Superintendents' New and Critical Role in Putting Green Construction

Step by step to a successful green.

BY JAMES FRANCIS MOORE

The last few years have been great for golfers, with new courses springing up in virtually every community. Many of these new courses come equipped with state-of-the-art irrigation systems, dramatic and exciting designs, and the best grasses turfgrass scientists can develop. Not surprisingly, these new courses often offer some of the very best playing conditions found in a community. Such conditions draw players away from the older courses — unless the older courses make steady improvements to remain competitive. This need to stay competitive has led to a significant rise in renovations, particularly on the putting greens.

While there are many questions that must be addressed prior to beginning a green reconstruction or renovation project, perhaps the most critical is, "How much will this cost?" Until this question is addressed accurately, the feasibility and scope of the project cannot be determined. The second question often is, "How can we be sure the job is done right?"

The total cost of the project involves a variety of issues ranging from how much revenue will be lost in the restaurant to the cost of repairing roads damaged by heavy equipment. But by far the most variable cost (and thus the most difficult to accurately determine) will be for construction materials. No one is in a better position to locate suitable construction materials, and thus determine their cost, than the golf course superintendent.

When the green reconstruction project begins, quality control is paramount to protect the owner's investment. This is particularly true for the production of the rootzone material. Again, no one is in a better position to ensure the work is being done properly than the golf course superintendent.

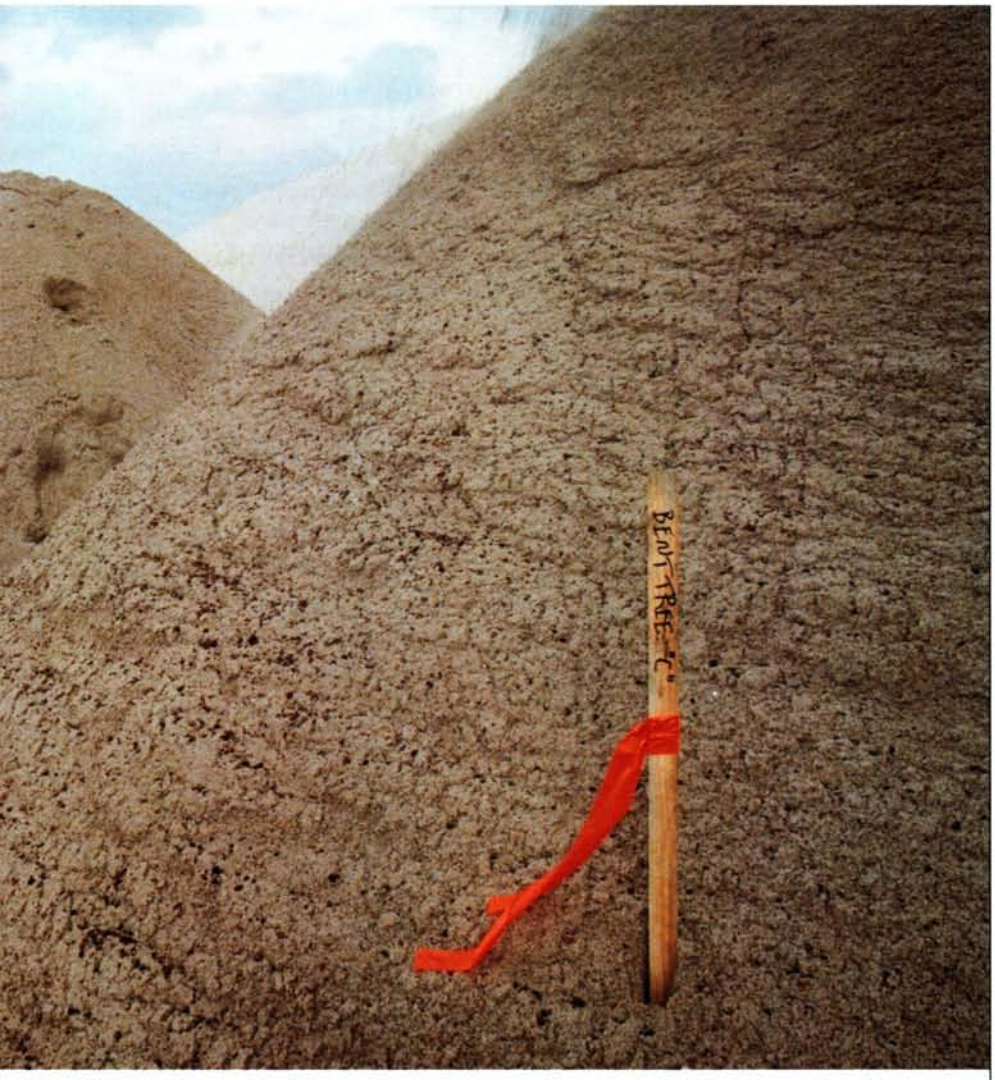
The bottom line is that today's superintendents are often finding themselves charged with responsibilities critical to the success of one of the most important improvement projects a course can undertake. To meet these responsibilities, the superintendent must play a very active role in materials selection and quality control testing. It is the superintendent's task to accomplish the following major goals:

- Identify materials that meet the project specifications and are the most reasonably priced. This will allow a close estimation of total project cost.
- Establish a positive relationship with the materials supplier, which will prove invaluable throughout the project.
- Ensure an accurate bidding process by making certain all bids are based on the same construction materials. Variances in the bid amounts then will reflect differences in contractor methods and will eliminate materials substitutions.
- Institute a methodical and scientifically based sampling program that protects both the owner and the contractors (suppliers, blenders, and builders).

To accomplish these goals, the superintendent should follow the steps listed below:

STEP 1 — PRE-QUALIFY CONSTRUCTION MATERIALS

Most communities will have numerous suppliers of sand and gravel within a reasonable distance to the course. The superintendent and the assistant superintendent should visit these suppliers and learn about their products and their overall operations. The superintendent can help the supplier better understand the project needs by giving them a packet of information regarding putting



Three 50-ton piles are mixed with varying percentages of organic matter. The piles are "lean," "medium," and "rich." By sampling each pile, the ideal mix can be identified by the laboratory.

green construction and quality control. These packets are available free of charge from the Green Section Construction Education Program office.

From each supplier, the superintendent should collect samples of sand and gravel that are likely to fall within the project specifications. Be sure to follow the sample collection procedure outlined in the Green Section publication entitled *Quality Control Sampling of Rootzone Mixture Stockpiles.*

These samples should be submitted to an accredited physical soil testing laboratory. A list of the accredited laboratories can be found at the web site referenced at the end of this article. Please note: It is important to select one laboratory and utilize only that laboratory for all testing activity throughout the entire project. The laboratory will produce various mixtures of the submitted sand and the most commonly used peat moss products. If an inorganic amendment or compost product is preferred, it will be necessary to provide these materials to the lab. Be sure to talk to the lab directly to determine how much of the amendments they will need. The lab will also compare the sand to the gravel to determine whether or not they are compatible.

The lab will send a report back to the superintendent, detailing the physical and performance characteristics of various mixtures of the supplied materials. It is now the superintendent's job to select which combination of sand, amendments, and gravel will be best for the project. This decision should be based on numerous factors, including cost, availability, and performance. Every superintendent should seek qualified help in this decision-making process.

When this step is completed, the superintendent will have identified exactly which materials will be used, who will supply them, and the price of those materials. This information is then provided to those who wish to bid on the project. Although each bidder should negotiate the cost of the materials with the supplier, everyone must base their bids on the same materials.

STEP 2 — DEVELOP A STANDARD OR TARGET MIXTURE

The next step is to actually begin producing the rootzone materials for the greens. It is likely that months will have passed since the first testing process took place in Step 1. By now, the project has been approved, contractors have been selected, and construction is underway. The sand supplier is ready to provide the sand, the organic matter has been delivered, and the blending contractor is ready to begin producing the mixture to go into the green cavity. The goal now is to produce a mixture that is acceptable to all concerned parties.

The blender should be instructed to blend approximately 150 tons of mix, using the materials and mixing ratio identified in Step 1. It is a good idea to blend three 50-ton piles, slightly changing the percent organic matter for each pile. Piles should be blended "lean," "middle," and "rich."

The superintendent should collect a sample from each 50-ton pile using the standardized sampling procedure. The same laboratory that did the preliminary testing should test the samples. When the lab returns the test results, they should be compared against the results of the preliminary testing. It is unlikely (and unnecessary) that these test results will be identical. However, the makeup of

the sand should be similar to the original sampling. If the numbers have changed radically, steps should be taken to determine why such a change has occurred.

The goal now is to select the best mixture of the three blending ratios. This mixture will then become the *standard* or *target value* for all future blending.

Should the test results of all three of the 50-ton piles prove unacceptable, the testing laboratory should be consulted regarding the best choice of remedial action. If the particle size distribution of the sand and organic matter have remained fairly consistent since the preliminary testing, it may simply be a matter of adjusting the blending ratio to make the mix acceptable. However, if adjusting the blending equipment does not correct the problem, the sand may need to be processed further (through additional washing and/or screening) to achieve a more favorable particle size distribution. It is also possible that the organic material has changed in its composition. Either way, the entire testing process will need to be repeated until a satisfactory 50-ton pile can be achieved. This is critical to establish the *standard* for the remainder of the blending process.

STEP 3 — BLEND STOCKPILES AND COMPARE THEM TO THE STANDARD

After the physical properties of the *standard* have been identified, mass production of the rootzone mixture can begin. The rootzone mix should be blended in 1,000-ton increments, which is acceptable for most jobs. However, if the sand and/or organic amendments tend to vary in their makeup, 500-ton lots will provide a greater degree of quality control. The smaller 500-ton lots are also a good idea when the laboratory test results indicate the materials are borderline in terms of meeting the construction guidelines chosen for the project.

Each 1,000- or 500-ton pile should be sampled using the standardized procedure, and the test results should be compared against the *standard*. Again, it is highly unlikely that the *standard* and the sample removed from each pile will match up exactly. The USGA Green Section document *Guidelines for Establishing Quality Control Tolerances* outlines the plus or minus values that should be utilized when comparing the two samples.

If all of the test results are within acceptable tolerances, the 1,000- or 500-ton pile should be marked ready for delivery to the project. However, if any aspect of the testing indicates that the pile has deviated from the target sample by more than the tolerances identified in the document, and the new properties are unacceptable, the pile should be reblended.

After the pile has been approved, it can be hauled to the project or stored for later delivery. As each pile is tested and approved, it can be combined with previously approved piles for the sake of storage.

Rootzone materials production should be a team effort, including the golf course superintendent, his assistant(s), a representative of the materials supplier, and the blender.

CONCLUSION

Although this article outlines three important steps a superintendent should take to help ensure a successful green construction project, there is a fourth step that is probably the most important of all. Given the tremendous responsibility today's superintendent needs to shoulder during such a project, he or she should strive to learn everything possible about green construction and rootzone testing issues. A visit to the USGA Green Section's web site (www.usga.org/green/coned) will provide a wealth of information. For additional assistance, e-mail or phone the Green Section Construction Education Program office.

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