THE BUNKER SAND TRAP

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Choosing a new bunker sand has many of the elements of organized gambling; if you are lucky or particularly skillful you could win, but the odds are not on your side. It is possible to even things up, if some of the basic guidelines for making the selection are observed.

In the laboratory, several factors are taken into account. We make recommendations based on particles, particle shape, color, cleanliness and cost. After we have done all that, we then bring the whole thing into the real world by firing a golf ball into a pile of sand almost horizontally and then dropping it from a height sufficient to achieve something close to terminal velocity. If the material passes these tests, it is going to be fine.

For the individual in the field doing the selection, there are some points to consider. The first consideration is particle size. Experience has demonstrated that having the majority of the particles in the .25MM to the 1.0MM range provides the most satisfactory results. By majority, incidently, we are referring to 85% or more of the material, not merely a percentage large enough to elect a President.

Particles exceeding 1.0MM work their way toward the top of any aggregation, while the fines are moved downward through the coarser materials. Any mixture of particles will demonstrate their characteristic while achieving stability.

Large particles blasted onto the green can cause damage to equipment, as well as becoming an uncomfortable hazard to bystanders. Deposits of the recommended sand range are usually very similar to the material used for topdressing; consequently they create few problems. An excess of fine particles often indicate the presence of significant amounts of soil materials; these associated silts and clays can create serious drainage problems, or complicate existing ones.

It is most desirable to have the bulk of the particles in the .5MM to .25MM range, except where frequent high or gusty winds occur. In this instance, it is advisable to go to the larger size range.

Particle shape is harder to determine and is largely a subjective determination in the field. There is no national standard for sand; one company's mason sand may be another's concrete or glass sand. You can at least request an angular or sub-angular sand, which terms have loose meanings to most suppliers. The problems engendered by Round sands make a determined search for angular materials worthwhile. round sands are theorized to have been windblown at some point in their history; the forces which create them are too great to have been mere water movement. They are inappropriate for most golf course uses, since they shift under pressures of various sorts. A good analogy is a boxful of ball bearings. If you apply pressure at any point everything moves eventually. Pity the hapless golfer, slowly sinking beneath a tide of encroaching sand, while slashing hopelessly at his invisible ball.

Angular materials have some flat sides which interlock with those of other particles, establishing stability quickly, and retaining it well in the long term. It is possible to go too far into the region of the angular; truly sharp sands may pack too hard, making explosion shots difficult. These determinations are difficult to make without special techniques, and these sands are best selected with a laboratory procedure.

The term "angle of repose" is related to particle shape; the more angular the particle, the greater the angle of repose. The material is piled to the highest angle it will support without having grains of sand begin to avalanche down the sides of the pile. The test is done with material in the dry state; the presence of moisture increases this angle considerably in all sands.

Color is a consideration which requires special attention. While the beautiful white sands show up well on television and are much sought-after by persons who must rely on visual appeal for sales of property or memberships, the white sands are hard on the eyes, and can make the ball hard to see in some situations. If you have a choice of materials, you might want to take into consideration your specific needs. If maintenance creates problems, bear in mind that the white and pale cream sands show contamination much more readily than some of the darker materials.

Compaction is another major consideration. The best results are usually obtained from the silica-based sands. There are white limestone sands which are available; however they tend to break down, creating an undesirable quantity of fines. The fines can cement together, creating drainage problems; they can also produce a good deal of dust in windy conditions. This is your last choice if any other materials are available.

Cleanliness is a major consideration in the choice of a bunker sand. Many sands, including "washed" sands, have a significant silt/clay component. This is difficult to determine quantitatively in the field. Because processing methods vary so greatly, one company's washing procedure may be much more or less efficient than another's. As with any of the conditions involv-

(Continued on Page 32)

Bunker Sand Traps—

(Continued from Page 5)

ing fine particles, the silt and clay can cause drainage problems, and should be avoided. A percentage of no more than 2% total silt plus clay may be acceptable in a material which meets all other standards.

The final consideration is cost. As the ideal material must be screened, and in most cases washed, you can predict that your costs will be substantial. Do not assume that the most expensive material is necessarily the best one; the material may have had to be processed much more intensively than its less expensive competitor in order to meet acceptable standards. In some areas there are local "name" brand materials with good reputations; these tend to be quite expensive, and not always better than a less well-known one. The cost of hauling cannot be overlooked in the cost equation, since this factor can double or triple your total cost. In submitting material for testing, it is helpful to indicate relative costs of the materials, since we can weight our selection using the same factors you do and assist you more effectively in making a choice.

There are a few things to bear in mind as you prepare to put your new materials in place. First, do not mix new material with old, contaminated sand. The bunker should be emptied, drainage checked and corrected, and then the new sand should be added.

Also, try to stage the addition of the material; have it brought to the course and dumped on a driveway or other hard, clean surface. Then transfer it to the prepared bunker. This permits examination and control of incoming materials. It is a good idea to specify that the trucks doing the hauling be cleaned before picking up your load. This prevents contaminating materials such as gravel or cement being picked up by your fresh sand.

Finally, check with the supplier of your selected materials to determine that the deposit of the material you select is adequate to supply your needs for some time to come. Limited availability can affect your future additions, and require that you go through the whole process again much sooner than you would wish.

A little time spent initially on assessing your specific needs, making inquiries concerning available materials and solving the initial cost versus maintenance cost equation will provide you with a more satisfactory long term result. The more information you have, and can provide to us, the better able we will be to recommend the best material for your needs.

Rochester G&CC—

(Continued from Page 7)

tance here. This is the only hole with out-of-bounds directly along the right side. This green will only receive very high shots or those landing on the front half of the green. Don't be left of the green.

No. 17, Par 4, 390 yards. With prevailing southerly winds, this hole will play long. Tee shots finding the right side will be blocked by a large Eastern White Pine. Pin placements on the left side will require an approach shot short and right of the hole.

No. 18, Par 4, 410 yards. A drive down the left side of the fairway will avoid the double elm on the approach. The greenside bunkers on the left front give a false sense of depth perception. Pin placements to the left require accuracy.

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