

able but will require special management techniques to avoid salt and sodic-related problems.

Sodic soil problems can be remedied but are likely to be time-consuming and costly. Applications of gypsum may be used to supply excess calcium to dislodge sodium ions from the soil. The sodium combines with the sulfate in the gypsum, forming water-soluble sodium sulfate, which can be leached from the soil. Over a period of years, the soil structure can be improved, though it's best not to let it get this far. On putting greens, the maximum amount of gypsum that can be safely applied is 0.5 to 1.0 lb. per 1,000 ft.², while up to 300 to 500 lb. per acre can be applied on fairways. Rates should be based on soil and water tests. Foliar burn potential can be reduced by spreading gypsum applications over several months of cool weather.

Effluent water can also pose problems with carbonate (CO_3^{2-}) and bicarbonate (HCO_3^-) ratios. Carbon dioxide, produced by root and soil microbial respiration, reacts with water to form carbonic acid (H_2CO_3). Normally, carbonic acid is not a problem. When effluent water with a high pH is used, the bicarbonates and additional carbonates in the water bond with calcium and magnesium in the soil to form lime. This situation allows sodium to absorb onto the soil peds, causing deflocculation and loss of soil structure. Hard water can also increase soil pH over time, potentially causing elements such as iron, manganese and zinc to become unavailable for turf uptake. This problem can usually be remedied by using chelated and/or foliar applications of micronutrients. Hard water problems can be reduced by injecting acid into the irrigation system. Acid injection uses sulfuric, sulfurous or phosphoric acids to reduce the water pH. Although acid injection does not correct sodium problems directly, it does keep the calcium and magnesium solubilized and prevents lime formation in the soil.

Heavy metals are the final type of contaminant to check for in effluent water sources. Heavy metals are

Heavy metals are the final type of contaminant to check for in effluent water sources. Heavy metals are especially likely to be present if the effluent contains water affected by heavy industry or mining operations.

especially likely to be present if the effluent contains water affected by heavy industry or mining operations. Some urban areas may also add heavy metals such as cadmium, copper, nickel and zinc. At excessive levels, any micronutrient can be toxic to plants. Chlorine and boron are problems in some areas and their toxicity effects have been more rigorously studied than some of the other micronutrients. Both accumulate in leaf tips, causing burn that can fortunately be removed by mowing. The clippings need to be collected and discarded, preferably being spread out so as not to concentrate the elements in another area. Trees and shrubs can also be sensitive to excessive chlorine (above 350 ppm) and boron (above 2 ppm) levels.



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—Cornish & Whitten, "The Architects of Golf"

The intent of the architect is to offer risks, rewards and challenges depending on skill and nerve. Balance in golf course design is equal parts playability, difficulty and beauty, as is illustrated at the no. 6 green at Augusta National.



With all the recent improvements to golf equipment, we mere mortals still suffer from shanks, hooks, slices, chili-dips, three-whacks and the dreaded . . . whiff. Average golfers and average golf have not changed much in the past four decades. Like most average golfers, I can butcher a shot no matter where it lies. But the better golfer has become . . . much better. For the superior, and longer, player, bunkers that were once in play, are no longer; water that once generated fear, does not; length, that once encouraged a long iron, now offers a wedge to the "range rat"; greens with slick, fast turf, afford little or no anxiety.

(continued on page 25)



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So how does a golf course provide a suitable contest for the better golfer, while simultaneously challenging the average player? The burden to create such a venue is placed squarely upon the golf course architect. Because golfing abilities range so widely, the objective for a golf course architect, according to Tom Fazio, is not about "risk and reward, but about challenge versus playability." Great golf courses are great because of variety, setting, playability and challenge for everyone.

I am often asked to build in difficulty so that the course will be recognized as a "true challenge" . . . whatever that is. Clients insist, "Make it hard . . . no pushover holes . . . the tougher the better." This is an intriguing and perplexing issue, because golf is a tough game anyway. Tougher, more demanding courses are seemingly more attractive to course critics and can offer immediate media coverage. The signature-hole photograph illustrating steep grades, heavy shadows and water everywhere


is compelling to the nomadic, average golfer.

However, these same facilities need more daily play by average golfers and satisfied members for ultimate survival. Difficult golf courses are not necessarily great. On the other hand, great golf courses are almost always challenging. Therefore, difficulty shouldn't be confused with greatness. Nor should it be confused with economic stability.

There are some who believe that to be considered a great architect, your courses must host championships. However, on an annual basis, Tom Fazio is voted as the world's premier golf course architect. His courses are demanding while playable, beautiful and functional, and most importantly, fulfill the client's mission. For the most part, however, his courses are not championship venues. Other architects like Norman, Doak, Kidd, Crenshaw and Coore, are generating wonderful

(continued on page 26)

So how does a golf course provide a suitable contest for the better golfer, while simultaneously challenging the average player? The burden to create such a venue is placed squarely upon the golf course architect.



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facilities, suitable for the single-digit or high-handicap golfer. These architects produce some fantastic facilities worthy of high acclaim.

The ability to integrate challenge and playability is a difficult task. Simply, it is very easy to make golf courses tough. Like these architects, I try to avoid designing purely for difficulty. Specifically, holes that rely solely on length require little imagination by the architect, and even less skill by the golfer. If length is presented, then wider fairways may be desirable or even necessary. I subscribe to wide, forgiving fairways with more difficult approach shots. Donald Ross emphasized that errant shots should be offered a chance for recovery, no matter how remote. The intent is to offer risks, rewards and challenges depending upon skill and nerve. Balance in golf course design is equal parts playability, difficulty and beauty.

Aside from the obvious (the best projects), great architects have a unique ability to employ a specific landscape and produce a wonderful golfing experience for everyone. They find a dominant landscape characteristic and exploit it. These artisans utilize subtle characteristics to resolve playability issues. It is this creative and thoughtful ability that makes an architect and golf course great.

Golfers and architects, critics and novices, must realize that this game is one of endless solutions. Answers to questions about design, difficulty, challenge and playability will be hard to find particularly as golfers are afforded a looser interpretation of any equipment standard. Some truths, however, are obvious. Some may deem the "the rub of the green" as fair, some will call it fickle. Maybe, "playable" could be defined as: "Equally challenging for all."



The intent is to offer risks, rewards and challenges depending upon skill and nerve. Balance in golf course design is equal parts playability, difficulty and beauty.

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The Changing Face of Golf Course Management

Editor's Note: The GCSAA issued this press release in early March. It appears here to reflect how GCSAA is positioning the new certification requirements under PDI.

As sure as the azaleas blooming at Augusta National, the start of each golf season brings new technology that the marketing gurus say is guaranteed to improve one's game.

But come 2003, the newest advancement will not be a longer-flying ball; a lighter, yet bigger, oversized club head; or a more flexible shaft. In fact, to take advantage of this new innovation, golfers will not have to take a lesson, make a purchase at a pro shop or spend extra hours at the driving range.

As of July 1, 2003, Golf Course Superintendents Association of America (GCSAA) members will have to meet more rigorous standards. Other associations have created stricter membership requirements, and like those associations, GCSAA recognized a void in the world in which its members functioned. Today's golf course superintendents are being challenged by golfers and employers to produce at unprecedented levels, and there is no reason to believe those demands will wane in the future. The new standards will provide golf course superintendents with the tools to manage a facility in a manner that enhances the golfer's enjoyment of the game.

"The game and the business of golf have changed tremendously in a relatively short time period," says GCSAA president Mike Wallace, certified golf course superintendent. "There are economic and course management pressures that did not exist 10 years ago. Competition between golf facilities is more intense and the expectations for premium conditions on a daily basis have combined to put the onus on the golf course superintendent to perform like never before."

Recognizing the continued need to keep pace with the marketplace, GCSAA members in February 2001 approved a membership standards bylaw amendment that will showcase the knowledge, skills and abilities of the

golf course superintendent. Class A members will be responsible for completing entry-level and ongoing requirements for continuing education and service, tenure as a superintendent and possess pesticide application credentials. The pesticide license requirement speaks to the core makeup of the golf course superintendent. In addition to a love for the game of golf, superintendents choose to enter the profession because of a desire to work with nature. The combination of standards and the pesticide license support the commitment of the profession to environmental stewardship.

A key feature of the continuing education program is development of individual occupational core competencies. The establishment of these competencies will provide focus and enhance the education GCSAA provides to golf course superintendents and the golf course management industry. These competencies include communications, leadership, operations management and resource utilization. The competencies are broken down further into specific skill sets. For example, the resource utilization competency is evaluated on such subjects as the rules of golf; golf course and grounds construction/renovation; soil management; turf management; and staffing, among others.

The competencies also will serve as the guiding foundation for the Class A requirements and the advanced voluntary level of Certified Golf Course Superintendent (CGCS). There are approximately 9,000 Class A GCSAA members and 1,800 Certified Golf Course Superintendents. The certified requirements will still be substantially more challenging than those of Class A. A certified applicant must pass a six-

hour exam and have his/her course evaluated by two other certified golf course superintendents before achieving this status.

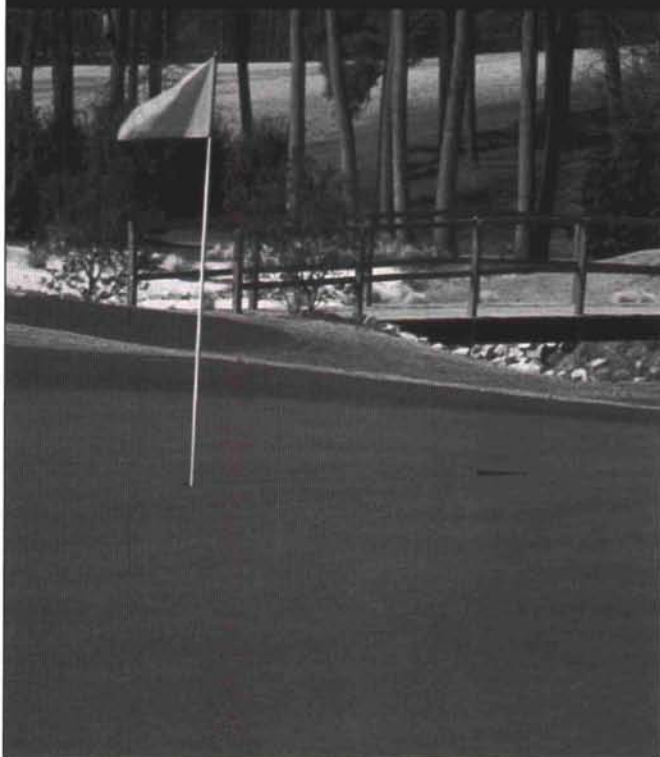
"The membership standards dictate a prescribed level of education and experience for the GCSAA golf course superintendent," Wallace says. "This will no doubt advance the superintendent profession, but the ultimate benefactor will be the golfer. A better educated golf course superintendent means a better golf experience."

For the past 75 years, GCSAA has provided education, representation and information to the men and women who maintain golf facilities. During this time, golfers have witnessed unprecedented advances in the quality of golf's playing field. Golf course superintendents have been able to overcome the ills of weather, disease and traffic that afflict their facilities. Events that used to close facilities for days or render large portions useless for weeks upon end are now a rare occurrence. Regular maintenance activities that once called for courses to be closed for a day can now be performed during play, resulting in little or no interference with golfers.

In fact, many golf industry experts—including the legendary Byron Nelson—contend that the greatest advances in the game have come not in the playing implements, but in the science, technology and education employed in maintaining golf courses. The new standards for GCSAA superintendents will continue the improvements the game has witnessed over the past 75 years.



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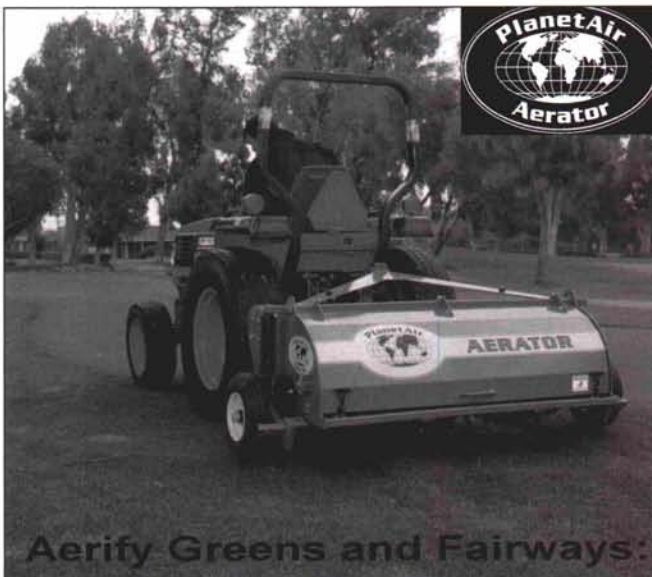
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