



The Science of Golf: What a Superintendent Needs to Know

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Perspective

As I recall my first appearance in the Grass Roots, I remember commenting that one either enters the golf course management profession through the maintenance shop or the pro shop: love for the land or love for the game. In my case it was clearly love for the land, yet I remain fascinated with a game for which people develop such passion. I am pleased to write that I have found some answers—the science of golf.

Science by definition is “a systematic accumulation of knowledge through study or practice”. My personal definition adds “thinking about the complexities and subtleties of a vocation”. Therefore, I am captivated when I encounter information that systematically probes the various aspects of my profession. Recently, I have been reading the *Proceedings of the World Scientific Congress of Golf* held last summer in St. Andrews, Scotland. It contains 92 different papers and over 600 pages covering the world of golf including the golfer, the equipment, the golf course and finally the game.

The essence of the *Proceedings* is wonderfully outlined by Mr. Frank Thomas, the technical director of the United States Golf Association (USGA). Mr. Thomas writes, “golf is one of the few activities which allows us to satisfy a subconscious urge to evaluate ourselves.” He continues to suggest that golf allows us to “periodically take stock of ourselves through feelings of humility.” Still, one “derives an inner warmth from achieving their goals” which lies at the core of the passion. Without knowing it, Mr. Thomas describes for us who enter through the maintenance shop, the feelings that settle inside us when our course is prepared to our satisfaction for all to enjoy.

The Golfer

As I read through the *Proceedings*, I kept asking the question, “how does this relate to the golf course superin-

tendent?” Would the respiratory pattern during the golf swing or the analysis of Tom Watson’s play at the U.S. Open over the last 13 years impact course maintenance? (by the way, Watson’s lack of competitiveness at major tournaments has long been thought to be a result of poor putting. Yet, statistically analyzing his 3719 shots during the Open we find it is a decline in his tee to green play). However, articles on the psychological aspects of a golfer’s performance does provide some useful insight.

Psychology and Maintenance. If a typical round of golf is played in 4 hours with 90 shots and 20 seconds for each shot, then golf is only “played” for about 30 minutes. The remaining 3.5 hours is spent thinking about performance, but more likely it is spent enjoying the beautiful surroundings that are under our care. The article continues to present in-depth discussion relating optimum performance to the golfer’s ability to focus on the internal environment (goals, practice, preparation and analysis) and avoid expending energy on the uncontrollable external environment (weather, course conditions, opponents). In other words, the golfers most critical of course conditions could be considered engaged in a violent struggle to mentally master the game.

The best players direct attention to internal concerns that determine performance. These ideas provide support for superintendents to focus course maintenance on consistency, maximizing the challenge of each hole and maintaining a visually appealing landscape. This information also suggests that there is a strong correlation between how much someone complains and how well they are playing—no surprise here.

A study was conducted to evaluate the golfer’s ability to read greens. The conclusion was that poor putting performance was a result of an inability to determine the break in a green. Data

was collected after the golfers under study attempted the same putt 6 times. The question in my mind remains, “how do most golfers determine putting green quality?” Criticism of functional performance such as speed, grain and resiliency must be related to more theoretical psychology than reality.

The Golf Course

With an appreciation for what goes on inside a golfer’s head and how it might explain some issues of golfer expectations, I was interested in the section that discussed the science of the course. Of the 20 articles in this section 50% were from the United States (US), with the next most (30%) from the United Kingdom (UK).

Ball Roll and Ball Impact. Stephen Baker of the Sports Turf Research Institute in the UK presented an article that relates directly to the WGCSA/WTA sponsored “Putting Green Management Systems” research. Dr. Baker discusses the influence of management factors on the playing (functional) quality of putting greens. Estimates for professional players indicate that 66% of all golf shots involve an interaction between the ball and the golf green, either as an approach shot or a putt. It is no surprise then that when the greens are in rough shape, the golfer’s perception of the course can be negative.

The interaction of the ball and the surface can be subdivided into ball roll (green speed) or ball impact on the green. There is considerably more information on the influence of management on ball roll than on ball impact. However, large gaps in the effects of wear, thatch and verticutting on ball roll still exist with only a few studies to support management decisions. Ball roll is less influenced by rootzone materials, except in wet conditions, than is ball impact, which is strongly influenced by rootzone materials. The processes of ball impact are more complex and relate to resiliency characteristics, surface

hardness and amount of ball spin retained after impact.

Another study conducted in the UK specifically addressed golf ball impact on the green. A conclusion of the study was that greens with low amounts of annual bluegrass provided a more firm surface that enabled golfers to utilize backspin. As annual bluegrass populations increased the ability to utilize backspin decreased. This relationship was suggested to be indirect, possibly a result of increased moisture levels that encourage annual bluegrass. Do large populations of annual bluegrass limit a superintendent's ability to develop firm surfaces?

Player Perspective. Stephen Baker suggests an interesting concept relative to player evaluation. He suggests a written survey distributed to the golfer to determine overall putting green turf performance on the same day that physical measurements of ball roll and ball impact are collected. This would enable a superintendent to determine the actual quality preferences of the golfers using the course. A superintendent could then focus on maintenance practices that provide the conditions most appreciated by the players. This process has begun in Wisconsin as the putting green

research at the Noer Facility strives to identify some guidelines that could then be tested on courses and evaluated by golfers. Is it possible we are over-grooming the course?

The Game

The golf course section of the *Proceedings* contains articles on pesticides and the environment, black layer and other interesting topics. However, an analysis of professional player performance provides some interesting bits of information with respect to course maintenance. Driving distance over the last 25 years has increased only 12 yards, greens in regulation is the same, but putting has improved by approximately one stroke and accounts for improved scoring over the 25-year period. I contend that the lack of significantly improved performance over the period is a result of refined maintenance practices that have enabled the courses to maintain a consistently challenging test that still rewards accuracy and patience. Course maintenance has improved as player skill has improved.

The *Proceedings* conclude with articles that address the future of golf and the need for new course development. I was glad to see the discussion bal-

anced among demand for golf, economics and environmental concerns. We are truly becoming more aware of the biological and social issues that impact the game. There is even a suggestion that golf has a civilizing function that attempts to explain why it has grown from an obscure and casual game played by an elite few, to a worldwide global obsession. The authors suggest that the discipline involved to excel at golf has a civilizing effect on the masses. Clearly, these authors have never attended a green committee meeting or been around on men's day.

Closing Thought

I will always consider myself to be a student of my profession (the science of turfgrass) and may never embody all that the game of golf strives to teach me. Yet, I am convinced that continued progress in golf course management and science must include the golfer. The superintendent will need to develop management programs that are refined to address the golfers' reasonable expectations, linking quality to maintenance. These programs will emanate from the accumulation of knowledge and experience—also known as science. ♣



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