

Putting Green Speeds, Slopes, and “Non-Conforming” Hole Locations

When selecting hole locations on your greens, there are a number of factors to consider.

BY JERRY LEMONS

“That hole location is illegal! That green is just unfair! That green doesn’t have enough hole locations!” These comments are just a few that golf course superintendents have heard more frequently in the last 30 years as green speeds have continued to increase on most golf courses.

What classifies a hole location or green to be illegal or unfair?

The Rules of Golf are very detailed, as Rule 32-b establishes that the Committee responsible for setting up play is to determine hole locations.

But where can the Committee find guidelines for a legal hole placement? And specifically, when does a putting green or specific hole location become “non-conforming” under the Rules of Golf? For many years, the USGA and R&A have published general guidelines for the Committee to assist in deter-

mining where to place holes fairly and how to set up greens for play.

An area two to three feet in radius around the hole should be in good condition without any steep slopes or, if possible, any changes in the degree of slope. In other words, the green in the holing-out area should be as nearly level as possible and of uniform grade, but it need not be exactly level. In no case should holes be located in tricky places or on sharp slopes where a ball can gather speed. A player above the hole should be able to putt with a reasonable degree of boldness, and not purely defensively.¹

Championship greens should be fast and uniformly paced, firm but resilient. They should place a premium on well-executed shots, while exacting a penalty for less precise shots.²

These guidelines sound simple enough, but what factors help define a “conforming” hole location?

GREEN SPEED

There have been numerous articles written on green speed since the Stimpmeter was introduced in 1976. Here are a few highlights:

In 1976 and 1977, the years during which the Stimpmeter was first tested, the average speed across the country was 6'6". Any speed at 7'6" or more was considered “excitingly fast” by the Green Section agronomists.³

Readings at the 1978 U.S. Open: Practice Round – 8'8". First Round – 8'11". Second Round – 9'4". Third Round – 9'5". Fourth Round – 9'8".⁴

In March of 1983, a Green Section agronomist declared, “9½ feet to 10½ feet provides an excellent putting surface for most championships. However, any green faster than 11½ feet should be considered too fast for some championship play and dangerous for the long life of the green if proper attention is not given.”⁵

The final *Green Section Record* edition of 1983 discovered “. . . that most golfers prefer a daily Stimpmeter speed of between 7'6" and 8'6".”⁶

In 1992, “. . . this combination will allow for reasonable putting green speeds, somewhere between 7'6" and 9'.”⁷

We found in 1995 the S.P.E.E.D. acronym chart only went up to 9'6".⁸

A 2003 article told us, “Stimpmeter readings on American golf courses generally range from 7' to 12'.”⁹

By 2006, “The idea of ‘target’ rolling offers the perfect combination of rolling without causing excess stress, creating smooth surfaces at whatever



This classic 1904 Strong and Tillinghast course contains slopes that are practically impossible to negotiate when the greens are fast.

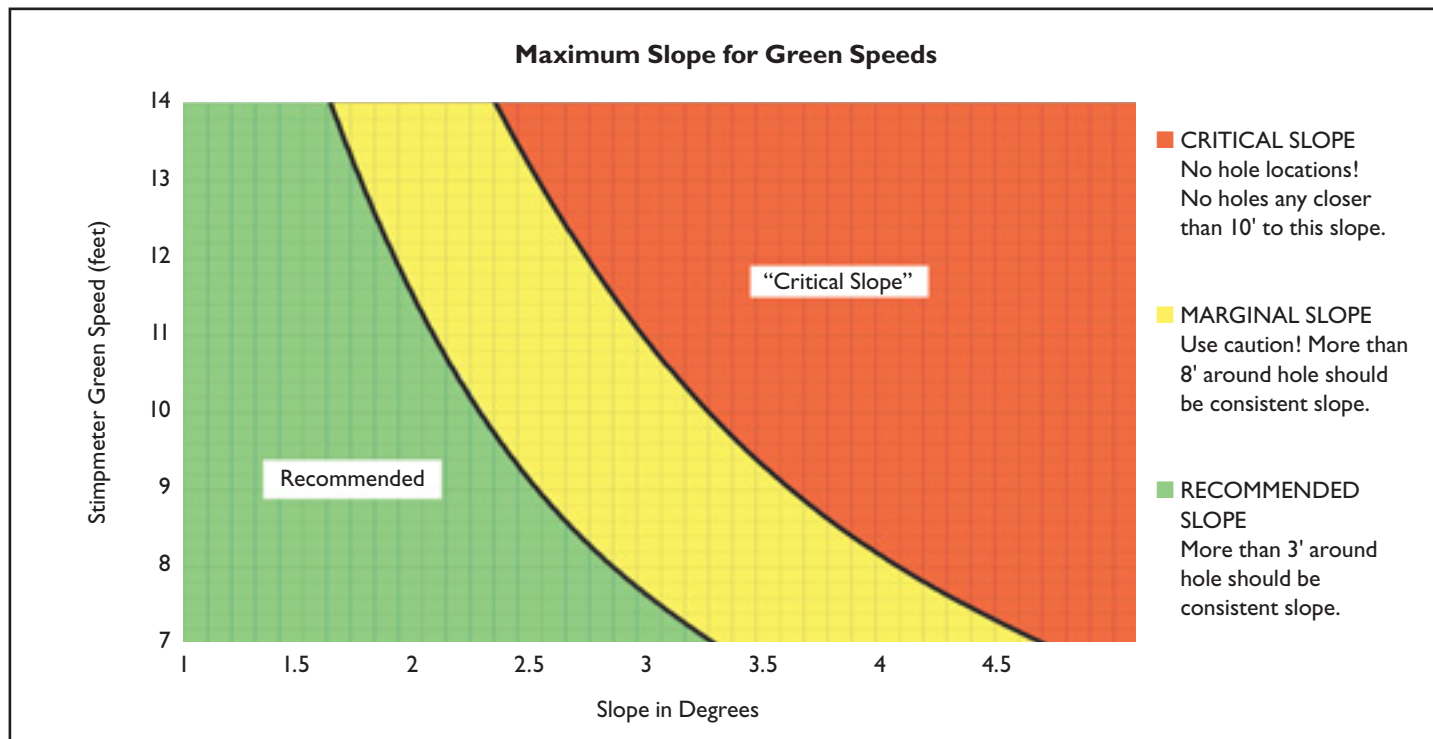


Figure 1. It is important to understand the direct relationship between green speed and putting green slope. As green speeds increase, the potential for uncontrollable slopes also increases.

speed your membership desires (stay in the 9'6" to 10'6" range, if possible).¹⁰

In 2007, rated courses in Tennessee had speeds from 8'1" to 9'4" on public courses and 9'5" to 10'4" on private courses.¹¹

ASGCA member Rees Jones says green speeds probably will be at 13' for the U.S. Open at Torrey Pines.¹²

Without fail, the *Green Section Record* articles warned of trying to maintain fast greens, especially for extended periods.

Since the introduction of the Stimp-meter, green speeds have inched higher. Putting green speed discussions are not going away and will likely remain part of the conversation on most every round of golf, warranted or not. In my opinion, most clubs have consistently met the goal of providing their golfers with greens at acceptable speeds. Superintendents now have better tools and knowledge and can provide faster putting surfaces if proper financial resources are available.

Will green speeds continue to climb? I doubt that we will ever again see the same significant average increase as in

the last 30 years, although some of the new bentgrass varieties and ultra-dwarf bermudagrasses can be extremely fast when these greens are dormant. Green speeds on these turfgrasses can exceed 13' without intention and remain that way until the turf begins to grow.

Many golfers find that the faster green putts truer. Faster greens add another level of interest to the game. However, golfers do not like greens that are *too* fast. Greens should be considered too fast when better players experience anxiety because the ball becomes uncontrollable on a putting surface.¹³

PUTTING GREEN SLOPES

We golf course architects enjoy designing and playing greens with character. This character (for which many courses are known) can be any combination of slopes, bumps, swales, and twists of the surface. Putting greens that have too much severity of any of these traits can become unfair at a fast green speed. In short, a putt that misses the hole placed on too steep a slope on a fast putting

green will not come to rest near the hole.

The *USGA Course Rating System Guide* says, "When a downhill roll on the Stimpmeter is 2 times greater in length than uphill, it is considered moderately sloped. When a downhill roll on the Stimpmeter is 3 times greater in length than uphill, it is considered steeply sloped."¹⁴

Over the years, the Green Section has suggested:

The slope of a major portion of a putting green should usually not be greater than 3 percent (1.7 degrees), although some areas may exceed this for special reasons, such as difficult terrain or dramatic architectural effect.¹⁵

Based on current information, any slope 3% (1.7 degrees) or greater on a 10' Stimpmeter reading is too steep for hole use.¹⁶

For us to understand what is "too sharp or too steep," we need to understand the direct relationship between green speed and slopes. We have all watched tournament after tournament on television where greens were so fast that players lost control of the ball

speed and the putts rolled further from the hole and even off the green. As green speeds increase, the potential for uncontrollable slopes becomes inevitable. Committees with years of experience in locating holes can appear foolish when conditions change and hole locations become too difficult.

So at what slope, at a given green speed, does a golf ball continue to roll?

To determine a “conforming” slope, we need to know the green speed and slope that cause a golf ball to continue rolling. Remember your high school physics: a moving ball tends to stay in motion with the same speed and in the same direction unless acted upon by an unbalanced force. Gravity (of steep slope) and friction (of the putting surface) are unbalanced forces on a golf ball.

The Maximum Slope Graph (see Figure 1) shows the Stimpmeter speeds on the left and slope in degrees below. To use this graph, find your current green speed and go to the *red area*. This is the “critical” slope for that speed; it is where a golf ball will continue rolling. The *yellow area* defines slopes that are marginally conforming, while the *green area* on the graph defines “conforming” slopes for a given speed.

We are fortunate to have digital tools that show instantly the slope on a green (Smart Tool, Breakmaster). Like the Stimpmeter, every superintendent should have one of these inexpensive tools to help determine “conforming” hole locations. By using one of these instruments, a Stimpmeter, and this graph, it is quite simple to find a fair hole location. Keep in mind that the tools’ accuracy in reading slopes depends on the straightedge upon which they are placed.

DESIGN OF GREENS — ARCHITECTURE

Among those on your list of favorite golf course architects, most all, past and present, placed an emphasis on the putting green. Since every golfer will play each putting green in a round,

and putting comprises about 40% of the strokes, luck should not come into play.

Architects of the Golden Age such as Mackenzie, Tillinghast, Ross, and Maxwell created greens with bold contours. So do a few contemporary architects. The exciting movement in such greens helps to make those courses interesting to play day after day. Even with the steeper slopes, the greens had adequate fair hole locations, and the superintendent was able to move them often enough to allow turf to recover from traffic.



Placing digital tools on a Stimpmeter or a straight level improves accuracy.

However, as green speeds have increased, some hole locations on these putting surfaces have become unfair. Greens that had 15–20 fair hole locations may now be reduced to two or three. At today’s faster green speeds, these masterpieces can be frustrating to play and even more difficult to maintain due to damage caused by concentrated traffic.

Keep in mind that many greens built prior to the development of the USGA’s method for green construction had little or no subsurface drainage. Golf course architects of many classic courses were not only adding character to their putting greens, but they were ensuring good surface drainage on the soil greens. Fast greens as we now know them were simply unheard of.

FUNCTIONALITY

Putting greens must be designed and built to function as intended. Form

must always follow function. A green that looks good but has few hole locations will suffer during stress periods. For a green to disperse golfer traffic, holeable turf area must be present so that turf recovery can occur during the rotation of hole placement.

A green typically needs no fewer than 14 days for old hole locations to recover from play. If these 14 areas have a radius of 8' (200 sq. ft.), then 2,800 sq. ft. ($\pi \times \text{radius}^2 \times 14$) of space useable for hole locations on the green is needed. The putting surface from the collar inward to 10' contains about

2,200 sq. ft. This means that a 5,000 sq. ft. green needs all 2,800 sq. ft. of remaining useable space to handle normal golfer traffic. Smaller greens can accommodate play only if additional maintenance practices, such as aerification, are intensified. When steep slopes exist on these greens and are maintained at too fast a putting speed, the functionality of the green diminishes.¹⁷

If the number of reasonable hole locations drops below seven or eight per green because the greens are being maintained too fast, the course may become less enjoyable for regular play.

HOLE LOCATIONS

In reality, there are several factors to consider when determining a hole location, but if it is cut on the putting surface, it is legal.¹⁸

A hole should be placed in such a position that no matter where the

golfer is putting from, assuming continuous putting surface between himself and the hole, it should be possible to stop the ball within approximately two feet of the hole.¹⁹

A green so fast (or a hole cut in such a position) that a ball cannot be stopped near the hole from any point on the green, for example, is an unfair challenge.²⁰

Hole placements as a general rule need to be five paces from the edge of the putting surface.²¹

No one likes to see a missed putt roll back or a well-struck putt roll completely off a green when the ball has missed the hole. We all agonize when it happens to us or a favorite professional on television. By using the charts and checking slopes near the hole, a hole location can be set far enough away from steep slopes and the edge of the green so that a well-executed shot that misses the hole will not run off the green, thus giving the player an opportunity to hole out.

The five-pace recommendation is a good one on courses with large greens, but consider that on a 5,000 sq. ft. green, 25% of the green is in the five-pace area (Figure 2). There are courses with small or irregularly shaped greens for which the five-pace suggestion just does not work. Using a 10' guideline increases holeable space by 33%. An even better guide is to make sure that a hole is no less than 10' from the edge of a putting surface, but only if no hazards or steep slopes are within five paces of the edge of the green. This allows a player enough room to have a reasonable opportunity to recover from a good shot that just missed the green.

Take care on greens with multiple contours and slopes. A hole location on the front portion of a multilevel green may be difficult for most golfers to navigate when above the hole.

A CHECKLIST FOR "CONFORMING" HOLE LOCATIONS

- Check and know your green speed.

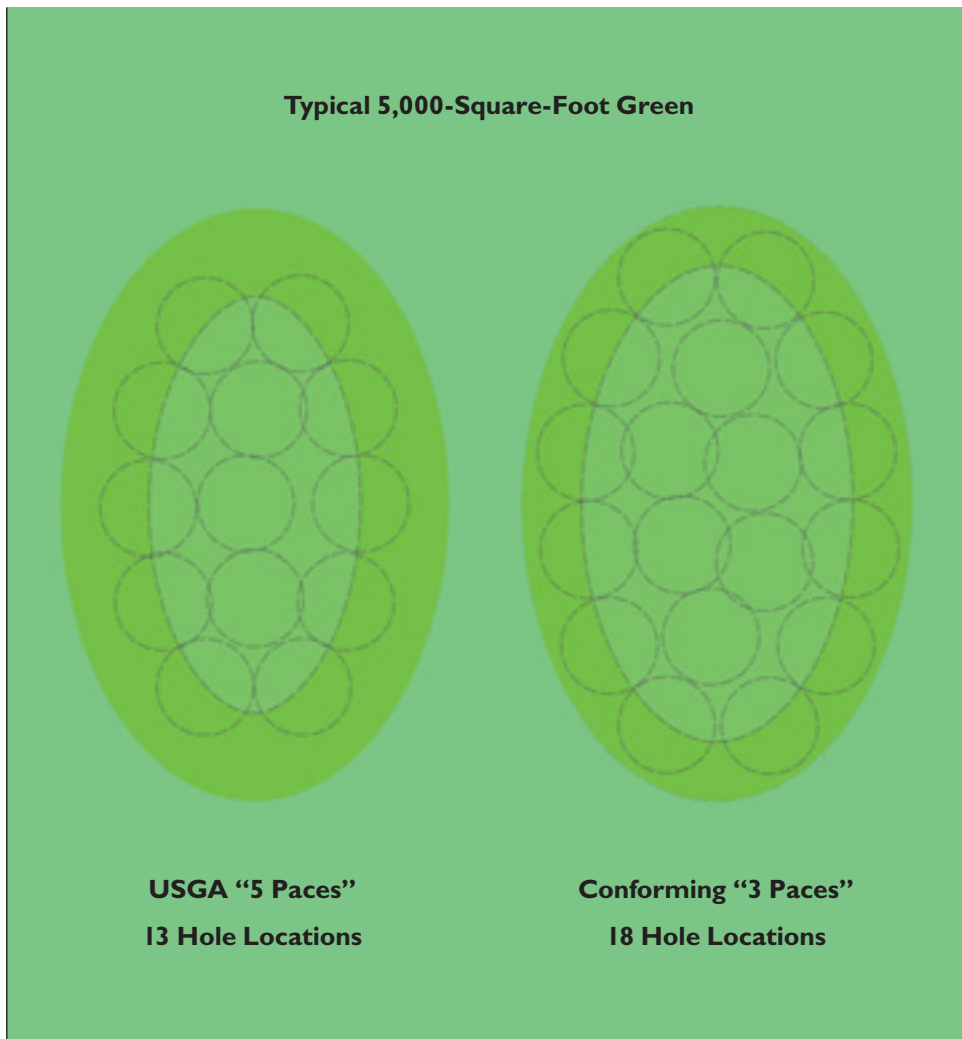


Figure 2. Keeping hole locations at least five paces from the edge of a green is a good recommendation for large greens. On courses with small or irregularly shaped greens, using a minimum 10' guideline from the green edge increases holeable space by 33%.

- Using the Green Speed Slope Chart, determine the maximum slope based on the speed of the fastest green, keeping in mind that weather conditions can change during the day and may result in faster green speeds.
- Study the design of the golf hole and factors affecting the shot into the green, especially the wind, length, and hazards around the green. Anticipate the probable weather conditions and how they may affect the shots played.
- Hole placements, as a general rule, need to be at least four to five paces from the edge of the putting surface. A hole should be no fewer than 10' from the edge of a putting surface if no hazards or steep slopes are near the edge

- of the green. A player should have a reasonable opportunity to recover from a good shot that just misses the green. There must be enough putting green surface between the hole and the front and the sides of the green to accommodate the required shot. For example, for a long iron or wood shot to the green, the hole should be located deeper in the green and further from its sides than may be the case for a short pitch shot.
- Balance hole locations from right, center, back, front, and in difficulty. Make every attempt to have six very easy, six moderate, and six moderately difficult hole locations.
- Once the above criteria are met, the turf around the area should be in good

condition, void of old cup marks, damage, and excessive pitch marks.

- The hole location should have at least 3' around the hole (holing-out area) that is consistent in slope. Hole locations using steeper slopes (yellow on the green speed slope chart) should have at least 6' around the hole. Holes should be placed no closer than three paces to critical steep slopes (in the red).

- In no case should holes be located in tricky places or on sharp slopes where a ball can gather speed. A player above the hole should be able to putt with a reasonable degree of boldness and not purely defensively. A player should not lose the ability to control the ball on a putting green, especially around the holing area.

- For a competition played over several days, the course should be kept in balance daily as to degree of difficulty. In a stroke competition, the first hole of the first round is as important as the last hole of the last round, and so the course should not be appreciably more difficult for any round — balanced treatment is the aim. An old concept of making the course progressively harder round after round is fallacious.

- In early rounds, anticipate players' traffic patterns and avoid locating many holes where walking across the green by many players could spoil good hole locations for later rounds.

- In match play, a hole location may, if necessary, be changed during a round provided the opponents in each match play the same location. In stroke play, Rule 36-4a requires that all competitors in a single round play with each hole cut in the same position. When 36 holes are played in one day, it is not customary for hole locations to be changed between rounds, but there is no Rule to prohibit it. If they are changed, all competitors should be informed.

- During practice days before a competition, it is advisable to locate holes

in areas not likely to be used during play, preferably at the fronts and the backs of greens, bearing in mind the areas that will be impaired by foot traffic patterns.

- The superintendent who cuts the holes should make sure that the Rules of Golf are observed, especially the requirements that the hole liner not exceed 4" in outer diameter and that it be sunk at least 1" below the putting green surface (Definition 15). The hole should be cut as vertically as possible.

- Use common sense with hole placements: "If you have to look long — it's wrong!"

Bob Jones said, "Control of the ball is what all good golfers are striving for. The great courses in America allow the player to make use of his talent to the degree that he can, yet challenge that talent to reward only the exceptional."²²

Although the Rules of Golf may not specifically define a "conforming" or "non-conforming" hole location, in the interest of the game, the committee should consider these recommendations when setting up their golf course for daily and championship play. Selecting fair hole locations involves using art *and* science. Neither the Rules of Golf nor the committee can use an exact formula that can be applied to every situation.

These recommendations will not only allow competitions to occur in a fair manner by identifying the player with the best skills, but they will also allow the great game we enjoy to be played in the spirit that was intended for many years to come.

Courses that maintain greens so fast that only a few conforming hole locations exist should consider slower green speeds. If a club is adamant about having faster speeds, then individual greens can be modified by removing severe slopes and still keep the architectural intent of the existing green.

Call an ASGCA member today!

REFERENCES

- ¹USGA Green Section Record, July 1966.
- ²USGA Green Section Stimpmeter Handbook and USGA Green Section Record, September 1967.
- ³USGA Green Section Record, March 1977.
- ⁴USGA Green Section Record, November/December 1978.
- ⁵USGA Green Section Record, March 1983.
- ⁶USGA Green Section Record, November/December 1983.
- ⁷USGA Green Section Record, September/October 1992.
- ⁸USGA Green Section Record, November/December 1995.
- ⁹USGA Green Section Record, July/August 2003.
- ¹⁰USGA Green Section Record, July/August 2006.
- ¹¹Tennessee Golf Association Course Ratings.
- ¹²San Diego Union Tribune, "Architect Rees Jones is excited and proud as his redesigned Torrey Pines South gets set to host U.S. Open," by Ed Zieralski, February 13, 2008.
- ¹³USGA Green Section Record, November/December 1984.
- ¹⁴USGA Course Rating 2007 System Guide.
- ¹⁵USGA Green Section Record, July/August 1987, "Turf Twisters."
- ¹⁶USGA Green Section Record, March/April 2005, "Turf Twisters."
- ¹⁷Excerpts from Golf Course Architecture, Dr. Michael Hurdzan.
- ¹⁸USGA Green Section Record, January/February 2000.
- ¹⁹USGA Green Section Record, September/October 1981.
- ²⁰USGA Green Section Record, July/August 1987.
- ²¹USGA Green Section Record, September/October 1981.
- ²²USGA Green Section Record, March/April 1977.

SPECIAL THANKS to *Jan Beljan, ASGCA; Rick Robbins, ASGCA; Todd Jenkins, PGA; for their assistance.*

JERRY LEMONS is a golf course designer in Old Hickory, Tennessee. A 27-year veteran of the GCSAA, he earned CGCS status in 1988. He recently was selected as an Associate Member of the American Society of Golf Course Architects. Jerry has designed more than 25 courses and can be reached at www.lemonsolfdesign.com.