



Figure 1, a multi-row automatic irrigation system.

Automatic Irrigation — Experiences in Conversion

by RAY HANSEN

In considering some of the practical aspects of conversion, we would like to tell you what we already have done at Essex County Country Club, and what we intend to do during the spring of 1969.

Essex County Country Club consists of two golf courses, an 18-hole private course and an 18-hole public course. In 1959 a single row manual system was installed on our private course. At this time most courses in the Northeast were installing this type system. It was designed to supplement natural rainfall during an average year. However, in most cases the weather during these years has been far from average.

During this same period the trend has been to maintain fairways more like greens. This presents problems because in almost every case fairways are not constructed in the same manner as greens. We find undulations where stumps have decayed, ledge rock sometimes within an inch of the surface, and poorly drained areas. A mistake in the application

of water on these fairways can be more critical than on greens because of these built-in hazards.

With this in mind, plus the lack of water available in the New Jersey area in 1967, we installed a multi-row automatic irrigation system on our public course.

Main Line in Rough

We placed the main lines down the rough, branching off to a battery of sprinkler heads. Terrain was kept in mind so as to group heads having similar elevations and conditions. In the multi-row automatic system, we used two to three 15 gallon-a-minute heads to cover the same area formerly covered by one 60 to 70 gallon-a-minute head on a single row system (Figure 1).

We are using more equipment, but with the capability of a lighter precipitation rate. This achieves greater uniformity. With the added advantage of automatic valves and control-



Figure II, run-off left high areas dry.

lers, we are able to operate the sprinkler heads at short intervals several times in one night. This reduces run-off, yet allows us to water to field capacity.

The year 1968 brought us a variety of conditions, especially in rainfall and humidity. At times we received as much as one inch of water in 30 minutes; much too fast for our soils to absorb. This caused run-off into low areas, leaving high areas dry (Figure 2). Differences were often found within the range of the same sprinkler head. To save the grass in these areas it was necessary to water the best way possible with the men and equipment available.

In keeping records of the total amount of water used on each course, we found that we were watering the course with the multi-row automatic system much more uniformly than we were the course with the single-row manual system. Our total consumption of water used

was approximately one-third less where the multi-row system was in operation. Also, with the single row system, we could see where the fairways were creeping in from the edges.

We placed rain gauges (Figure 3) on similar fairways on each course; one gauge in the center and one ten yards out on each side. Both systems were put into operation for 40 minutes. In checking the gauges on the single-row system we found $3/10$ of an inch in the outside gauge, $6/10$ of an inch in the center and $2/10$ in the one on the other side.

When we checked the gauges on the multi-row system, we found $5/10$ of an inch in the outside gauge, $5/10$ in the center gauge and $4/10$ on the other side.

This proved to us that in order to place enough water on the outside edges of our fairways with the single row system, we were putting much more than we needed in the center. Or, in reverse, if only enough water

Figure III, rain gauges measuring amount of water applied.



were placed in the center, the outside portions would suffer.

Multi-Row System Needed

These facts made it apparent that for efficiency and sound economics, the single-row system had to be converted to an automatic, multi-row system. The consulting engineer prepared a basic design, and the required gal-lonage for the system was determined. The techniques and methods to be used in the conversion program were then chosen.

In placing the pipe in the ground, two methods were considered: trenching and mole installation. Figure 4 shows the trenching method. The sod was cut and placed to the side of the trenching area. Trenching operations were completed, pipe put in place, soil compacted, and the sod replaced.

We also tried the mole method (Figure 5) for pipe installation. Two cubic-foot holes were dug at each sprinkler and valve location and the pipe was "moled" in as shown. This method proved to be far more satisfactory than trenching. It was more efficient, more economical and caused little disruption to play.

Control wire can also be installed in this manner on short runs. On longer runs a modified subsoil attachment affixed to a tractor will do the job better. As you can see, a very small mound is raised by mole installation, but is easily returned to its original condition. This method is also good in the rough areas where more stone is likely to be encountered.



Figure V, mole method of laying pipe.

In conclusion, may I point out why we chose the multi-row automatic system and the moling technique of conversion;

- 1) The multi-row system provides even and effective water distribution.
- 2) The moling method leaves little damage to turf areas.
- 3) A minimum of inconvenience to the golfer during the installation period.
- 4) And finally, a capital improvement that will be totally enjoyed by the most important people — the golfers.

Figure IV, trenching method of laying pipe.

