How Minikahda's Watering System Was Installed

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From many years experience around golf courses I know that many laborious hours are spent in turf care only to have a desired goal not met. The turf is scorched and dried out for want of an adequate watering system. The results are poor conditions and criticism against the staff responsible for the maintenance of the course.

A problem like this can mean only one thing to a club with a high standard to maintain: Immediate action to correct faults and to furnish whatever is needed to reach that desired goal, properly maintained turf.

Once the seed of interest is sown the next step is to engage a reputable irrigation engineer to survey and estimate the proposed project. C. E. Stewart was retained by the club for this service. It was the spring of the year following the establishment of such an arrangement that I took over my present duties as grounds superintendent of Minikahda Club and supervised the job of installing our new irrigation system.

With contractors' estimates extremely high, due in part to uncertain materials prices, and because of some experience, I felt capable of handling this situation. With the advice and assistance of several engineers on the grounds committee, and the able assistance of the clubhouse engineer and grounds foremen we commenced operations. The first thing we decided, before adopting a definite plan, was to ascertain the permanency of tees, greens, traps and any other contours that were likely to be altered in the near future by our maintenance program. This pre-arrangement of our work schedule helped to route the proposed pipe line, thus forestalled the need for any major piping alterations after the lines were installed.

Pump Capacity and Pressure Vital

The pump capacity and pressure are vital to all irrigation systems, and in our case two centrifugal pumps, each with 350 GPM capacity, working in parallel, each driven by a 25 HP electric motor, were installed. These two pumps discharge into an overhead tank providing a hydrostatic head of about 45 lbs. gauge at grade level. A booster pump rated at 700 GPM and driven by a 30 HP motor discharges into the 8" main header at 125 pounds gauge. Hydraulically speaking, our new pumps are thus capable of delivering 700 GPM at a pressure of 125 lbs. gauge. This is not required, however, since 90 lbs. minimum at the hydrant enables a large Buckner sprinkler to discharge approximately 60 gals. per minute, which will cover a circle 180 ft. in diameter. The medium size sprinkler for greens will discharge 30 GPM with a coverage of 140 ft. to 150 ft., and the small type for tees with an output of 9 to 12 GPM will cover 100 ft. to 110 ft. The discharge of the sprinkler and the distance covered depends on the size of the nozzles and the orifices.

Consideration must be given to friction or line loss and the more lineal feet of pipe used, plus the angles and bends, the greater the loss. Therefore, one of the main things to bear in mind is the proper size of pipe and its reductions throughout the system. Too small a main or laterals will definitely result in insufficient pressure and water supply. Once the figures are proved by practical use a watering schedule can then be worked out to insure that the maximum efficiency is derived from the entire system.

Active operations on our project actually started with the "taking off" of a bill of materials from the engineer's plans and specifications. This is an exacting task, as every line on the blueprint must be measured to scale to ascertain the number of feet of pipe we were to requisition. Also every joint, tee, elbow, valve, coupling, and reducer had to be tabulated in order to be included on the order for material. Once this is completed and you have confirmation of delivery, the next step is to arrange for a railroad siding to spot the carloads of pipe and fittings for the unloading.

Organizing the Job

The manpower, labor and equipment enters into the picture next. Once the delivery date of the pipe is known, the

time is opportune for the organization of the crew.

First to be considered was the equipment and tools necessary. For our particular project we equipped our Minneapolis Moline industrial tractor with a boom to lift and transport all the pipe at the railroad unloading site and on the golf course.

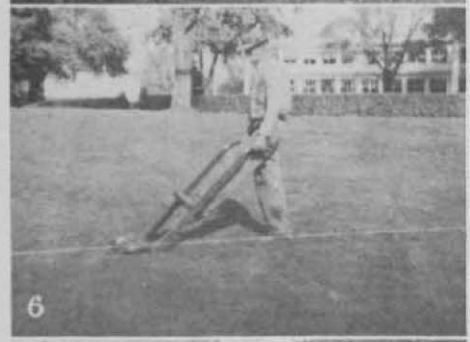
I might mention at this point that we had chosen to install 8", 6", 4" and 3" cast iron pipe with bell and spigot joints, with 2" and 1½" copper tubing for the smaller lines. The cast iron pipe came in lengths 18 ft. long and weighed approximately 300 to 800 lbs. per length. So the handling of this heavy material was not a light chore. The copper tubing was delivered crated 10 lengths to the bundle, each length measuring 20 ft. We used Type K hard and soft copper, and found the soft very useful in making angles and bends without the use of fittings. Although copper tubing was substituted in lieu of galvanized pipe at a somewhat higher price, the labor saving to install it was considerable, as the fitting and coupling operations were very easy. Other items of equipment and tools will be mentioned as we proceeded with the installation.

We did not own a ditch digger, therefore it was necessary to hire a machine that we felt would not mark or scar the turf. Several were considered, but we agreed to use a Jeep trencher with a 14" wide claw and a boom long enough to dig 6 ft. deep. The main line was then measured, staked, the turf was removed, and the trencher went to work, digging approximately 300 to 900 ft. a day. The depth of the ditch depended on the contours, but the minimum was to be deep enough to give us an 18" coverage over the pipe. Before going further with the actual work I will treat briefly the work allocation and crew organization.

Crew Duties Assigned

The crew was divided into three subcrews, each with its assigned task. In Crew No. 1, headed by the clubhouse engineer, all the plumbing and fitting was carried out involving the packing and caulking of all the bell and spigot joints. The locating and fitting of all the hydrants and drain valves, as well as the plumbing and leveling of all the lines, was important in order that they might be drained in the fall. To do this work, four

Special equipment was important factor in speeding up installation operations of Minikahda's watering system. 1. Minneapolis-Moline tractor equipped with boom to lift and transport pipe. 2. Special boom for hand lifting. 3. Jeep trencher was time and labor saver. 4. Jeep digging 300 to 900 feet per day.



helpers were required, one to pack the jute, one to melt and pour lead, one to drill holes for the hydrant and drain outlets, and one to measure and install the pipe upright and sprinkler valve. For tools and equipment there were required melting furnaces, lead pots, and other incidental tools such as hammers, caulking tools, spirit levels, crowbars, ropes, lead running clamps, etc., and of course the means of transporting these tools, material, and equipment along the line that was being worked.

To drill the holes through the cast iron pipe good use was made of a portable Onan generator that permitted utilization of our large power drill, using a 1½" and 2" hole saw (it was necessary to drill a hole every 90 ft. to provide an outlet for a sprinkler hydrant). The No. 2 Crew was under the supervision of the house grounds foreman, who had a gang totaling from six to 18 men at different times. This crew had to lift all the turf, roll and pile it a suitable distance from the line to make room for the trenching machine, and also the tractor handling the pipe. Once the ditch was dug by the Jeep digger, bell holes had to be dug at intervals of 18 ft. to enable a man to get into the trench and prepare and caulk the joint. After the digging of the bell holes the pipe was lowered into the ditch and made ready for the No. 1 or plumbing crew, coming behind.

Turf Temporarily Relaid

Crew No. 3, under the direction of the greenkeeper, consisting of eight or ten men, was responsible for checking all the joints and valve outlets to guard against incompletion, and to make sure all open holes were plugged to prevent dirt and small animals from getting into the line. The ditch then was filled, packed, and the turf relaid, but not relaid permanently, as there was anticipated a substantial settlement during the spring thaw which would subsequently necessitate minor relaying.

We worked on the theory that a hydraulic test on the line could wait until we were prepared to put it into actual use, presuming that leaks would soon be evidenced by their appearance on the surface of the ground and could easily be taken care of as they presented themselves.

It was hoped, of course, that good workmanship would prevail, and the number of leaks would be negligible.

5. Portable Onan generator provided power for drilling holes for sprinkler hydrant outlets. 6. Cutting, lifting and rolling turf was biggest hand operation. 7. Hand dug bell hole for caulking joints made easier work for plumbing crew (8) which followed.

It was unanimously decided by our committee to end the line at the edge of the green rather than continue into the center and install a sod cup for the use of a set sprinkler. We felt that by leaving a hydrant at the edge of the green and operating our sprinkler with a hose we could provide a full coverage to areas requiring water even when winds became strong and continuous.

To sum up the activities involved in the installation of our irrigation system, it was our intention to start this work the first of October, 1948, but we were delayed two weeks by an error in the sequence of shipment of the pipe. We requested at the time of requisitioning that the 8" pipe be shipped in the first carload, but due to a production error, or a misinterpretation of our order, we received the smaller pipe first.

We were very fortunate, however, in having 47 consecutive days of fair weather before inclement weather prevented any further progress. The fall termination of operations allowed us time to take stock of what we had accomplished, and we discovered that we only had a few stubs to run into the tees and nurseries, which was all copper tubing work. The cast iron pipe was behind us and the work left for this spring was mainly clean-up and odds and ends.

Heavy work of installing watering system was complete when ditch was filled and packed and turf relaid.

We handled all the clean-up work this spring with our maintenance crew. We were very well pleased with the trials and the system is now in full use. We made a few errors but are the wiser for them now. Taking the project on the whole it was considered a successful operation, and will definitely result in outstanding improvements for the club.

Our cost, excluding the re-arrangement of pumps, was $56,000.00. This involved the plumbing and fitting of, roughly 26,225 ft. of mains, laterals, and stub ends with quick coupling valves for sprinklers. We piped from tees through to greens with an average of 14 outlet valves per fairway on a 6,420 yd. course, plus the practice and lawn areas.

Money can be wasted on soils, fertilizers, and compost mixtures if the provisions for water are not adequate. Now that this new watering system is installed, every maintenance dollar will bring in its full value of enjoyment for the membership, and a real sense of accomplishment for the golf course staff.

Ten Weeks Winter School Dates Announced by Univ. of Mass.

The University of Massachusetts' Twentieth annual Ten Weeks Winter School for Turf Managers opens January 2nd, 1950, under the direction of Prof. Lawrence S. Dickinson and Geoffrey Cornish.

The purpose of the course is to furnish growers of fine turf with knowledge of all aspects of turf culture. It is open to superintendents of golf courses, cemeteries, parks and grounds, and their assistants; to other golf course employees, lawn builders, and turf managers of airports and highway developments.

The course is limited to twenty men annually. All applicants are carefully screened on basis of experience and schooling. Full high school education is usually required, except for experienced men. The training program includes the following courses:

Construction of turf areas—Construction of golf courses, recreational areas, athletic fields, airports, lawns and cemeteries, is studied from the turf viewpoint.

Equipment—Maintenance equipment is carefully evaluated, particularly as to use and cultural results. Students are given practice in assembling equipment.

Grasses—The characteristics and adaptabilities of turf grasses are studied. Students are given practice in identification of grasses and seeds.

Managerial Problems — Cultural and monetary costs of maintenance and construction of turf areas are considered together with purchasing practices, management reports, and record keeping.

Use of Chemicals on Turf—Chemical fungicides, insecticides, and herbicides used on turf together with their methods of application and expected results.

Allied courses are also given in Soils and Fertilizers, Plant Structure, Insect Pests, Water Systems and Drainage. Turf nurseries and greenhouse plots are maintained on the University campus for class study.