golf business

The six basics of turfgrass establishment

by Arthur Jack Snyder

Golf course architects are required to design and prepare construction specifications for courses in all types of climates and soil conditions. My experiences range from the sandy soils of Tidewater Virginia to the lava-covered slopes of an active volcano in Hawaii.

Since we do have this extreme range of conditions to cope with, it is vital that we make the correct selection of variables in preparing our plans and specifications.

First, we must separate the terms "turfgrass establishment" and "turfgrass development and maintenance." *Establishment* has to do with setting up the environment and materials used, which is the golf course architect's domain; turfgrass *development and maintenance* is the province of the golf course superintendent. The basics to be considered in the establishment of turfgrasses are:

1) Climate
2) Soil and soil-related problems
3) Nutrition and fertilizers
4) Soil water — irrigation and drainage
5) Planting time
6) Initial maintenance.

The first basic: climate

The contiguous United States is generally divided into four regions:

Region 1 — the cool, humid northeastern two-thirds of the country and along the Pacific Ocean in Washington, Oregon, and Northern California where the major turfgrass species are the bluegrasses, fescues, bentgrasses, and ryegrasses.

Region 2 — the warm, humid southeastern one-third of the country. The main permanent turfgrasses in this area are the bermudagrasses.

Region 3 — the arid and semi-arid southwestern area including the western two-thirds of Texas and the southern sections of New Mexico, Arizona, and California. These are variable, however, according to the elevation. Rainfall varies from 20 inches in Western Texas to less than 5 inches in parts of Arizona and California. Wind velocity in this region is low, averaging about 5 to 6 miles per hour. Golf course grasses used are mainly the bermudagrasses, but bentgrass is frequently used on greens where conditions are right.

Region 4 — the cool, arid and semi-arid area of the West Central and Intermountain regions. Despite the fact that the region is large and the climate rigorous and there is a wide difference in elevations, the same cool season grasses used in the northeast are common to the entire area. One addition I make is Fairway crested wheatgrass. Annual rainfall varies from about 25 inches on the eastern side along the 98th meridian to less than 10 inches in many areas of the drier intermountain plateaus. About 80 percent of the rainfall comes during the spring and summer. Temperatures vary widely.

We cannot do much to change climate. We must learn to live with it, understand its restrictions and limitations, and specify the use of grasses that will prosper in the particular region.

The second basic: soil

We can do something about the soil in which our grasses are grown, although sometimes it is very difficult and expensive to do so.

Of first major importance is the obtaining of soil tests from samples collected throughout the golf course site. From these we can determine what must be done in regard to:

1) Physical properties of the soil. Soil tests provide us with a tabulation of the amounts of sand, silt, and clay in the soil, determined by a particle size analysis. Physical properties are important in determining the productivity of the soil since they influence water, air, and temperature relationships as well as soil chemical and microbiological properties.

2) Chemical properties of the soil. To the layman and general practitioner this has to do with the pH and the fertility status of the soil. In the arid and semi-arid areas we are interested also in the existence of saline and alkali soils, and we ask for an electrical conductivity reading expressed in milliohms per cubic centimeter at 25°C.

The third basic: nutrition

Soil tests tell us also the amount of nutrient existing in the soil. Grasses are reasonably uniform in the requirement for the major nutrients (nitrogen, phosphorus, and potassium), but soils vary greatly in providing these materials.

In arid regions minor nutrient elements may be a greater problem by being present in toxic amounts or, usually, by being deficient or unavailable because the pH of the soil is too high from excessive calcium, sodium, or other salts. Magnesium levels are important. Iron deficiency chlorosis is very common. To help in the reduction of alkalinity we will use fertilizers containing sulfur, such as ammonium sulfate, potassium sulfate, or ferrous sulfate.

Soil tests help us in identifying nutrients to be suppplied; when we know what is in the soil we are better able to specify the correct nutrients. Soil tests for nitrogen, incidentally, are of no practical value.

The fourth basic: water

Turfgrass requires water, whether it falls as rain or is applied through an irrigation system. Even in areas of sufficient natural precipitation, irrigation must be supplied during dry periods. Oahu Country Club in Honolulu normally receives about 150 inches of

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Construction of number 4 green on new executive-length Fairgreen Golf Course in New Smyrna Beach, Fla., designed by golf architect William W. Amick. During and before this stage especially close attention must be paid to the basics of turfgrass establishment.

rain a year, but recently installed an irrigation system to carry over during the summer dry season.

Irrigation system design is a part of the architect's responsibility to his clients. Adequate supplies of water must be applied to produce the quality of turf demanded by golfers. Recent droughts have affected this thinking in the past year. It would be great if we could let our courses dry out a little!

At the same time we must have soil mixtures which allow for the internal movement of moisture through the soil. The USGA specification for green construction is a good catch-all spec, and it should be utilized in most areas where there is heavy rainfall. However, where normal precipitation is less than 15 inches a year I do not believe it adds anything but cost. I do not mean to imply that we can forget subsurface drainage entirely where an impervious subgrade exists, but we are successfully handling the situation by using drainage sumps at the low points in the subsurface contouring.

In arid regions most drainage problems on greens are caused by improper irrigation practices, not by excessive rainfall.

There is one other important consideration regarding drainage, especially on greens, and that is to provide adequate surface drainage for heavy precipitation. If the green contouring can be constructed so that water drains quickly off the green surface, it greatly reduces the need for more costly internal drainage systems.

Of course, on greens which are built completely with permeable material we do not have the problem in the first place.

The fifth basic: planting time

Construction schedules should always take into consideration the required dates for seeding and stolonizing for the best growth of the grass. In Hawaii it doesn't make much difference, as long as the site is somewhere near sea level. In the arid west, where construction work can go on almost year-round, we will plant cool season grasses anytime during the growing period — allowing, of course, time for adequate growth before the dormant season comes. In the warm and hot areas we will plant bermudas anytime from April to September. When we plant both warm and cool season grasses on the same site, then we run into some scheduling difficulties.

The sixth basic: initial maintenance

Once the whole package is put together — the grading completed, the irrigation system installed, finish grade work done, fertilizer and seed applied, the water turned on, warm air temperatures aid in seed germination — then what?

Personally, I prefer that the golf course maintenance crew take over the job from this point. Normally the golf course superintendent and his staff are far more qualified than the contractor to carry on this phase of establishment. The contractor rarely has the equipment or the knowledge to pursue the requirements of the growth of turfgrass.

In summary, I want to stress one point: nothing is as subject to change as are specifications for turfgrass installation and maintenance, because of the multitude of varying conditions encountered on each and every project. A golf course architect cannot be satisified with one standard specification. He must be prepared to revise and adjust his specifications to produce the best possible turfgrass for each golf course. □