Other Systems

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Sprinkling systems must be designed to meet the extreme climatic conditions that one expects to encounter. The climatic conditions and the area to be watered determine the minimum amount of water applied each week. Somewhat more water than this minimum will actually have to be applied, depending upon the efficiency and uniformity of distribution. If the sprinkling system is wasting water through runoff or uneven distribution, an equivalent additional amount will have to be applied. Generally speaking, a well-designed fully automatic system will be the most efficient because the human element in timing the run of each sprinkler is eliminated. The desired running time can be preset.

All types of systems under consideration here require a main line to distribute water. They require a source of water, either a tie-in to city mains, or pumps and a well or reservoir. The cost of this distributions system will be essentially the same for all types of systems, with the exception of the full automatic which, with its more efficient use of water, would in some cases permit use of slightly smaller distribution lines and pump. Even in a full automatic system, the cost of pumps and main distribution lines represents, approximately 50% of the total cost. This means that the cheapest type of system using hoses and movable sprinklers will cost somewhat more than 50% of the cost of the full automatic system.

Any design necessarily has to be a compromise in the cost-performance equation. The designer must understand the factors involved and he must be provided with certain basic decisions that can be properly made only by the people operating the course.

The design of the system must start with answers to the system specifications.

1. Amount of water to be applied.
2. Area to be covered.
3. Hours available for watering.
4. Type of system.

The first point is determined by climatic conditions alone; the other three involve the cost-performance relationship.

Area to be watered: For example, some members may want to water from fence to fence. Others may say greens and tees, while others will say fairways 150 feet wide. Balance what you would like against the cost and reach a decision.

Hours available for watering: A system that will deliver all the water required in a 6-hour period will cost a lot more than one which requires 24 hours. If your members don't mind playing when the sprinklers are running, the 24-hour system might be best. If the course is to be open from 5 A.M. to 10 P.M. and not get the members wet, 7 hours would be the time available.

Type of system: In many cases the automatic system will save money. The decision then can be made purely on the basis of money available. However, in some areas where irrigation is a supplemental thing involving only 4 to 8 weeks per year, often the automatic system cannot be justified on cost alone. Consideration then should be given to the fringe benefits of the automatic system, matters such as more uniform watering, better turf, less fertilizer, and elimination of night watering-crew problem.

Figure 1 - Not a river bed, just a water development project at Scarsdale Country Club, Hartsdale, N. Y. Improvement included realignment of several holes which was made possible after dredging for improved water supply for irrigation. A large shallow pond covered the area previously.

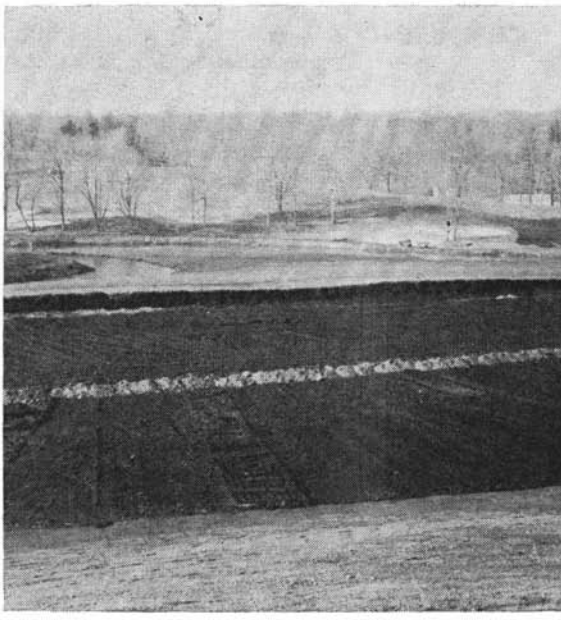

Figure 2 - Irrigation line splits the center of the new No. 1 fairway built on 40 feet of peat and muck. Palisades across far center of picture shows how deep the peat was dug to provide for constant water flow. It measures approximately 10 feet in height.

After establishing these basic specifications, many other decisions must be made. Some questions to be considered are these: What is the difference between a quality job and a non-quality job? Can corners be cut by using smaller pipe? Are large heads cheaper than small ones?

The answers are best left to the designer. First you must tell him what performance you expect. This also should become part of your specifications. You must tell the designer what uniformity of precipitation you expect. You must specify service life for various components of the system.

The four points of system specifications must be answered by the owner or operator of the course. If these are answered carefully and intelligently, they will do far more for your course than you can do by attempting to become a sprinkler system designer.

If you will concentrate on acquiring the knowledge you need to properly specify what you want the system to do, you can then shop for a system, taking full advantage of free competitive enterprise to obtain competitive prices, and be assured of a system which will meet your needs, at a fair price.

Questions:

Q. How much more costly is a multi-row system?

A. The difference here is mainly one of area covered. It is possible to water wider fairways with multi-row sys-

tems. The cost is higher, roughly, in proportion to the increase in area. A single row system with large heads will water about a 150-foot-wide fairway. A three-row system using medium size heads will water about a 210-foot fairway at about 40% increase in cost.

Q. Comment on the cost of a semi-automatic system?

A. This system costs less for heads, but more for pipe and quick-coupler valves. A block system uses very large groups of heads which add considerably to pipe cost, and results generally in a very serious back drainage problem. Its cost is generally over 90% of the full automatic system.

Q. If you already have a manual system and wish to convert to an automatic system, can it be done? What is required and at what cost approximately?

A. Yes, if the system is adequate. That is, can it deliver the required volume and pressure? Is the piping in good shape? If so, it can be converted to automatic and the previous system quotation will give you some idea of the cost. These figures, plus about $3,000 extra installation labor should cover it.

Q. Can a system be part manual and part automatic?

A. Yes. Sometimes greens and tees only are automated and sometimes fairways only. The trend in fully automatic systems is toward providing more flexibility in manual operation.

Q. Is it economical for a club to use its crew, or is it more economical to contract out?

A. Many qualified and capable installers are in the business. If the bid list is limited to qualified contractors, you can be certain of expert installation work at a competitive price, probably lower than if you were to install it yourself. It is recommended that you contract out the installation, limiting bids to a selected list of contractors who have the experience, the personnel and the equipment to do the job.

Q. Suppose you have a potential capacity of 2,000 GPM output. Should you gear to the maximum output? Where is the dividing line between excellence and extravagance? Excellence of system and being so thrifty that it hurts? What should water velocity be?

A. These are questions the system designer must answer. A good designer will give you what you need—no more and no less. An inexperienced designer might add a large safety factor because he is not sure of his work. Maximum water velocity depends on many factors, such as permissible pressure drop, valve closing speeds, type of pipe, elevation differences. Some situations would allow a velocity of 15 feet per second, others might be as low as 4 feet per second.

Cost of Systems Operation

HOSE AND PORTABLE SPRINKLER SYSTEM

Manpower and equipment costs for moving hose and sprinklers are the highest of any of the four systems. The replacement and repair costs are high. Hoses used with the movable sprinkler have a short life expectancy and the movable sprinklers are subject to handling damage as well as

normal wear. Consequently, they have high maintenance costs.

QUICK COUPLER SYSTEM

The cost of operation is a little lower than the hose and sprinkler system. However, maintenance costs might be slightly higher because of the large number of quick coupler valves that have to be replaced occasionally. Water supply costs and power costs are approximately the same.

In attempting to determine the labor cost in operating a sprinkling system it should be kept in mind that this is a job to be done at night. It has to be done on a "call" basis, depending upon weather conditions. A great deal of supervisory attention must be devoted to an "on call" labor force. They have to be paid a very good wage to be sure that they will be available when called. The cost of maintaining a good night watering crew is considerably higher than one might expect.

SEMI-AUTOMATIC SYSTEM

The costs of this type are generally within 90% of the cost of a full automatic, but this system requires almost as much labor as a conventional quick coupler. The only advantages are that the labor can be performed at a more convenient time and the actual running time of the heads can be set automatically. The cost of operation will be slightly lower than the quick coupler system because of lower labor costs. This will, in part, be offset by higher maintenance costs on a large number of sprinkler heads which are handled twice during each watering.

FULL AUTOMATIC SYSTEM

The cost of operation is, by far, the lowest. Labor is completely eliminated. Water supply costs and power costs are somewhat reduced through efficient use of water. Replacement and maintenance costs can be slightly higher because of the larger cost of the equipment involved. However, frequently it is found that replacement and maintenance costs are actually lower.

In an automatic system, even in the most arid climate, each sprinkler head will only be run 100-150 hours per year and will not be subject to handling damage. In a quick coupler system the sprinklers cost less, there are approximately 1/10 as many sprinklers, but each has to run 10 times as long. This, plus handling damage, means increased maintenance costs. Often the maintenance costs are higher than for the full automatic system.

It must be assumed that each type system is adequate. A system that cannot deliver the required volume of water is inadequate and it will be inadequate whether it is a hose and sprinkler, a quick coupler, semi-automatic, or a full automatic. Conversion is possible only if the initial system has adequate capacity. If it doesn't, additional mains and pumps should be added before converting and calculating costs.

SUPERINTENDENT'S RESPONSIBILITY

He will have greatly reduced his personnel problems with an automatic system. Recruiting, training, supervising of night watering crew would be eliminated. Maintenance responsibilities increase slightly.

The economic advantages are, of course, greater in an arid climate.