

Sometimes Drainage Can Be Boring

A technique new to golf courses that can help keep water moving.

by PAUL VERMEULEN

NOT ALL PUTTING greens have been created equal. Some were built using exacting specifications to ensure excellent drainage and optimum turf performance, while others were built with heavy soils and consequently have problems. The most common problem with soil greens is poor drainage that jeopardizes the survival of the turf during periods of heavy rainfall.

When faced with the challenge of greens that drain poorly, most superintendents would prefer to discuss complete reconstruction. Due to overriding circumstances, however, there are many cases where this option is not immediately available. For example, a green may have beloved architectural characteristics that the golfers fear will somehow be lost if reconstructed, or a green would otherwise be fine if it were not for stagnant water standing in the cup following a downpour.

For the small number of greens that drain poorly and are questionable candidates for complete reconstruction, specialized drainpipe can be installed by using horizontal boring technology. This technology has a wide range of applications and is somewhat familiar to many because it is used to install utilities under existing roadways. The clear advantage to using horizontal boring technology to install drainpipe underneath soil greens is that it involves absolutely no putting surface disruption whatsoever.

Daniel Dinelli, superintendent of North Shore Country Club, in Glenview, Illinois, was the first to take advantage of horizontal boring technology for installing putting green drainpipe. After being denied membership approval to rebuild the older greens that had developed chronic drainage problems, he knew that he had to look elsewhere for a meaningful solution to his situation. If he could not improve the drainage characteristics of



After several lateral drain pipes have been pulled underneath the ground by a boring machine, they must be connected to a mainline that allows excess moisture to escape from the green. Connecting the drain pipe to a main line requires digging a narrow trench off to the side of the green, where the disruption will have little impact on play.

the old greens, it was certain that the turf would forever suffer during the summer months.

The first option investigated by Mr. Dinelli was to dig trenches in the old greens and install standard perforated drainpipe. This option has gained great popularity across the country due in large part to the successes at many well-known courses. In fact, there are even several golf course construction contractors who have special expertise in this method of drainpipe installation and are capable of completing the work on putting greens with minimal scarring.

With the looming prospect of digging trenches in the older greens, though, Dan turned his attention to the second option of using horizontal boring technology. The only unsettling aspects of this second option were that it would require working with a contractor with no golf course experience and adapting specialized pipe used to pump air up through soils contaminated with petroleum or other hazardous materials. Basically, the entire operation would require boring 2"-diameter circular passageways 18"

below the surface of the green and then pulling the PVC pipe with small slits cut into the sidewalls back through the openings. The operation was deemed a success upon completion with only a small hole dug approximately 20 feet in front of the green where the four PVC drainpipes could be connected to a mainline running off to the side of the fairway.

To maximize the efficacy of the specialized drainpipe, Dan also worked with David Potts, president of Soil Air Technology. By attaching a vacuum pump to the main line, most of the excess moisture trapped in the heavy soil used to build the green now can be evacuated in one to two hours after a rainstorm. In essence, the vacuum has increased the saturated hydraulic conductivity reading for the green from 1.5" per hour to 3.5" per hour.

An additional possible benefit realized from the use of a vacuum on the main line is that the CO₂ level in the soil can be lowered throughout the profile of the green. This finding may well prove to be relevant at some later date, assuming that overall turf vigor is related to the concentration of various gases in the root zone. At the very least, the alteration of the CO₂ level illustrates that the vacuum has an effect several feet outward from each of the drainpipes.

For additional information on the use of horizontal boring technology, contact Daniel Dinelli or David Potts. As of the writing of this Turf Tip, a patent for the process of installing the specialized pipe underneath a putting green for the sake of improving sub-surface drainage was being pursued.

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