

# Understanding and Appreciating Firmness

Our mentors taught us that firm is good. Now we have to spread the word.

BY STANLEY J. ZONTEK



*A view of St. Andrews Links. Links golf has always had a special appeal for its tight lies, firmness, and the ground game. Achieving firmness through using less water, managing thatch, and good soil drainage should provide excellent golf course playability — all part of a more sustainable golf course on either side of the Atlantic.*

The USGA, golfers, and turf managers have long recognized the link between firmness, good golf, and sustainable turf management. An article entitled “Firm Greens, Best for You and the Course” by Bob Sommers, former managing editor of *Golf Journal*, appeared in the April 1966 issue of that magazine. While the intent of this article centers partly on irrigation practices, the point then and now remains that firm greens are best for golf.

Today, this desire for the same type of firmness extends to all areas of the golf course. Firm tees provide better footing in comparison to soft, unstable footing on a thatchy and often wet tee. On fairways, the appeal of the traditional links golf courses of the British Isles has always been their firmness, tight lies, and ball roll — the ground game. This is in comparison to the

traditional American style of golf and golf course design, where the primary emphasis is on the air game and less emphasis on the ground game. How greens hold a shot has always been part of our vernacular.

In addition to having firm greens, putting green approaches also should be firm, especially in situations where the design of the green allows, if not demands, a pitch-and-run shot to have the ball bounce and run onto a forward hole location. Agronomically, firmness is an integral part of both good golf and good turfgrass management. Both can and should coexist. But how?

## UNDERSTANDING AND EDUCATION

Links golf has appeal on multiple levels — the ground game and the ability to consistently play pitch-and-run shots or even putt the ball from

yards off the green. This style of golf and turfgrass management has been sadly lacking in how golf is defined in America.

Many American-style golf courses were and are designed more for an air game than a ground game. Look into the bags of better golfers. They carry multiple wedges. These clubs were designed not to bounce and run a golf ball onto a putting green, but rather to loft them high into the air so they will hit the green and stop near the hole. These same lofted clubs also are good for recovery from lies in deep rough. In any case, the evolution of the American-style air game has influenced how golf courses are managed, maintained, and even designed.

The management of this style of golf course centers on the shot-holding ability of a green. The best greens are those that are both firm yet resilient,





*Thatchy turf, be it on a green, tee, or fairway equates, to soft and spongy playing surfaces. The popularity of fairway topdressing, even in a down economy, underscores the importance placed on thatch management, soil improvement, better drainage, and the better turf that results from this program.*

but these are not easy factors to balance. After all, golf course superintendents are essentially employees of the course. They maintain the golf course they are given with the resources that are available. Golf course maintenance has an effect on firmness. That said, even the best golf course superintendent, with good thatch and water management skills, can only do so much, especially when golfers are reluctant to allow enough time for core aeration, topdressing and/or deep dethatchings of the turf, or if they are hampered by a poor irrigation system and soggy, poorly draining soils. Without the flexibility to do this necessary work, the job of maintaining a firm golf course becomes difficult. The golf course superintendent has a huge influence on how the golf course is presented, but ultimately it is what the

golfer wants and is willing to pay for that influences the course and how it is managed. Therefore, the first steps toward a firmer golf course could be (1) understanding the golf course and its needs and (2) educating those involved that this is what it will take to achieve the firmness desired. It is a long-term commitment, not simply using less water.

### THE PERCEPTION OF "GOOD"

The majority of surveys about what golfers want, or perceive as being good, is to "play on a well-conditioned golf course." In simple terms, this means no dead grass anywhere, and a well-presented course is vital. This perception of what is good can also include no bad lies in the roughs and no bad lies in the sand bunkers. Forget the obvious fact that a golf shot hit into

a hazard or into the rough should be penalized just a little bit.

As golf and turf management are defined in the United States, how the golf course looks and how fairly and consistently it plays are the foundation of what players judge a good golf course to be and how it should be maintained. It is important to understand how we got to where we are, and it will take education and understanding to move forward to sustainable and more playable golf courses. The golf course may not look as handsome, but it is how the course plays that's the most important criterion.

Note: Not every golf course can or should reconstruct and lower every elevated green to allow for a pitch-and-run shot, or turn off the water and let the golf course brown-out (golf cart traffic on wilting grass is not good), or furrow sand bunkers to make them more of a hazard, etc. Rather, simply look at your golf course and discuss it with your members, golfers, committees, course management, and/or ownership and ask this question: "Looking forward, how do we want our golf course to look and play?" After all, the fascination of golf is that no two golf courses are alike.

Other options for golf course "definition" do exist. An article that appeared in the *USGA Golf Journal* in 1977 titled "Green Is Not Great" by Alexander M. Radko, then national director of the USGA Green Section, was clear and direct. Al Radko asked, "Does every blade of grass on a golf course have to be perfectly clipped? Should not a few brown spots on fairway edges be a sign of good turfgrass management?" Those questions are as appropriate to ask now as they were in 1977, especially as we look to conserve precious water resources.

### THE USGA INITIATIVE

At the 2010 USGA Annual Meeting, the incoming USGA president, Jim Hyler, asked, "Can golf courses be managed in a more sustainable manner, using less water while emphasizing playability over appearance? Could these golf courses also be economically sustainable to maintain in the long



term?” As an agronomist for the USGA, I can say that the answer is “Yes.”

### MEASURING FIRMNESS

Perhaps it is no coincidence that the two governing bodies of golf, the USGA and R&A, have developed or are participating in the development of devices to measure firmness. The USGA developed the TruFirm. The R&A, along with the scientists of the Sports Turf Research Institute (STRI), adopted the Clegg Hammer to measure firmness. While the devices are different in their engineering, the purpose is the same: to measure the firmness of a turf surface by measuring the impact of a golf ball-sized steel shaft on the surface. We now have tools to accurately measure the firmness of golf playing surfaces. This did not exist even a handful of years ago. Today, governing bodies of golf are incorporating firmness measurements into their championship preparations. After all, the USGA defines course setups for only 16 golf courses each year — those hosting our championships. These tools allow superintendents at every golf course to measure and make their own decisions on firmness.



*Improving the infrastructure by installing sand-channel drains improves drainage in old topsoil-based greens. Improved drainage is good for the grass and definitely aids in firmness.*

### MANAGEMENT IMPACTS

Turf managers have long appreciated the negative impact of thatch accumulation on firmness. Soils having a generous layer of thatch or organic matter accumulation tend to be soft and spongy. Grass growing in thatch tends to have shallow rooting, which

necessitates more applications of water. This layer of organic matter accumulation, while part of normal and natural grass growth, needs to be managed on an ongoing basis. Thatch is controlled best by core aeration, deep vertical mowing, and incorporation of topdressing sand into the surface of the soil. Research is clear on these points. When the surface of the ground is firm, the organic matter is well diluted with topdressing and has channels for water, air, and grass roots to move down through the soil. The grass is healthier, more deeply rooted, grows in a better soil environment, and the playing surface is firmer, be it a green, tee, or fairway. Note: A certain amount of thatch is desirable. Well-diluted organic matter holds moisture in the soil, retains nutrients, and cushions the soil from the effects of traffic and compaction.

### OTHER CONSIDERATIONS

Turf managers and soil scientists have long appreciated the importance of the relationship individual sand grains have on firmness and other factors. In simple terms, the more rounded the sand grains and the higher their percentage, the softer the putting green, topdressing, or bunker sand. By



*The goal is to keep the grass healthy and alive without overwatering. Good water management contributes to healthy turf, firmness, and better playability.*



contrast, the more angular or sharper sands tend to bridge, resulting in firmer putting green soils and bunker or topdressing sands. Think marbles vs. bricks. Manufactured sands (crushed rocks) tend to be firmer sands, whereas sands mined from the soil tend to be sub-angular to more rounded due to eons of tumbling and weathering.

Most golf course sands are composed of all manner of sand particles of different sizes and shapes intermixed with small amounts of silt, clay, and other fines that contribute to firmness. The relationship between the individual sand particles determines how soft or firm a sand will be. This is all well understood, but the golf industry still lacks definitive firmness guidelines. That said, soil testing labs can provide guidelines on which sands are softer, firmer, and somewhere in between. There is more to selecting sand than its color or particle size analysis. Increasingly, if there is a desire for firmness, accredited testing labs can assist in providing the measurements we do have, i.e., determining the Coefficient of Uniformity (CU) and the fried-egg test.

Our appreciation of firmness now allows us to construct new golf greens with firmness as a design consideration. The newly rebuilt greens at Congressional Country Club, Bethesda, Maryland, site of the 2011 US Open Championship, were constructed with firmness in mind.

### EVERYDAY CONSIDERATIONS

What can golf courses not hosting the US Open do to achieve better firmness? Here are some thoughts.

**Maintenance Standards.** If a Maintenance Standard Statement does not exist, develop one. This document will help define the golf course, how it should look and play, and, ultimately, how it is to be maintained. All golf courses are not the same. Having maintenance standards reduces the assumptions anyone may have on how the golf course is to be maintained.

**Education.** If a firmer, drier golf course is your goal, golfers need to know that there may be less lush grass or even a few brown spots out on the golf course. A few dry spots and turf wilt on high spots should not result in a

panic attack that the golf course is dying or being poorly maintained. Rather, the course is being properly maintained to the agreed-upon maintenance standards, especially as it pertains to irrigation. The question should be, how did the golf course play? Was it firm with bounce and roll? Were the ball marks on the greens bruises and not deep pits, gouges, or the dreaded skid mark ball mark?

The one complicating factor in the maintenance of a truly dry golf course, especially during the heat of the summer, is golf cart traffic. This traffic on wilting grass, especially bentgrass, can cause turf loss problems. The one factor links golf courses in the British Isles (and some of our best courses) do not have to manage is traffic from golf carts. It is a question of balancing the needs of the turf with the reality of income and play.

The desire to achieve a firm and playable golf course should not be taken to extremes or be used as an excuse for the gross mismanagement of a golf course. There clearly is a matter of balance between the realities of growing grass and the need to



*Light, frequent dustings of topdressing are an important management tool to maintain putting green smoothness, trueness of putt, and thatch management. These light, frequent applications also contribute to firmer greens.*

provide good, playable golf turf for all golfers. It is important to define how you want your golf course to look, play, and be maintained. This is a question that all golf courses need to address.

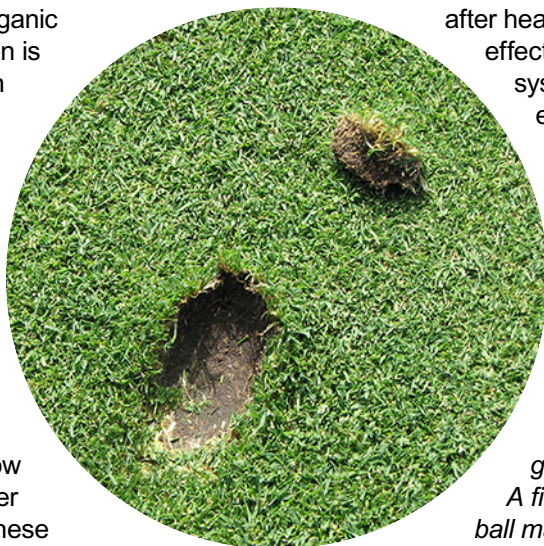
**Organic Matter/Thatch Management.** Look at and study the organic matter layer on all of your principal play areas — greens, tees, and fairways. If too much organic matter exists, or if that zone of organic matter accumulation is not well diluted with topdressing, begin programs to reduce the amount of organic matter and dilute what remains with a topdressing program. There are physical soil tests that accurately determine how much organic matter exists in the soil. These same tests can be used to monitor the organic matter content of soils over time. These tests can show if greens are being over-aerated, i.e., they need some organic matter accumulation. More golf courses should utilize physical soil testing to complement chemical soil testing.

If any question arises on any of these points, work with your local USGA Green Section agronomist to develop and monitor these programs. Part of a Green Section Turf Advisory Service (TAS) visit should concentrate on achieving your goals, be it firmness, playability, healthy grass, and long-term golf course sustainability. There can be no better money spent than on proper guidance from the appropriate consultants and laboratories to achieve your goals.

**Golf Course Infrastructure.** Two important golf course infrastructure features, drainage and irrigation, should coexist in order to achieve healthy and sustainable turf along with reasonable levels of firmness. Consistent firmness requires well-draining soil. There are options to retrofit drain lines into greens, tees, and even fairways. Poorly drained soils can be improved

by soil modification techniques, such as sand topdressing and a deep aeration program, even on fairways. An amazing number of golf courses are embracing fairway topdressing as a way to achieve better drainage, healthier grass with less disease, thatch control, and firmer conditions, while allowing golf carts back out onto the fairways sooner

after heavy rains. An effective drainage system needs to exist to remove excess water when it rains too much.



*This type of ball mark is a good indicator that the putting green is too soft.*

*A firm green has a ball mark that is more of a dent or bruise that often can be hard to find. The different ball marks are good indicators of firmness.*

Equally, when there is a need for irrigation water, this precious resource needs to be accurately and evenly applied. Our industry has efficient and effective irrigation systems, far better than those of yesteryear. The industry has several good options to monitor soil moisture levels via portable monitors or those buried in the soil. The goal is the same: to apply water when and where it is needed and not in excess. This is good for the grass, good for golf, good for your budget, and good for the environment and overall golf course sustainability. Well-designed and functioning irrigation and drainage systems are important infrastructure elements that need to exist in order to achieve a firmer and drier golf course, along with better grass.

**Golf Course Maintenance.** How the golf course is physically maintained has an effect on grass health, firmness, playability, and golf course presentation. Does the budget allow

for extra labor to hand-water? For core aeration and topdressing programs for greens, tees, and fairways? For effective thatch management and soil modification, including sand injection? How the golf course is maintained is a good topic to discuss with the staff, management, and outside consultants. The goal is to achieve a consensus and then to develop a golf course maintenance plan.

#### **Grass Growing Environment.**

Grass and soil that are constantly in shade stay wet and softer longer, and intense shade is not good for healthy grass growth. One of the beauties of the British links golf courses is that they are essentially treeless. This fact, along with freer draining and sandier soils, are two of the most significant natural features that makes links golf courses so special.

#### **IN CONCLUSION**

In the final analysis, every golf course manager must determine what is in the best interest of the course; what is sustainable for one golf course may not be for another. The goal of this article is not to suggest that all golf courses be crusty brown; rather, to suggest that it is okay to have an off-color golf course where playability comes first.

The governing bodies of golf are trying to affect golfers' thinking that how the golf course plays is far more important than how it looks. While each golf course is different, some factors are the same: The game of golf is played on grass; firmer grass and soils are best for golf; a firmer, drier golf course may be a more sustainable golf course; and a green, lush golf course is not necessarily a great golf course.

Our mentors had it right. It is for us to move these thoughts ahead into the future by understanding and appreciating the importance of firmness and how it relates to the game of golf, sustainable turfgrass management, and the environment, now and into the future.

STANLEY J. ZONTEK is the director of the USGA's Mid-Atlantic Region.