WT&T

LETTERS

Golf Green Construction Is Precise Business

In the article on "Soilless Greens" in the December 1982 issue, golf course architect Ron Fream does a good job of presenting generally some of the problems and solutions involved in the construction of golf course greens.

To avoid creating situations which can be disastrous where the amateur in greens construction (even though he might be a landscape architect or golf course superintendent) tries to use Architect Fream's article for constructing greens on a new course or reconstructing greens on an old course, I hasten to elaborate on his article and offer this constructive criticism.

One of the problems of this profession is that "everyone's an expert," including many golf course superintendents and nurserymen, as well as members of green committees at country clubs. "I read an article, and this is how you do it!"

First of all, no one should attempt to use a seedbed mixture that has not been tested by the United States Golf Association - Green Section's approved testing laboratory. The address of this laboratory can be obtained through the U.S.G.A. office at Far Hills, New Jersey. These tests will indicate the porosity-capilarity relationship of the proposed mixture, the moisture retention of the mixture, the bulk density, and other factors necessary for the scientific decisions in making a good seedbed mixture. Unfortunately, this recommendation was left out of Architect Fream's article.

There are some pitfalls to be avoided in greens construction work which were not mentioned in Fream's article, possibly for lack of space. For example, the use of the sand he recommends could result in percolation rates of from 15 inches to 40 inches per hour, which is considerably beyond the recommendations of the U.S.G.A. calling for a minimum of 3 inches per hour and a maximum of 10 inches per hour for most greens. Loading the sand with additional organic material, such as going from the 20% normally recommended by the U.S.G.A. Green Section to the 30% indicated in this article, might slow down the percolation rate but possibly at the expense of increased danger of disease due to the high organic content of the green. And when the organic material eventually "burns out" by decomposition, the green might be left with an exceptionally high percolation rate.

High percolation rates are often very acceptable in the eastern part of the United States or along the gulf coast where humidity is high. Another factor to be considered is the wind velocity. With high humidity and low wind velocity, such as found often in the southeastern and middle Atlantic states, the rate of moisture removal from the seedbed by evaporation is greatly reduced. But in the midwest and western parts of the United States where humidities are lower and wind velocities are higher, the use of sand and organic material only often results in an excessive percolation rate and can mean very drouthy greens, unless excessive maintenance costs are used in syringing, watering, and fertilizing. Both money and water are getting to be scarcer these days, and labor isn't getting cheaper.

So, while greens with percolation rates of 10 inches to 30 inches per hour based on pure sand and organic material,

Continued on page 94

such as peat, might be acceptable in certain parts of the southeast, those same greens could be a real problem in Kansas, West Texas, or the mountain states. For example, while we have no objections to greens with percolation rates of between 6 inches per hour and 10 inches per hour in the east, we try to keep our greens on the lower side of the U.S.G.A. recommendation, namely in the 3 inches to 5 inches per hour range, when building greens in drier, windier climates. But you won't know what your percolation rate is unless you have the mixture tested!

To accomplish the lower percolation rate normally means the incorporation either of fine sands or the incorporation of native soils, or calcined clay fines, should they be available and economical. "Uniformly dirty" sands are just not usually available. We like the calcined clay fines for the simple reason that they are non-plastic, are easily mixed, have a good moisture retention capacity, and have ion-exchange capability. Although some agronomists do not like the use of calcined clay in any form, Dr. Bill Daniel at Purdue has had excellent results in the use of this material based on his research going back to 1956. And we have had excellent results with it on many courses.

Another very important matter to watch out for, and not covered completely in Architect Fream's article, is the quality of the organic material being use. Many products on the market, and some natural products which unfortunately get mixed with the soil on which they are deposited, have a high clay and silt content themselves. Or they may have a very high ash content. Other materials, such as lignitic material, or "muck" have particle sizes so small that they can actually be detrimental to the mixture and plug up the pores

of the seedbed worse than clay or silt. The plugging action is not so much from a particle size standpoint, but by having a specific gravity lower than one, they are easily floated to the surface to form a barrier. We have seen organic materials offered on the market which were less than 50% organic, as determined by laboratory ignition loss. We urge that the organic material used for greens construction have an ignition loss of at least 90%.

And the argument over "on-site" versus "off-site" mixing will go on for some years yet. The U.S.G.A. recommends only off-site mixing so that "great homogeneity" can be obtained. We have found that you can have as many problems with off-site mixing as you can with on-site, particularly if the operator mixing off-site is not careful and mixes topsoil from underneath the stack with the seedbed itself. A paved surface for mixing is usually not available. "On-site" mixing has its place, particularly when one is trying to mix one part of material A into four parts or six parts of material B. Careful rototilling of A into the top 5 or 6 inches of B, and checking the degree of mixing, can product excellent results on putting greens.

The problem with on-site mixing comes when people try to mix one part of material A with one, two, or even three parts of material B. But when the major material to be mixed is sand, and the minor material being mixed in is either calcined clay fines, peat, or other organic materials, and you're only using up to 20% of these organic materials, it's pretty difficult to go wrong if the rototilling is reasonably thorough. The savings to be obtained are great, as you do not have to put the same expensive additives in the bottom six inches,

Continued on page 98

where it generally is fairly inert anyhow.

Some of the best agronomists I have talked with agree that the major portion of turf control on greens is in the top three inches to four inches, and what is down below that is relatively unimportant as long as it drains. Excessive drainage is undesirable, as some capillarity must be available for "feedback" of water from the perched water table to the roots of the plant above.

I fully agree with Architect Fream that one of the most important matters in the future maintenance of greens is the topdressing. Topdressing materials should be the same as the initial mixture for the greens. Any change should only be done after consultation with experts in greens construction, such as the U.S.G.A. Green Section. We can often tell exactly when the green committee or the superintendent was changed by looking at the profile of greens which have been in existence for six to twelve years or more.

In short, the proper construction of golf greens is a matter of both aesthetics, the game of golf, engineering, and a very special agronomy. It is not a job for ordinary landscape architects, golf course superintendents (who might have the agronomy expertise but not the design expertise), or even touring pros, who might know the game of golf but not know the agronomy! This is where the golf course architect, in conjunction with the Greens Section arm of the U.S.G.A., should have control.

I trust your readers understand this.

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