



Better Turf for Better Golf

TURF MANAGEMENT

from the USGA Green Section

A Completely Automatic Sprinkling System at the Seattle Golf Club

By EDWARD A. DUNN
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The Green Section suggested that you would be interested in why we selected an automatic, multi-row sprinkling system; how we engineered and installed it; and finally, how it operates.

We have a limited supply of water and with the poor utilization of a manual system we were forced to let the first 100 yards of the fairways and all of the rough to brown out. Also, night water men were so unreliable that some areas would be saturated and others starved. Even the most conscientious workmen tend to overwater and apply 40 minutes when ordered 20 minutes. Usually at the end of the summer season our greens are in poor shape and we attribute this to the erratic watering. We play golf twelve months a year and whatever condition the greens are in on November 1st, we have to play on them until March. So we felt that an automatic sprinkling system was mandatory.

Out on the Pacific Coast we never make a major move without consulting with our Western Director, Bill Bengeyfield. So naturally, when we decided to install a system, we sent Ken Putnam, our green superintendent, down to Los Angeles and Bengeyfield's office for advice. Bill conducted him and directed him to the courses which he considered

had the most desirable systems. Putnam's report was that, down the middle, quick coupling systems were successful in parts of California, but in the Pacific Northwest, resulted in overwatered centers because of our non-porous soil. He was also concerned about compaction by the long throw systems. The automatic multi-row systems he judged successful except he did not like the fairways, tees, and greens all receiving the same amount of water. We then chose the multi-row automatic system with separate controls for greens, tees, and fairways plus parallel systems of quick couplers around greens and tees and quick couplers for the rough. Putnam also reported that he found no superintendent that was happy with contract installed systems.

A fixed contract price was attractive but we chose to install the system ourselves. This gave us complete control over planning, design, and installation. We knew that any contract would have to have a percentage in it for contingencies plus a profit. We were sure also that this margin would cover any expense incurred by our lack of experience.

Our superintendent was a strong factor in our decisions. His observations were very helpful in the selection of the system. He supervised and worked on the

installation twelve to fourteen hours a day for three months. One very favorable advantage we gained by owner installation is that we have a superintendent that is familiar with every facet of our system.

We have a very competent irrigation engineer in Seattle. We hired him on a fee basis. He informed us that an entire system of noncorrosive materials was particularly important in automatic systems. We have 890 automatic pop up gear driven sprinkler heads that can be jammed by scale or corrosive elements. This dictated our decision to use transite pipe for all our main supply lines. For the pressure lines leading to our quick coupling valves we used PVC or polyvinyl chloride material because of its structural or impact strength. For the non-constant pressure lines leading to the pop ups, A B S or Kralastic was used. The hydraulic control tubing is 3/8" and 5/16" polyethylene.

We were very concerned over reports of plastic pipe failures. Our engineer drew up five typewritten pages of specifications. They included what materials the pipe should be made of, the physical standards including specific gravity, tensile strength, compressive strength, and others. He also listed acetic acid and impact tests that he would conduct at the factory before shipment. Incidentally, the only rejection he made was one set of elbows with walls that were not up to the specified thickness.

Controlling pressure is a very important factor in using plastic pipe. Our system operates with a pressure of approximately 72 pounds. We installed a valve just beyond the booster pump. When the pressure approaches 80 pounds, the valve opens and routes the water back to the main line.

The ultimate success of a system is in the sprinkler head itself. We selected gear driven pop ups over the cam driven because they have a more even rate of turning, a greater diameter of coverage with smaller droplet size and we were assured that they are less subject to normal wear. The smaller droplet size gives better penetration and we expect to use 40% less water than we would with a long throwing system. Our sprinkler heads are oversize and throttled down to allow us a margin of error in our

calculations. The heads are spaced on 60 to 65 foot centers and set to give us an overlap of about 6 feet.

The system is hydraulically operated by the 8 clock controls, 4 for fairways, 2 for greens, and 2 for tees. The controls are set to operate on alternate nights. Five minutes of operation on alternate nights delivers 1/10 of an inch of water per week, thus 50 minutes gives us one inch per week. The clocks will be set to turn on for 25 minutes and then four hours later come on for the other 25 minutes. The interval between applications naturally gives better penetration.

We have been questioned about the justification of the double systems around the greens. Our temperature rarely goes over 80 degrees and we want to hold the water on our shallow rooted Poa greens to a minimum. Occasionally, we get a short spell of weather that approaches 90 degrees, then we have to have an auxiliary system to prevent wilt. We also have areas at the sides and backs of greens that the pop ups do not reach. The quick couplers have an adjustable head that can be set at anything from 10 degrees to 360 degrees coverage. We can cover any one part of the green or we can set for the sides and none of the green.

Our main supply line is a 6-inch steel pipe installed in 1944. Corrosion has cut its capacity to less than that of a 4-inch line. We lift water to an elevation of 443 feet through over a mile of this pipe. We actually force 350 gallons per minute through this line with a 100 HP vertical turbine pump. When we replace it, at a cost of \$30,000, our pumping rate will be increased to 500 gallons per minute and the efficiency will be increased at least 75%.

TURF MANAGEMENT

The book "Turf Management," sponsored by the United States Golf Association and edited by Prof. H. B. Musser, is a complete and authoritative guide in the practical development of golf-course turfs.

This 354-page volume is available through the USGA, 40 East 38th Street, New York 16, N. Y., the USGA Green Section Regional Offices, the McGraw-Hill Book Co., 350 West 42nd Street, New York 36, N. Y., or local bookstores. The cost is \$7.

Our material list included: 15,400 feet of transite; 20,000 feet of PVC (Polyvinyl chloride); 55,000 feet of ABS; 90,000 feet of polyethylene control tubing; 890 gear driven pop ups; 320 quick coupler outlets; 8 control clocks, plus all of the accessories.

Double elbows under each sprinkler head provide five way movement without breakage. Heavy equipment can ride over it or knock it in any direction and the elbows allow a turning action that saves the pipe.

In installing our system we used three diggers. A larger digger cut 14-inch trenches for our main lines. A medium size cut 8-inch widths on the fairways and a small digger dug the 4-inch trenches around the tees and greens.

A questionnaire on a sprinkling system would include: how complete is the coverage, how much labor is required, and

finally how small a droplet of water is being applied. We believe that our system rates high on all three counts.

The 1960 Educational Meeting of the USGA Green Section was held in New York on January 29. Most of the papers presented at that meeting were reproduced in the April and June issues of the USGA Journal. Mr. Dunn presented the discussion of "A Completely Automatic Sprinkling System at the Seattle Golf Club" at that meeting. In response to questions, he also presented the information contained in the accompanying article entitled "A Turf Lifting Operation at the Seattle Golf Club." A more complete description of this operation, together with pictures, appeared in the USGA Journal of August, 1958.

A Turf Lifting Operation at the Seattle Golf Club

By **EDWARD A. DUNN**
President, Seattle Golf Club

Our course was carved out of the forest in 1908. The land is glacial moraine with hard pan underlying the surface. The bulldozers blasted out the large Douglas Fir stumps. The roots had penetrated the hard pan and the dynamite loosened it more. Over the years these areas kept sinking until we had a series of mounds and depressions. The mowers would scalp the mounds and the water would run off them. The mowers would miss the depressions and the water would saturate them.

To correct the situation we lifted all the fairway sod, broke up the surface with a disc harrow and leveled it with a chain harrow. We then applied three tons of lime and 1,000 pounds of 10-10-10 fertilizer per acre. The sod then was relaid. When we could lift and relay within a five day interval, the sod would recover fast and we were able to play, using winter rules ten days later. When we left the sod off over a week, it would burn and take three to five weeks to recover.

Our sod cutter sliced the turf one inch thick, fifteen inches wide and forty-eight inches long. Pallet boards held three

stacks of these slabs. A fork lift attached to our tractor moved the pallets to the sides of the fairways. We then renovated the soil as described above and relaid the sod. Barring weather interruptions, we were able to complete one fourth of an average fairway per week. Play was continuous, using one side of the fairway.

Most of our work was done in late fall and early spring. A large percentage of our labor was accomplished with our own green crew by neglecting regular course maintenance. The cost including extra labor and materials averaged \$420.00 per acre. If we had employed all outside help, it would have cost about \$700.00 per acre. A goodly percentage of our cost was caused by the soil we encountered. We were forced to pick up by hand about 90 tons of rock.

The operation is now complete, with about 50 acres renovated. The members are very happy with their new fairways. The committee is gratified that the program increased the water utilization by fifty per cent.