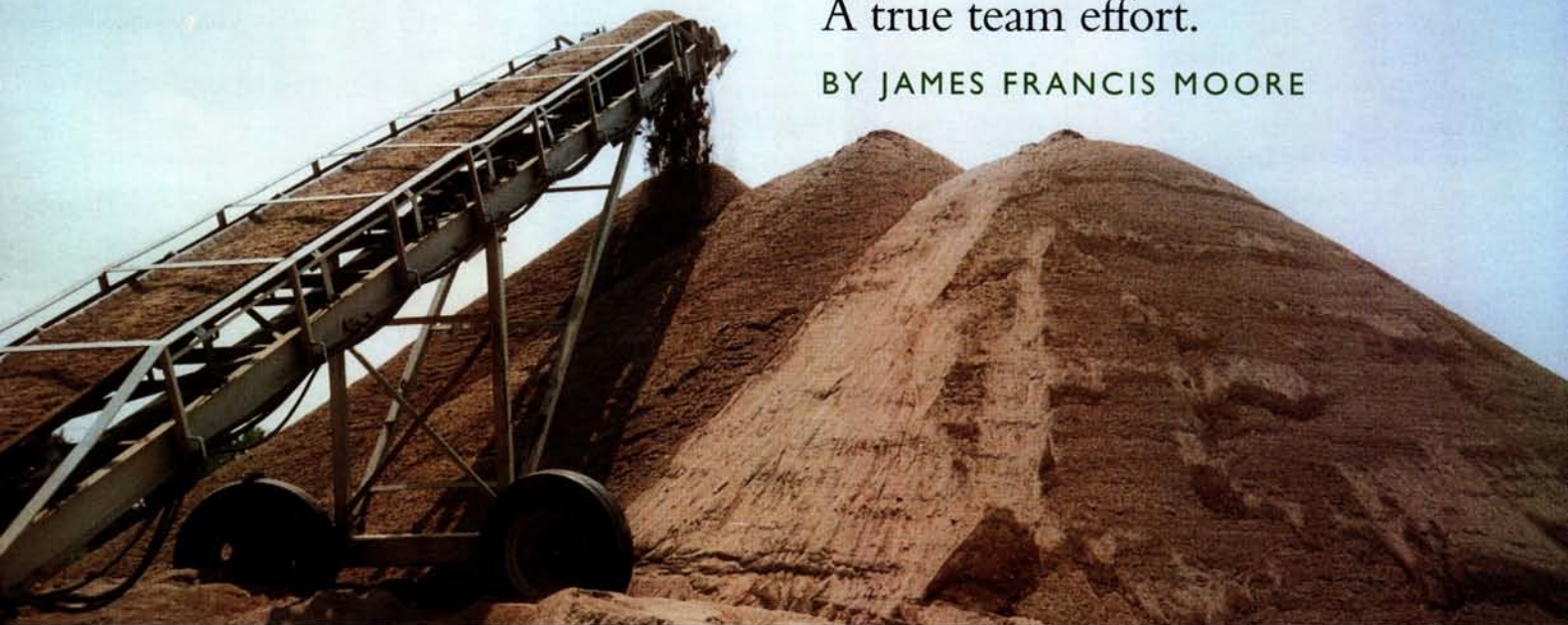


Revising the USGA's Recommendations for a Method of Putting Green Construction

A true team effort.

BY JAMES FRANCIS MOORE



The 2004 USGA Recommendations broaden the range of materials that can be used in USGA greens, which will help reduce costs.

The USGA's method of putting green construction has served as the industry standard for building greens since it was introduced in 1960. The guidelines for this method have been revised numerous times over the years to include improved construction techniques and new scientific information resulting from turfgrass research, and to better meet the increasing demands on modern putting greens. No other construction method has been so thoroughly researched or extensively used. Thus, the USGA's Recommendations offer the best combination of proven reliability and a continuing research effort to ensure the method remains sound.

With such a track record of success, the question is often asked, "Why change something that works?" After all, the USGA does not profit financially from courses choosing to build greens according to our guidelines. It would be easy to offer the method to the industry and let it stand on its own merits, forgoing expensive construction-related research. There are other green construction methods to choose from and seemingly endless modifications of the USGA method, but none have been researched and used nearly as extensively throughout the United States and the world.

In March of 2004, the Green Section completed yet another intensive review of the

Recommendations. The process took well over a year and involved an extraordinary collection of individuals throughout the world. The remainder of this article discusses this review process. Our hope is that by making our readers aware of how changes are made, they will have even more confidence in the method itself.

Shortly after the last revision of the USGA's construction method in 1993 (hereafter referred to as the Recommendations), we increased our investment in construction-related research. With golf enjoying a virtual boom in popularity, new courses were being built at a record pace. This prompted the introduction of countless new products and construction techniques, many of which had little or no scientific research behind them. And then there was the issue of laboratory testing. With so many new greens being built, there were correspondingly large numbers of rootzone mixtures that needed to be tested. To meet the demand, new physical soil testing laboratories joined those that had been in business for many years. Consistency problems arose — particularly when rootzone mixture samples were sent to different laboratories in an effort to achieve more favorable test results.

Since 1993, more than \$1 million of USGA-sponsored research efforts have been undertaken in this country and abroad. Eighteen separate

projects were funded on a variety of issues, such as:

- Slope of greens.
- Water movement in USGA and California profiles.
- Engineering characteristics of sand rootzones.
- Impact of inorganic and organic amendments.
- Environmental impact of sand-based greens.
- Status of microorganisms in sand-based greens and in fumigated rootzones.
- Testing protocol for physical soil testing laboratories.
- Development of quality control parameters and procedures.

During this same period the Green Section's Construction Education Program (CEP) was formed. One of the first steps the CEP took was to form an advisory committee comprised of experts from various industry disciplines, including golf course architecture, construction, materials suppliers, and testing laboratories. Over the next five years these experts provided invaluable feedback regarding potential improvements in the Recommendations, as well as guidance for ongoing and future research efforts. A wide variety of possible changes were discussed.

By the time 2003 rolled around, we had identified 18 possible revisions that we felt had the potential to reduce the cost of green construction without sacrificing agronomic quality. It was decided to include the CEP committee in a much larger committee that was given the unwieldy name of the Putting Green Guidelines Review Committee (PGGRC). The PGGRC was composed of more than 80 professionals from throughout the world, including the following:

- Current members of the CEP Committee.
- Current members of the USGA Research Committee.
- Representatives from each of the A2LA accredited laboratories.
- Select individuals from the academic community.
- USGA Green Section staff.
- Other key individuals who did not fit into one of the other categories.

Obviously, it was impractical to assemble so many individuals in one place to discuss the Recommendations. Therefore, a Microsoft application called "Team Services" was employed to provide an on-line forum for the exchange of ideas and documents. The forum proved extremely successful, with more than 200 printed pages

submitted and discussed. Pros and cons of each proposal received in-depth review. On-line surveys were conducted to accurately gauge how the group felt on each topic.

By late 2003, the PGGRC had completed its task and it was time to form yet another committee. The PGGRC was culled to a group of 12 (plus the Green Section staff) and was entitled the Final Review Committee (FRC). Once again, a Team Services site was established to facilitate the ready exchange of ideas. In October, the FRC met in Columbus, Ohio, in conjunction with the USGA Research Committee. On-line discussions and conference calls continued through February 2004 to allow time to consider new research that

The USGA continues to fund construction-related research to ensure our guidelines remain the most agronomically sound putting green construction method available.

Previous versions of the USGA Recommendations called for the depth of the rootzone to be 12 inches plus or minus 0.5 inch. The 2004 revisions increase this tolerance to plus or minus 1 inch.



The gravel layer continues to be an integral drainage component of USGA greens. Scientific research has demonstrated another important function of this layer — to help equalize moisture retention levels throughout the green.



addressed some of the laboratory testing issues. Eventually, the list of 18 possible revisions was reduced to six.

By the time the GCSAA meeting in San Diego rolled around in February 2004, we were ready to adopt these six revisions to the Recommendations. These revisions were discussed one last time during the Green Section staff meeting. The decision was then made to publish the revisions to the USGA Web site as soon as they could be written up in their final form.

After reading this article, and upon reviewing the revisions that made it through the entire process, there will probably be some who wonder why we went to so much trouble. The revisions are important, and we believe they will have a very positive impact on green construction for years to come. However, the 2004 Recommendations are by no means a complete rewrite of the 1993 version. In fact, a number of the revisions are quite subtle. The bottom line is that even after undergoing a very intense review process, the Recommendations have been proven sound and without need of major revision.

As stated earlier, the six changes to the 1993 Recommendations are all intended to help make the construction of USGA greens less expensive

and less complicated. Although they are briefly presented here for convenience, the reader is encouraged to visit our Web site (www.usga.org) to view the Recommendations in their entirety.

- A great deal of confusion exists in the industry regarding saturated hydraulic conductivity (also referred to as infiltration rate). The 1993 version specified two ranges. *Normal* referred to an SHC value of 6–12 inches per hour. *Accelerated* referred to a value of 12–24 inches per hour. This nomenclature has been eliminated in 2004. The 2004 Recommendations simply call for a minimum SHC value of 6 inches per hour.

- In 1993 the depth of the rootzone was 12 inches, plus or minus 0.5 inch. This is an extremely tight tolerance that proved very difficult to achieve. The 2004 Recommendations widen the tolerance to plus or minus 1 inch.

- Properly sized gravel is sometimes difficult to find, resulting in increased trucking costs. Research has shown that the specification for gravel can be safely widened. The 2004 Recommendations increase the range of gravel that can be used in a USGA green.

- The CU (coefficient of uniformity) factor for gravel has also been increased, which again will make gravel easier to find and thus less costly.

- Previous versions specifically prohibited the use of inorganic amendments. The 2004 Recommendations allow the use of such amendments, pending approval by the physical soil testing laboratory of the final rootzone mixture. If used, the amendments must be incorporated throughout the entire depth of the 12-inch rootzone.

- Previous versions also prohibited the use of *flat pipe*. The 2004 Recommendations allow the use of such materials as long as they meet ASTM 7001, are not covered with a *sock*, and are a minimum of 12 inches in width.

So now that the 2004 Recommendations are out, how long will we wait before we begin considering future revisions? New research projects are already underway and others are being considered to address issues such as highly calcareous sands, laboratory procedures and test equipment, and the use of composts in the rootzone mixture. So don't be surprised if in ten years or so you see another article describing potential changes to the USGA Recommendations!

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