

The Big Three of Putting Green Setup: Firmness, Slope, and Speed

Three principles, three tools, and three applications will have you on your way to creative, fair, and fun playing conditions.

BY CHRIS HARTWIGER

Golf is an outdoor game played on finely maintained turf. Every golf course has a unique “game board,” and golfers, armed with up to 14 clubs and a golf ball, attempt to negotiate varied terrain in as few strokes as possible. Most of the strokes and much of the time in a round of golf involve the putting greens. As a result, the decisions made by the golf course superintendent related to the daily setup of the putting greens influence difficulty, pace of play, and the enjoyment of the golfer.

Firmness, green speed, and the amount of slope around the hole location are three variables managed by the superintendent. This article aims to identify three principles associated with each of these variables and demonstrate how they impact the golf experience. Three tools will be reviewed that can be used to quantify or measure these variables, and three applications for use at golf courses will be offered.



The USGA Stimpmeter measures green speed and provides valuable information to assist golf course superintendents in making day-to-day management decisions.



A digital level provides a precise measurement of the slope around a hole location.

THREE PRINCIPLES

Principle: The firmness of a putting green influences the reaction of the golf ball on shots landing on the putting green.

This principle is intuitive and easily recognized by golfers. As firmness changes, the golf ball will either release farther from the point of impact or not as far. Generally speaking, putting greens that are less firm will yield lower scores because the golf ball does not move as far from where it lands. In other words, the area where a ball can hit the putting green and remain on it effectively increases. Also, more shots hit from the rough or mishit will hold the green. When conditions become firmer, the effective landing area on the green will decrease, which increases difficulty.

Principle: The green speed influences how far a ball will roll on a flat surface.

Green speed is measured with a USGA Stimpmeter on a flat surface. Generally, faster green speeds are associated with more difficulty. It is not too difficult for

golfers to calibrate their strokes on a perfectly flat putting green across a wide range of green speeds. But in reality, a golfer is rarely likely to face a putt with a green speed that matches the speed measured on a flat surface. Why? Because putting greens are not flat and the golfer is constantly facing putts that are influenced by the slope.

Principle: The slope around the hole location influences the difficulty of the putt.

If putting greens were perfectly flat like pool tables, all putts of the same distance would be of equal difficulty, regardless of the position of the ball in relation to the hole. However, all putting greens are unique and golfers must constantly judge the distance and slope associated with their putts. Straight putts are less challenging, with the straight uphill putt being easier to make. As slope increases, sidehill putts become increasingly more difficult as golfers are required to read the line and speed of the putt with the amount of force the golfer intends to use when striking the putt.

A short video (webcast.usga.org/usga/splitscreen.wmv) is provided to drive home the point that at a given green speed, the slope along the line of the putt has a tremendous influence on how far the ball will roll at a given force. The video demonstrates what happens when three golf balls are released from a USGA Stimpmeter on a putting green with a speed of 11 feet down a 3.4% slope. Each of the golf balls rolled approximately 36 feet. When the balls were rolled up the same slope, ball roll was just short of 7 feet. Therefore, decisions made each day at every golf course on where to place the hole will have a large impact on the challenge facing golfers. More slope equals more difficulty, and less slope equals less difficulty.

THREE TOOLS

How the variables of firmness, green speed, and slope are managed day to day impacts the golfer's experience. These factors will be managed more effectively if they are measured. Fortunately, three tools are available.

Tool: The USGA Stimpmeter is a device that should be used to measure

green speed — not to dictate a minimum number.

The USGA Stimpmeter is a staple in most golf course superintendents' utility vehicles. It allows the superintendent to assign a number to the green speed on any given day. Also, it offers feedback on how certain maintenance practices are impacting green speed.



The TruFirm is a tool developed by the USGA to quantify the firmness of a putting green. As firmness changes, so does the reaction of a golf ball on a putting green after it hits the surface.

In 2013, the USGA introduced a new Stimpmeter that features a second ball-release notch lower on the Stimpmeter. This is ideal for putting greens with limited flat areas. More information on the new USGA Stimpmeter and additional links on its use can be found here: [USGA Stimpmeter Information](#).

Tool: The digital level should be used to determine slope and can help avoid hole locations that are too difficult.

A digital level can be used to measure slope at a current or potential hole location. A variety of digital levels are available at a reasonable cost from most home-improvement stores. They are used routinely by either the staff or the person changing holes to quantify the slope immediately around the hole.

Tool: The TruFirm is a device that measures the firmness of the playing surface.

The USGA TruFirm was developed by USGA Technical Director Dr. Matt Pringle as a way to quantify putting green firmness. Previously, firmness was evaluated subjectively by watching how golf shots reacted after hitting the putting green. Initially, the TruFirm was cost prohibitive for most golf courses, but a recent partnership with Spectrum Technologies has resulted in a much lower cost. More information on the USGA TruFirm is available here: [Spectrum Field Scout TruFirm](#). Today, golf course superintendents have access to a tool to measure firmness daily and track how it changes seasonally.

THREE APPLICATIONS

Understanding the principles above and having access to appropriate tools provides superintendents with more information with which to make decisions regarding daily course setup. Below are three possible applications of these principles and tools for use on any golf course.

Application: Turf Under Stress.

There are times of year when putting green turf comes under environmental stress. Because excellent playing quality on putting greens presupposes healthy turf, it sometimes is necessary to shift maintenance practices for turf under stress to favor the health of the turf at the expense of playing quality. Sometimes golfers complain about losses in firmness and green speed when these changes are made. To offset these complaints, the superintendent can use areas with more slope for hole locations, thereby increasing the difficulty of putting.



A fair, but challenging course setup must consider firmness, slope around the hole location, and green speed.

In addition, the superintendent can use more hole locations along the edges of the putting greens if firmness has decreased. Softer putting greens increase the effective landing area, but the edge hole locations offer a more challenging target. A benefit of making either of these changes is that more area on the putting greens will be used for hole locations, which disperses

traffic over a wider area. This is beneficial for turf under stress.

Application: High-Volume Play.

A busy golf course is good for revenue. Unfortunately, sometimes a busy golf course is associated with slow play. Green speed, firmness, and the slope of the hole location all influence the difficulty of putting and, ultimately, they influence how long golfers spend on a

putting green. Three putts take longer than two putts.

With the principles in mind and tools in use, the superintendent is in a position to influence the amount of time golfers are spending on a putting green. By tracking data on speed, hole location slope, and firmness, the superintendent will learn what combination will produce the best results for pace of play on busy days and may be able to proactively identify potential problem areas that cause bottlenecks.

Application: Tournament Conditions at Regular Green Speeds.

Sometimes golfers have so much faith in their golf course superintendent they believe he can change green speed just like turning a faucet on or off. Unfortunately, this isn't true. However, the principles and tools can be applied to create "tournament conditions" at regular green speeds. This can be accomplished in the following ways. First, identify hole locations on several putting greens where most golfers will face downhill putts. As demonstrated earlier, downhill putts roll much farther than the posted green speeds. Good potential locations include the front portion of a putting green with significant slope or areas just over bunkers. Second, identify areas where balls tend to collect that will leave golfers with putts with more break to a given hole location. Sometimes these can be found on edge hole locations or hole locations at the front of a shelf.

CONCLUSION

Golf is a great game full of challenges. The superintendent is not only in charge of the health of the turf but is a master of the challenge the golfer faces each day. Taking the time to study the principles offered in this article coupled with consistent measurement of the variables will provide golf course superintendents with the knowledge to keep the "game board" fair, challenging, and constantly changing.

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