

Irrigation Systems-Operation

A Panel Discussion

At USGA Green Section's 1966 Conference on Golf Course Management, New York. William H. Bengeyfield, Moderator; Herb Clarke, Carlyle Regele, Joe Lee, Panelists.

Before we can enter into a discussion of the operation of irrigation systems, perhaps one should define the types of systems we find on golf courses today.

A manual operation is one requiring the operator to set each sprinkler manually by hose or quick coupling and then manually turn on the water flow valve. In some instances, the turn on operation is not necessary as the lines may already be under pressure.

The semi-automatic system uses remote control valves to activate the sprinklers (either pop-ups or quick couplers) but the controller has no timing device of its own and requires the human hand for activation, total time, and turn off.

Automatic irrigation involves permanently placed sprinkler heads, piping, remote control valves, control wiring or tubing, and a controller that automatically turns valves on and off at a preset time and on preselected days or nights.

Are Automatic Systems Really "Automatic"?

Unfortunately, some have concluded that an automatic system requires only the flick of a switch and the irrigation problem is forever solved. Nothing is quite that simple. The automatic system requires just as much (if not more) of the golf course

superintendent's time as any other system. He must constantly check sprinkler head operation and insure uniform coverage of each head. He must know the daily irrigation requirements of his entire course as dictated by ever-changing weather patterns. With such a system, the golf course superintendent becomes THE irrigator; the intricate mechanism only carries out his precise orders; and, to use the system properly, he must thoroughly understand its capabilities and limitations. His judgment is final and will not be altered that night. Indeed, this is one of the main advantages of automatic irrigation. The superintendent is the operational boss. He need not depend upon someone else's judgment.

Uniform Playing Conditions

To achieve the goal of uniform playing conditions (i.e. uniform irrigation levels) throughout the golf course, the automatic system must be properly designed, engineered, and installed. Since the sprinkler heads are in a fixed position, they can't be relocated nightly to compensate for low pressures, wind changes, or for correcting excessively dry or wet areas. This work must be done by the designer and engineer during installation. For this reason, proper design

This is the third issue of the USGA Green Section Record devoted primarily to the subject of golf course irrigation. Other material on this topic appeared in the March and the May issues. One article in the March issue dealt with designing irrigation systems and another with factors influencing irrigation. The sources of water supply was discussed in the May issue, along with the economics of certain irrigation systems.

and engineering are absolutely necessary.

Often clubs become interested in automatic systems and, once involved, their only thought is to accomplish the work at the lowest possible cost. The question of cost, not uniform coverage, is emphasized. Frequently this type of "economy" is supported by those suppliers or contractors who have something to gain if a sale is made; any sale. The final result is an inadequate system and great disappointment. Sprinkler heads are too widely spaced (about 70 feet seems maximum); a one- or two-row system is installed where a three-row system is usually needed; volume and pressures are off because of improper pipe size, etc. "You cannot build a cheap palace" is a quote worth remembering.

The Basic Components

Why should this paper, supposedly devoted to system operations, concern itself with design, engineering, installation, and cost factors? Simply because they are the essential, basic components of good operation. Without sound design, sound engineering, and sound installation, there is no operational factor worth considering.

The manufacturers of automatic irrigation equipment have largely solved the technical problems. Like the golf cart, automatic irrigation is here to stay. It is now up to the consumer to insist that it be properly used. Obviously, much new equipment and many new terms have come into use. Briefly, let us cite a few of the basic components:

Controllers: The automatic controller acts as the brain of the automatic system. The superintendent determines the day, the hour, and the total time each group of sprinklers (usually 3 to 5) will operate. The con-

troller supplies the signal when the remote control valves are to be opened and closed. Controllers must be of the same type (i.e. electric or hydraulic) as the remote control valves.

Electric Control Valves: An electric impulse activates a solenoid or heat device which opens or closes the control valve. Electric wire connects each control valve to a particular station at the controller.

Hydraulic Control Valves: Water pressure, or the relief of it, determines if the control valve is to open or close. Hydraulic tubing connects each control valve to a particular station at the controller.

Sprinkler Heads (Pop-Ups): Once the remote control valve opens, water enters the lateral line and its pressure causes the sprinkler heads on the line to rise and start operation. The head moves through a 360-degree arc (usually), applying water in an even pattern. The sprinkler head is driven by water pressure and/or velocity in one of 3 ways: cam driven, gear driven, and impact (kicker arm) drive.

When the desired time has elapsed, the controller signals the remote control valve to close, pressure drops in the lateral line, and the sprinklers return to the "rest" position. Water in the lateral line will then drain through the lowest sprinkler head on the line, frequently causing a very wet area near the head. To overcome this problem, a small valve is installed in or under each sprinkler head to prevent the leakage or line drain.

With this equipment, properly designed, engineered, installed, AND in the hands of one who understands the principles of good turfgrass management, the irrigation "problem" is eliminated. It now becomes an irrigation "practice"; and, as we know, practice makes perfect.