GOLFDOM continues its rundown on the most frequently asked questions about automatic irrigation

Automatic Irrigation: Ask the Experts

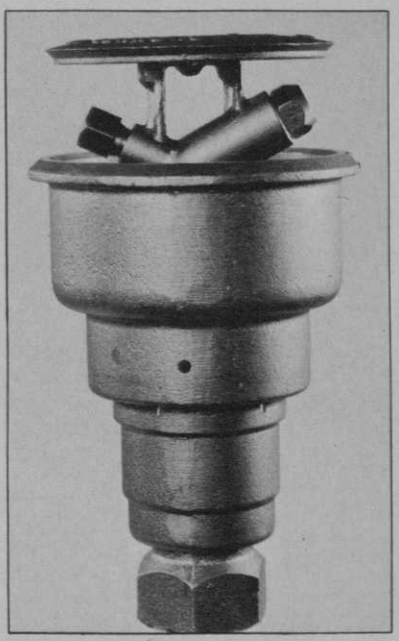
By the EDITORS and FRED V. GRAU

Some questions have been carried over from last month's article. Different manufacturers, however, have answered these particular questions. Again, the responses are solely the opinions of the individual manufacturers.

Question: Is an adequate source of water assured? Should we use city water, storage ponds or wells?
Answer: One of the most important factors to be considered in contemplating an automatic sprinkling system for the golf course is the water source, quality, the amount required and the cost.

Municipal water, when available, has the best assurances of a dependable supply and quality that does not need filtering. Cost in many cases includes the use of municipal water per 1,000 gallons or the cost of meter(s) or supply lines. Municipal water is usually delivered under pressure, which can reduce the pumping power cost to the golf course. In cases of high pressure, municipal water may eliminate pumps. The savings in initial pumping plant investment and power bills may offset the higher cost of municipal water.

Ponds or lakes are often most economical, particularly if well-located on the course and if the water can be easily replaced. Systems using pond or lake water carry the total cost of pumping plant and power, as well as screening or filtering of the water. Evaporation or seepage can increase cost, if replenishing costs are high. The cost of ponds and



their maintenance is usually offset by the beauty and other factors that they add to the course.

In many areas, wells can be developed at one or more points on the course from which sufficient water can be pumped directly into the automatic sprinkling system. If the wells are properly cased and developed, screening or filtering may not be necessary. Good wells do not have a replenishment cost, but the pumps will require more horsepower than lake pumps, because of the extra power required to lift the water from the water table in the wells.

In choosing the best water source, many factors should be considered. The cost of pipe for the sprinkling system will be affected by the location of the water source. The center of the course or a location just off-center at the highest elevation can make a worthwhile reduction in main line pipe costs. Less pipe cost results in some cases where two or more water sources are used.

The quantity of water required depends on the acreage to be watered, the amount of consumption by turf under climatic conditions and evaporation losses. The total water requirements for maintaining good turf can vary from a maximum of two inches a week, in hot, dry desert climate to as little as one inch in northern, cool climates. The sprinkler system water requirements must be based on the maximum usage during the hottest, driest period of the year. The sprinkling system may only be operated during the night hours from the closing of play in the evening until the start of play in the morning—usually not more than 10 hours and in the case of lighted courses, eight hours or less. With the acreage determined, the inches of precipitation per week required and the hours per day allowed for watering, the engineer can quickly and accurately compute the water in gallons per minute required at the source.

(Buckner Sprinkler Company)

Question: Will first cost be the last cost?
Answer: No, not quite. An automatic irrigation system, like any other mechanical piece of equipment used on a golf course, must be maintained.

Aside from the initial cost of building the golf course, an automatic irrigation system is probably

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the single largest investment a golf club will make. It stands to reason that a club will want to protect its investment with proper maintenance. For example, full-time mechanics are hired to maintain turf maintenance machinery that may only amount to one-third of the cost of an irrigation system. Similar attention should be paid to an automatic irrigation system. In other words, a part of the labor cost saved through automation should be diverted to maintenance.

(Toro Mfg. Corp.)

Question: Are present mains usually adequate or must all new lines be installed?

Answer: Present mains usually are not adequate enough, particularly where a quick coupler system is being converted to an automatic system. If the main is steel, as some are, the inside diameter size will have to be changed due to corrosion, increasing the flow loss. Also, new mains can usually be better placed and at the proper depth to accommodate a new design. In the overall picture, the main size is a very important part of a system, so the additional cost is more than warranted in our opinion. Also, manufacturers wish to give their products the best possible conditions under which to operate.

(Febco, Inc.)

Answer: Our answer, for the most part is no. If the golf course is not too old and the main lines are either asbestos cement pipe, cast iron pipe or steel pipe that has a cement mortar lining and is tar-coated or wrapped on the outside, then some sections of the pipe could possibly be utilized, but only if the pipe is of proper size to meet the demand of the engineered design of the new automatic system.

The following figures are taken

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from a list of 25 of our latest installations on existing courses: complete new main lines on 15 courses; no new main lines on seven courses, and partial new mains on three courses. Our experience has indicated that each golf course has its own characteristics, due to so many variables, so that one course cannot be compared to another, so my answer to the above is neither yes nor no.

(Automatic Irrigation Company)

Question: Will greens have to be rebuilt or re-designed to take care of the extra water?

Answer: We are surprised to realize that "extra water" seems to be associated with automatic irrigation in the minds of many. It is our opinion that a truly automatic system should be capable of delivering water according to the actual soil and turf needs, thus avoiding the possibility of over irrigating. If we are correct in our opinion, automatic irrigation should be just the opposite of a system which would deliver "extra water."

(Delmhorst Instrument Company)

Answer: I do not understand what is meant by "extra water." Watering greens is at the command of the golf superintendent. In all of our designs, all sprinkler heads around the greens can be programmed to come on, all at once, or any one individual sprinkler head can operate without the others, or any combination thereof. This programming is provided for from a central controller, usually installed at the maintenance building and sometimes installed on the wall of the golf superintendent's office. Therefore, greens do not have to be rebuilt. If the greens already have bad drainage, then the condition should improve because of better control of the watering.

(Automatic Irrigation Company)

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Question: Will an automatic system help prevent excessive overlap on greens? Will there be trouble with too much water on the greens when aprons and approaches get enough? How does this compare with a manual irrigation system?

Answer: An automatic system will help prevent excessive overlap on golf greens because the water is only placed where wanted and in the amounts required. In a well-engineered system, there is absolute control over each sprinkler head on each green, and water application rates are computed and converted to running time. Prevailing winds are a major factor and are used advantageously. In case the soil moisture absorption rate changes or is altered, the system can easily be altered to change its application rate.

The well-designed sprinkler system will "plan in" possible trouble spots and will design part circle sprinklers back to back around some high-crowned greens and each sprinkler will be controlled separately with alterations or program changes a simple spelled out instruction on the plan.

When one has a manual or quick coupling sprinkler system, one is more or less locked in as to the number of sprinklers that can operate in a given area at a given time. Human error is also locked in.

The complete versatility of a well-engineered automatic sprinkler system eliminates the guesswork from irrigation as well as saves water and pumping costs.

(Aqua-Dial)

Question: Can the system be set at 4 p.m. to go on at 1 a.m., allowing the superintendent to sleep without worrying that something may go wrong? Also, must one man continuously make the rounds checking on the operation? If so, does the automatic system really save labor costs?

Answer: We contacted two outstanding golf course superintendents. Jack Smith has operated an automatic irrigation system for over 10 years. He says a definite yes to the first question; no to the second. Manual Francis of the Belmont CC has watched automatic irrigation to make sure that all the bugs were out of it. He states a yes to the first question, providing the equipment used and the installers were reliable. He stated that the system he has installed at Belmont does not require constant attention and is completely reliable. Both men not only save on labor costs, but find that they do a better job of irrigating with an automatic system.

(Larchmont Engineering and Irrigation Company)

Question: To what extent should the golf course superintendent be made responsible for installation?

Answer: Every golf club should ask themselves this question when they first consider the purchase of an automatic irrigation system. Automatic systems can be installed in many ways.

1) A number of automatic golf course irrigation systems are being installed by clubs, with supervision provided from their suppliers. This can be more easily accomplished if the superintendent feels comfortable with the technical involvement of an automatic system. The superintendent should be involved during the planning and design stage to familiarize himself with the products applied to the system if he plans to supervise the installation. In either event, he should be given a certain amount of freedom from his other duties during installation of the system or put someone in charge of supervising the installation. Installation is a full-time job and requires close attention by the supervisor.

2) An agreement can be worked out with a contractor or supplier

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whereby the golf club will assist in part of the installation. That is, the club will contract to automate the pump house and install the the control system. (Or supply the machinery to trench or direct feed the wire or tubing.) On a conversion system, for example, the golf club then supplies the labor to install the swing joints and sprinklers, re-sod where necessary, and so forth. There should be a clear understanding between the golf club and the contractor or supplier of their mutual responsibilities.

3) Building block concept. If the golf club does not have sufficient capital to install a complete system, partial systems can be installed over a period of two or three years depending upon the amount of capital available. In so doing, it's important to proceed in a manner that will produce a completely integrated system upon completion. That is, each step along the way should be part of a master plan that takes into account the complete system. A typical procedure would be to first automate the pump house, second, automate nine greens, third, automate the other nine greens, and fourth, automate a portion of the fairways.

4) Turn key installation. If sufficient capital is available to invest in a complete system, installed by a contractor, it will provide the most immediate benefit to the club and superintendent with a minimum disturbance to the course. It also assures the club of a custom installation by a professional. Since the superintendent will be using and maintaining the system, it's important that he become completely familiar with its operation. He should receive a thorough briefing from the contractor in all phases of its operation after the system is installed.

The superintendent should work closely with the irrigation design specialist during the initial planning stages. He can supply important information necessary in order to arrive at a design that will fit his local watering requirements. For example, time available to water and the areas on the course that require special attention because of peculiar soil or climate conditions and existing local conditions.

After these factors are applied to the design, the superintendent should be involved in the programming of the system since he is responsible for the overall quality of the turf. Careful programming will assure the highest quality turf possible.

(Toro Mfg. Corp.)

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Question: Which is better—double row or single row outlets?

Answer: A double row system is better because the farther one must throw the water, the less control over its behavior pattern. This is due largely to winds. A few more heads may be involved, but the cost of the large heads used in a single row system is higher in price. A double row system can give the desired triangulation necessary in getting even distribution of water.

(Febco, Inc.)

Question: Should we consider electric, hydraulic or thermo-electric controls?

Answer: The electric valve can be either diaphragm or piston-type hydraulic operated by a simple 24-volt solenoid which opens and closes an internal bleed port to actuate valve. Extremely low amperage requirements allows for small gauge wiring. Valves, normally closed in case of power failure, open and close promptly, regardless of distance or elevation from controller. Valves require simplest type controller.

The hydraulic valve, same type without electric actuator, require plastic tubing or copper water control lines from controller to each valve. Hydraulic control lines must be completely free of air, protected from freezing, watertight connections. Most hydraulic valves are normally open in case of hydraulic failure. These valves require a rather complicated controller with rotary solenoid actuator with pressure and drain through hydraulic lines being accomplished at controller, which must also be protected from freezing. Elevations of controller must not be too much higher than lowest valve on any circuit. Hydraulic lines from valves to controller can be blown out with compressed air before freezing weather and re-

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filled with water, bleeding out all air, after frost danger in the spring. Valves are less expensive than electric, but controllers are higher in price. Tubing is slightly more costly than wire.

The thermal electric valve is directly actuated by a 24-volt thermal heat unit in each valve. Slow opening and closing, time variable depending on ground and water temperatures. The slow opening and closing characteristic can be an advantage where high velocities at high pressure must be dealt with but a disadvantage to sprinkler water distribution. Good hydraulic engineering on the pipe design of the automatic sprinkling system will eliminate the requirement for slow acting valves. Thermal valves, requiring heat, draw higher amperage and require larger control wire sizes.

All three types of valves are practical with the electrically actuated diaphragm hydraulic being overwhelmingly preferred for simplicity, operating characteristics and dependability.

(Buckner Industries, Inc.)

Question: What is the minimum water supply needed for an automatic system?

Answer: The minimum supply for an 18-hole golf course would be approximately 500 g.p.m.

(L.R. Nelson Mfg. Company, Inc.)

Question: How many stations for an automatic system are needed and how can they be protected from vandalism?

Answer: The number of stations required for an automatic system depends upon the flexibility desired in the system. Maximum flexibility would require a station for each sprinkler head. An average would be 150 to 200 stations for an 18-hole automatic system. The best means of protection from vandalism is to place the head inside an enclosure of some type.

(Rain Bird Sprinkler Corp.) □