the speed measurement. The magnetic wheel-mounted sensors supplied with most systems are typically far more accurate than standard speedometers.

Seeing a sprayer control system in action leaves little doubt of its ability to provide a clear picture of equipment performance. However, the bottom line is, will it pay for itself?

Mark L. Stewart, the course superintendent at Oak Hills Country Club in Omaha, Neb., says the sprayer control system he bought can easily pay for itself with a single year's chemical savings.

Stewart said the first year the system was in service at Oak Hills "we feel that we saved our club over \$3,400 in chemicals."

"By going back through available records, we believe our percent error in application was at one time 17 percent. Presently our percent is below 5 percent.

"What this all means in dollars and cents is that if you purchase \$10,000 worth of sprayable chemicals and your percent error is 17 percent, then \$1,700 worth of those chemicals are not being applied accurately, and if the application is not accurate the chemicals will not give the desired response and, in fact, could cause more harm than good," he said.

"After carefully considering all the possible variables," he said, "we concluded the majority of error (in the amount of chemical sprayed) was not the calibration of the sprayers but in the control system of the sprayers themselves. We found different factors can easily add up to considerable error. Some of these factors were clogged nozzles, restriction of the boom hoses, small leaks from fittings, and fluctuation of ground speed.

"Ground speed became a very important factor here at Oak Hills. Our course is a 6,218-yard par 71 private club located on approximately 120 acres. Nine of our 18 holes are arranged on two large hills with varying degrees of slope from gently rolling to very steep.

"Maintaining a constant ground speed on these hills is very difficult. The operator not only had to monitor the sprayer but also alter the speed so that the same amount

of material was applied on the uphill as on the downhill."

Because of these problems, Oak Hills began looking for a sprayer control system that would compensate for and/or monitor possible mechanical or human errors.

With the course's new control system, at a glance, the operator can know exactly how many gallons per acres and per minute is being applied, how many acres have been sprayed, how many gallons have been used, distance traveled, ground speed, and a percent display of any deviation from the target application rate.

"You may ask yourself, 'Why do you need to know all this?'" Stewart said.

"Take, for example, gallons per minute being applied. If ground speed is consistent and the rate begins to fall, there is a good chance there is a restriction or a nozzle is clogged. And if the rate rises, there is a good chance there is a leak in the system.

"Or consider the gallons per acre being applied. Now, at a glance, the operator can compare this with the target application rate of gallons per acre and know exactly how the sprayer is performing. These are just a couple of examples of how the monitoring capabilities of the control system can be used to assure accurate application."

Stewart added that the control system also has a warning light on the console that is illuminated if the application is in error of more than 10 percent. This type of fail-safe warning alerts the operator immediately that there is some malfunction in the system and he should stop the sprayer and correct the error.

"Another feature we use here at Oak Hills is called the on-the-go rate adjustment," he said. "This feature allows us to increase or decrease the target application rate while we are spraying by simply switching a toggle switch. We use that quite often while applying herbicides. When we are spraying the rough, or any other area where we have had weed problems, we hit the toggle a certain number of times to increase our target rate to where we want it. We use the same method to decrease our target rate."

Stewart concludes that the sprayer control system he bought "has not only saved Oak Hills money but has also given me and my membership the assurance that we are receiving the best possible response for our chemical dollar."

Stewart is representative of a growing number of superintendents who have improved the condition of their courses as well as their bottom line by combining some basic accounting with a little high technology.

Jeff Irish owns a creative design company while John Gallup is commercial sales manager of Micro-Trak Systems, Inc.

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