Deep dry wells may be needed for drain points for tile lines.

DRAINAGE —So Easy It's Difficult

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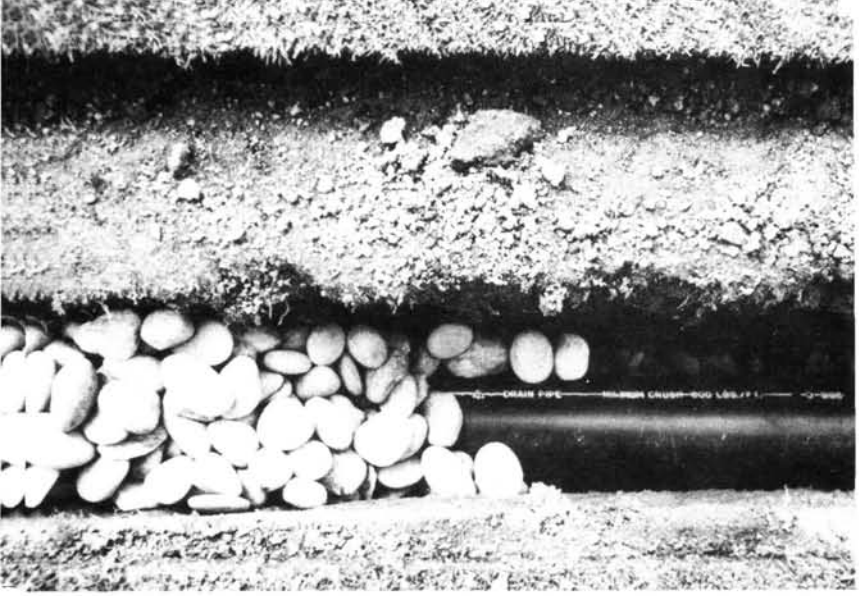
Secretly, every golf course has its own list of "Botched-up" jobs. Drainage projects must surely be at the top of at least 90 per cent of them! How can a relatively simple tile line installation turn into a disappointing, poorly done, botched-up mess? Maybe it's because it's so easy, only a few bother to do it right!

Digging a ditch and installing a tile line is not the most exciting job on the golf course. Nevertheless, the proper completion of it is essential to every superintendent's success. Ask any man on the maintenance crew if he knows how to install a tile drain properly and he'll probably answer "yes." Inspect the job two days later and nine out of 10 times it won't pass muster. The wet, muddy area is still there. The sod is covered with soil or mud or has died from dryness. Often times, golf cars (carts) have pounded it to death or the sod is poorly replaced or the soil below has settled unevenly. Sometimes coarse gravel is used to completely backfill the ditch and it is soon scattered in all directions. Since mowers were never intended as gravel spreaders, the entire golf course shows the results of dull equipment and a poor cut. It's a tragic scene; seen too often.

Solving drainage problems, at least in most cases, is not difficult or complex. Water still runs downhill and the best way to rid an area of it is by good surface drainage. Filling small, low areas with soil or cutting swales for surface drainage of larger ones should never be overlooked. Recontouring the surface offers a long-range, permanent solution to drainage problems.

Another way to cure critically wet areas in the summer months at least, (i.e., during the irrigation season) is closer control over the irrigation program. Time after time golfers comment that their course is drier and more playable during the spring, fall and winter months (i.e., the rainy season) than during the



On a gravel base, the title line is then covered with more gravel.

dry, summer season. In many cases, we cause our own drainage problems with poor irrigation control. Rather than installing tile lines, the answer lies in rearranging or reworking the irrigation schedule in areas of perpetual wetness. It will save money in many ways.

But what of those areas where drainlines offer the only practical solution? There is not much, but there is a bit more to it than simply opening up a ditch, throwing tile or rock into it and backfilling.

French drains, i.e., rock-filled trenches without an actual tile line installed, work fairly well but only in limited circumstances. If an area is chronically wet or if the drainway must handle any volume of water at any time of the year, French drains usually are unsatisfactory. They easily clog, their efficiency drops to nil and their usefulness soon ends. French drains have limited value.

Several years ago, we heard a great deal about slit trenches. These were sort of miniature French drains. They were made with a power chain saw cutting several inches deep into a poorly drained area, usually on a putting surface. The slit was narrow and had to be backfilled with coarse sand or calcine clay. In practice, the chain saw blade usually clogged or plugged rapidly and extensive cutting was impossible. Further, slit trenching was never intended to solve major drainage needs. The technique has very limited application.

This brings us to the final and most effective way of moving water underground; i.e., through a tile line properly installed. Actually, we should think in terms of "tile line systems," not unlike major river systems of the world. The Mississippi River for example drains the entire central portion of our country. It starts with the smallest rill on the farthest farm in its huge basin.

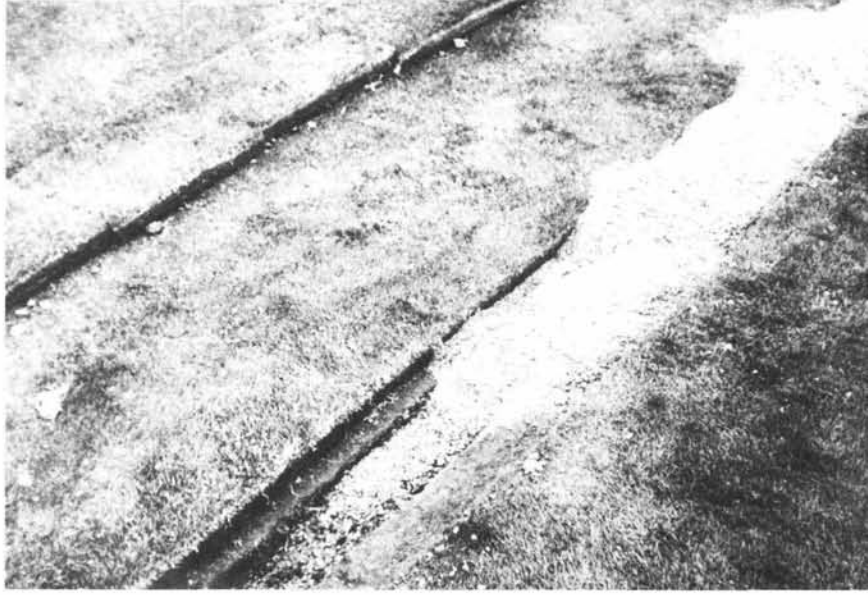
On a golf course, the nitty gritty of good drainage systems lies with moving excess water out of particular areas affecting play. These are usually found in front of greens, isolated fairway areas, occasionally on tees, frequently in sand bunkers, etc. Water collects, traffic passes and in any number of ways, poor playing conditions result. What can be done to correct this problem? How are tile lines most effectively installed here? The following check list is offered:

1) Stake out the best location for the line, keeping in mind the need for downhill flow. Too many drainlines are installed on level or even uphill flow patterns.

   When installing intercept tile lines, i.e., intercepting an underground flow or seepage of water from higher ground, be sure to install the line across or perpendicular to the direction of the seepage. The line must also be low enough to intercept the flow.

2) At the outflow end of the tile line, be sure the water it carries has some place to go. A tile line should never deadend. It must daylight, connect to another flowing line, dump into a large dry well or in some way insure the movement of water out of the line.

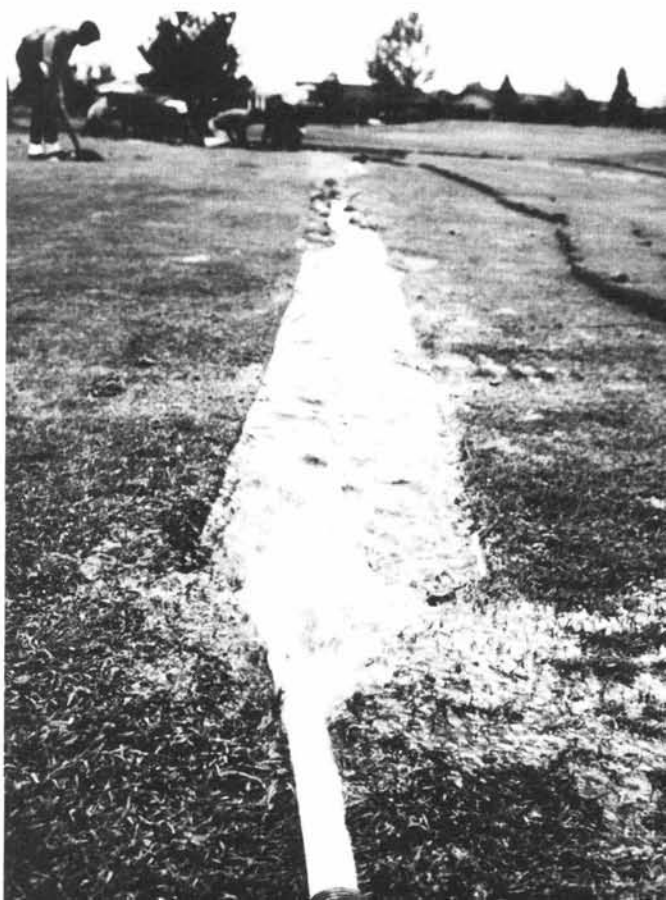
Pea gravel covers the coarser material to within two or three inches of the surface.



Coarse sand tops off the trench.

3) Dig the drainline ditch eight to 12 inches wide and approximately 18 to 24 inches deep. Keep downhill flow requirements in mind. Move the sod and soil directly to a wheelbarrow or truck. This keeps the job neat.
4) Place at least a 2-inch layer of gravel or coarse rock (¾inch to 1½-inches) in the bottom of the ditch. Adjust its depth to insure downhill flow.
5) Using 3- or 4-inch tile, place it carefully on the gravel base. Plastic corrugated perforated tile is most popular today although any perforated-type drainline material will do. Clay or concrete tile for agricultural purposes is good if joints are spaced about ¼-inch apart. Cover the upper half of each joint with tarpaper.
   Before going to step 6, make sure all tile has a downhill pitch and flow is assured.
6) Backfill carefully around the tile and ditch with gravel or coarse rock to within 4 to 6 inches of the surface.
7) Add 2 inches of pea gravel (¼-inch material) on top of the rock.
8) Finish off to ground level with a medium to coarse sand. Avoid fine sands.
9) Rope off the area if heavy golf car traffic is expected until the fill material becomes stabilized. Tell the fairway mowerman to take it easy in the newly installed drain areas.
10) Do not sod over the drainline. It will be far more effective if it remains "open" to the surface. However, if an extreme or critical condition dictates the need for an immediate grass cover, use only sod with a sand base. Do not seal off the drainline with sod having a heavy clay or silt base. This destroys effective drainage from the surface.
11) Gradually, the drainline scar will cover over with grass growing from the sides. This is fine. After several years, it may be necessary to re-establish or rejuvenate the drainline. This is easily done with a sod cutter stripping the grown-over sod, removing it and refilling the depression with more medium to coarse sand. Presto! the drainline is now ready to fully function once again.

Someone once said, "Common sense and good drainage are the two most important elements in golf course maintenance. If you don't have enough of Number 1 (common sense), then you had better have that much more of Number 2 (good drainage)." We agree! Good drainage simply cannot be beat when it comes to good turf for good golf.



Water is used for settling the backfill material.