

# *little things* Count in Tiling Golf Courses

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Much has been written and said about water during the past several years. Its sources and supplies, irrigation systems and practices have all received attention. While this has been going on, another very important facet of water management—drainage—has been pushed into the background. Good drainage is as important as good watering. Surely every golf course and every golf course superintendent has had to deal with a drainage problem at one time or another.

With this in mind, I would like to submit some specifications that I think are necessary for good tile line installation in greens, fairways and roughs. These specifications should help the novice, the club or any individual planning the contracting of drainage work.

A tile line is only as efficient as its weakest piece of tile. Considerable thought and planning should be given to any drainage project.

## TILING GREENS

Tile installation in greens is almost a lost art. The sod should first be cut to a width of one to two feet and removed from the putting green. This opening will show location, direction and distance of the tile lines. Ditches should

be from 12 to 18 inches wide, and the depth dependent on the topography and the outlet of the line itself.

All topsoil should be dug by hand and placed on polyethylene or plywood sheets alongside the trench. The subsoil should also be dug by hand and removed from the green by wheelbarrows operating on planks or ½-inch plywood. If a trencher is used, it must be operated on planks or heavy plywood so that the green surface will not be damaged. The trencher should discharge the subsoil on polyethylene or plywood and the soil then removed from the green. Subsoils should never be replaced in trenches in greens.

After removing the subsoil, one to two inches of pea gravel or ⅜ stone or ¾ gravel is placed in the bottom of the ditch. Carefully grade and finish it to the proper slope and depth as determined by prepared drawings or by qualified supervision.

Four-inch agricultural farm tile, concrete porous wall or equivalent tile is used for all drains. The tile must be kept as straight as the general direction of the trench permits, and bends should be made in smooth curves. Tiles

*"And quietly flows the Rhine." One tile line that didn't work.*





*Smooth flowing curves for tile lines are a 'must.'*

should fit snugly together with no more than a  $\frac{1}{8}$ -inch opening permitted at the top, but openings of  $\frac{1}{4}$ -inch at the bottom, where most of the water enters, are not objectionable.

Tiles should be turned to fit snugly for joints, on curves, or if tiles are slightly warped or have uneven ends. Any joints that have openings greater than the above permitted maximums must be covered with broken tile, flat stones or strips of heavy tarpaper. Tile that is cracked or broken must not be used.

Laterals must be connected to the main line with manufactured connections or branches such as Y's or T's. If not available, the junction should be chipped, fitted and the connection sealed with mortar consisting of 1 part cement and  $2\frac{1}{2}$  parts sand. The upper end of the tile line must be carefully blocked with a flat stone or similar material to prevent soil or animals from entering.

After the tiles are properly laid, they are covered with pea stone,  $\frac{3}{8}$  stone or  $\frac{3}{4}$  gravel. If pea stone or  $\frac{3}{8}$  stone is used, the entire ditch should be backfilled with it to within nine to

12 inches of the surface. If  $\frac{3}{4}$  gravel is used, backfill the ditch to within 15 inches of the surface, followed by three to six inches of pea stone or  $\frac{3}{8}$  stone. Care must be taken in the initial backfilling so that the tiles are not shifted out of place, broken by stones, or the coverings over the joints displaced.

Topsoil is then replaced to a depth of nine to 12 inches. It should be carefully settled by flooding or tamping in place. Final grading and careful resodding will complete the project.

### **DRAINING APPROACHES, FAIRWAYS AND ROUGHS**

After determining the exact location, direction, and distance of the tile lines, the sod should again be cut to a width of one to two feet and completely removed from the construction site. Ditches should be from 15 to 18 inches wide to a depth dependent on topography and the outlet point of the tile line.

Ditches may be dug with machinery such as a backhoe or trencher instead of by hand. The excavated soil may be placed on the ground alongside the ditch with no plywood or polyethylene required. If a backhoe is used, a one-foot

*Because they will be there for a long, long time, tile drainage line installation should be carefully done and closely supervised.*







*An important facet of good water management is good drainage. And we haven't paid enough attention to it.*

bucket is ample. A greater width bucket would require more soil than necessary to be removed and a larger amount of stone for grading and backfilling. Furthermore, the use of a backhoe will allow you to place the topsoil on one side of the ditch and the subsoil on the other. When backfilling, this will assure that the final four to six inches will be good topsoil.

If a trencher is used, the cut should be at least 12 inches wide to allow proper placing of tiles in the ditch. With a trencher, the topsoil and subsoil will be mixed so provisions must be made to backfill the final 4 - 6 inches with a suitable topsoil acceptable to the superintendent.

After the subsoil has been removed to the prescribed depth, 1 - 2 inches of pea stone,  $\frac{3}{8}$  stone or  $\frac{3}{4}$  gravel is placed in the bottom of the ditch. It should be carefully graded and finished so that a proper slope and depth is established. The ditch bottom must be graded accurately with no hills or valleys. If the machinery has dug deeper than required, additional stone must be added to conform to the final grade.

Agricultural farm drain tile or concrete porous-wall tile should be used for the drains and the size will depend on the area to be drained. The tile must be kept as straight as the general direction of the trench permits and bends should be made in smooth curves. The same restrictions concerning spacing between

tiles, joints and the use of broken or cracked tile as mentioned for greens would apply to fairways as well.

After the tiles are laid, they are covered with pea stone,  $\frac{3}{8}$  stone or  $\frac{3}{4}$  gravel to a depth of three to four inches over the top of the tile. Care must be taken in backfilling so that the tile is not shifted out of place, broken by stones or any coverings over the joints displaced.

Subsoil excavated from the trench can be used in backfilling to bring the grade up to four to six inches from the surface. If the subsoil is solid clay or other impervious material, it should not be used for backfilling the trench. Instead, backfill to within six inches of the surface with a sandy or gravelly bank-run material. Machinery such as a grader blade, front-end bucket or other means can be used in backfilling the trench provided that no damage is done to the surrounding turf. The subsoil should then be thoroughly settled by flooding and/or tamping.

Topsoil is then replaced to a depth of six inches and properly settled. All excess subsoil, stones and debris must be removed from the site and dumped in designated areas. Final grading and resodding will complete the project.

To do any job properly, close attention to every detail is important. In all too many cases, tile line installations are not carefully done or closely supervised. When there's a need for tile, there's a need for doing it properly—the first time!