Dr. Fred Grau (left) and Johnny Farrell (1928 U.S. Open winner) used a mechanical putter in 1933 to test the putting quality of USGA grasses located at the Arlington turf garden, Arlington, Virginia. The mechanical putter eliminated the human factors when measuring drift and ball speed.

S.P.E.E.D. — Consider What's Right For Your Course

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SINCE the humble beginnings of the game, golfers have maintained an immense interest in the quality of the putting surface. This should come as no surprise, considering that almost half the strokes recorded on the scorecard by most golfers are taken on the greens.

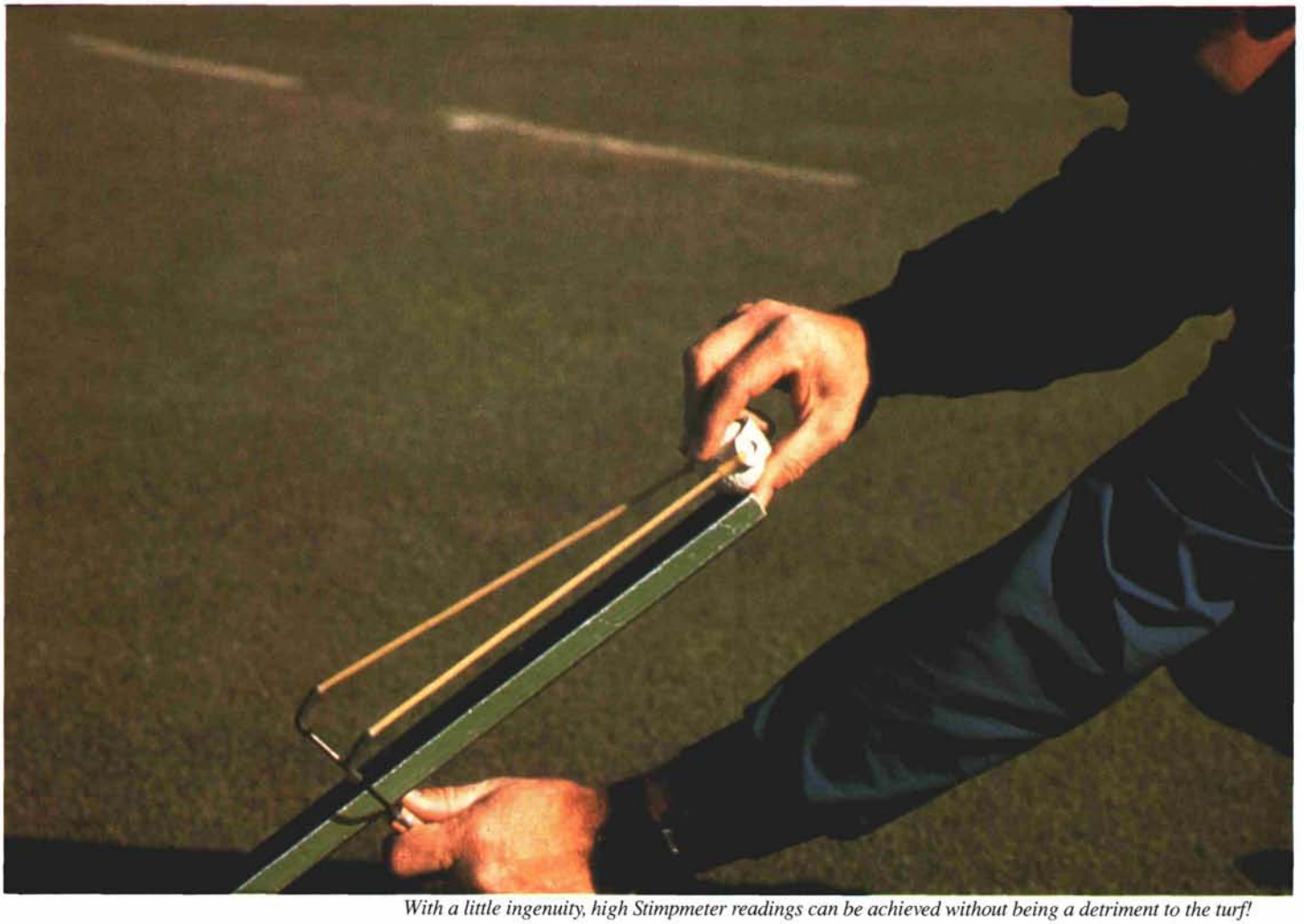
Unfortunately, high Stimpmeter readings are often used today as the sole criterion for evaluating putting quality when, in fact, many greens simply were not designed or built with high readings in mind. Depending on such variables as the principal resources available for course maintenance, environmental conditions, the expertise of the golfers who play the course, and the annual volume of play, maintaining smooth, consistent putting greens at slower Stimpmeter readings may be a more practical and worthy objective.

A review of putting green conditions over the past 100 years reveals how green speed became the focal point of most discussions about putting quality. For without some knowledge about how putting green turf was maintained and evolved, it would be easy to lose sight of where the turfgrass industry stands today.

In the spirit of the centennial year of the United States Golf Association, a good place to start looking at the history of putting conditions is at the turn of the 20th century. As there are no detailed records of putting quality, and putting green speed in particular, the condition of the putting greens can be considered only by examining the golf clubs and mowing equipment used in the late 1890s.

To control long putts, early American golfers needed to get the ball airborne over the tall grass. For this reason, putters were made with a loft as high as 12 degrees. During the past 75 years or so, this measurement has been steadily declining, and today the average loft is between two and four degrees.

Mowing equipment also has changed considerably in the last century. Before the introduction of the motorized mower in the 1920s, greens were cut with crude push mowers set at a quarter of an inch or higher.



With a little ingenuity, high Stimpmeter readings can be achieved without being a detriment to the turf!

As a consequence, the quality of the cut depended greatly on the training and physical condition of the maintenance staff.

Using information about vintage golf clubs and mowing equipment, it's a sure bet that the quality of putting greens when Horace Rawlins won the first U.S. Open Championship at Newport Country Club was a far cry from that of the putting greens on which the U.S. Open is played today. To illustrate the difference between then and now, imagine putting a golf ball on a poorly maintained tee with a one-iron versus putting on the greens at your home course.

Agronomically speaking, much in the past 100 years has changed, from the species and cultivars of turf being grown to the kinds of fertilizer used to nurture its growth. In the beginning, there were no fungicides to control diseases like Dollar Spot and Brown Patch, no 2,4-D to kill dandelions, and crabgrass had to be plucked from the putting greens by hand or it would have taken over by Independence Day. It was quite simply a bare-fisted superintendent against an irate Mother Nature, with golfers putting on the battlefield.

From the 1920s to the 1950s, things started changing for the better. During this era, new products for controlling major pest problems, new turfgrass varieties, new equipment, and synthetic fertilizers gave superintendents the means to maintain putting greens similar to what golfers see today. For the first time, golfers could begin to recognize the difference between well-maintained putting greens and sparse turf damaged by disease and infested with weeds.

One individual who wrote to the USGA to describe a procedure to distinguish good putting greens from bad was Edward S. Stimpson. In 1936, Stimpson developed a prototype of the Stimpmeter that is used today.

The Stimpmeter is a 36-inch extruded aluminum bar with a grooved runway on one side. A notch in the runway is used to support a golf ball until one end of the Stimpmeter is lifted to an angle of roughly 20 degrees. The average distance the golf ball travels after two opposing rolls down the Stimpmeter is referred to as the speed. The farther the ball rolls, the faster the green.

Stimpson learned through personal use of his prototype Stimpmeter that there was great variation in the speed of greens where competitive golf was played. He also found great variation in the condition of greens on the same course, and between hole locations on the same green.

He believed, and the Green Section staff agrees, that without some form of quantitative measurement, superintendents and course officials cannot evaluate playing conditions, discuss maintenance practices, and establish reasonable goals with respect to green speed. Indeed, superintendents who wanted to do a better job of managing the putting conditions on their courses were the first to approach Stimpson for his device.

After the USGA introduced the current version of the Stimpmeter in 1978, it was not long before a new philosophy developed. "The faster the better" became the rallying call that bonded golfers across the country. The basis for this new philosophy was the

A research project at the University of Nebraska evaluating green uniformity uses a precise tool to measure green speed. This research tool (above) uses photo cells located in a PVC tube to measure the speed of a golf ball as it passes by the series of photo cells. The information is automatically stored on a data logger for analysis.

Before attempting to increase Stimpmeter readings, an in-depth analysis should be made of the turf and soil conditions. Without ideal growing conditions, attempts at fast Stimpmeter readings should not be made during unfavorable weather conditions.

observation that as speed increased, the roll of the golf ball across the surface was more true. A meaningful translation is that the greens became more enjoyable to putt as they got faster, at least to a point.

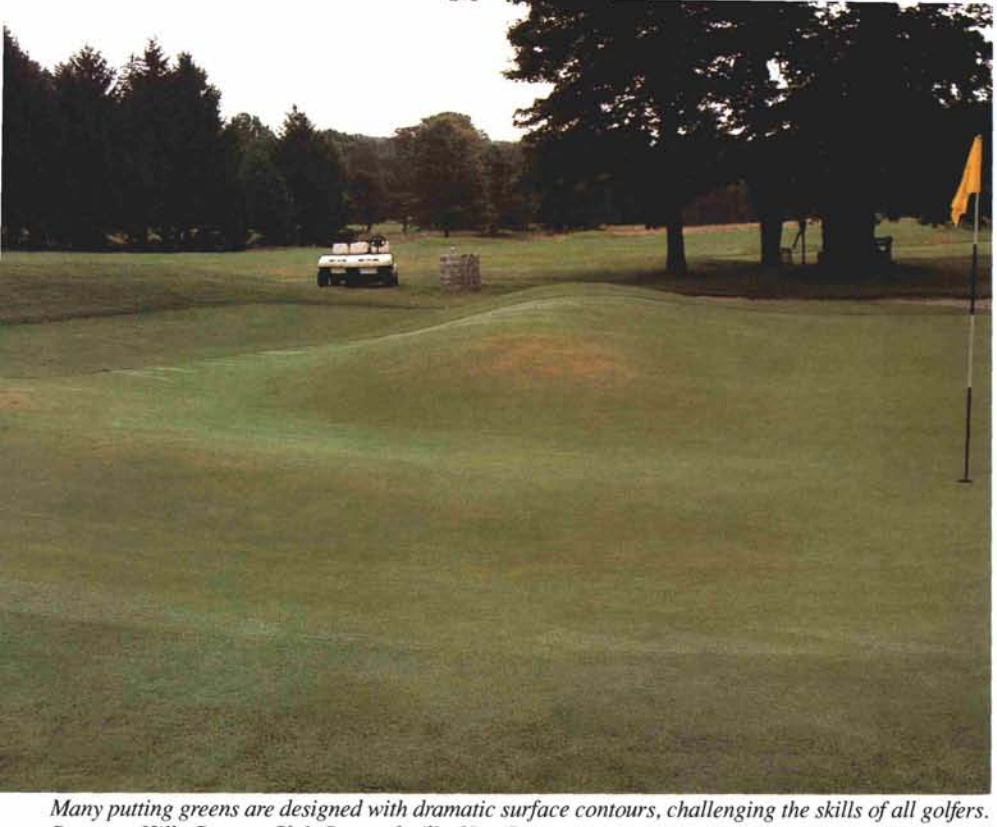
This one-size-fits-all mentality, having evolved from an era when green speeds were considerably slower than today, has grown into a real problem. Many golfers fail to realize the importance of the fact that no two golf courses are physically alike, and that the players at each course are different with respect to their golfing abilities.

Given the major differences between courses and their players, what factors can be used to evaluate how fast is fast enough? To help you analyze your situation, consider the following five criteria represented by the acronym S.P.E.E.D. The limit for putting green speed should be set by using the two or three criteria that produce the lowest speeds.

The acronym S.P.E.E.D. stands for:

Status of the turf
Principal resources
Environmental conditions
Expertise of the golfers
Design

To illustrate how the five-letter acronym S.P.E.E.D. can be used in various situations, Table 1 shows the optimum putting green speed for two examples. Example one,



Many putting greens are designed with dramatic surface contours, challenging the skills of all golfers. Somerset Hills Country Club, Bernardsville, New Jersey.

showing an optimum speed of eight feet six inches, is a new course planted with a new creeping bentgrass variety. The moderately contoured putting greens were built according to USGA Specifications and the resources available for course maintenance are not limiting. The expertise of the large majority of golfers is characterized as less than accomplished, and the prevailing environmental conditions are somewhat unfavorable. The optimum speed in this example is set by the contouring of the greens and the expertise of the golfers.

Example two, showing an optimum speed of eight feet, is a course built in the late 1950s that was established with Colonial bentgrass which has given way to *Poa annua* during the past 40 years. The contoured putting greens were built with soil native to the site, and three inches of sand has accumulated from regular topdressing. The resources available for course maintenance are not limiting. The expertise of the average golfer is characterized as accomplished, and the prevailing environmental conditions are somewhat favorable. The optimum speed in this example is set by the status of the turf as dictated by prevailing weather conditions.

Status of the Turf

Historically, the agronomic status of the turf has set the upper limit for green speed. For decades superintendents under the direction of course officials did everything in their power to increase Stimpmeter readings until they reached the biological limit of the turf. Beyond this limit the turf would perish.

In 1977, when detailed records of putting green speed were first kept, most courses measured between five feet six inches and seven feet six inches. Some find this difficult to believe, as the speeds at several famous courses were purported to be so fast that stopping a putt near the hole was like rolling a golf ball down a staircase and stopping it on the last step. But by examining putting green mowers used in the mid-1970s, it is known that they were adjusted to a height-of-cut between 3/16" and 1/4".

It is not so much that superintendents 20 years ago were concerned about killing the turf by mowing lower than 3/16", but the bedknives available for the mowers were so thick that they could not be adjusted any lower. The only exception was when the golf course mechanic used a grinder to reduce the thickness of the bedknives. As a point of reference, the "thin" or "championship" bedknives used by most courses today were not sold until the 1980s.

Some believe that the introduction of the Stimpmeter in 1976 produced a speed war. This war was fought by mowing greens lower and lower and practicing other techniques in order to establish bragging rights for having the fastest greens in the territory.

There were many casualties in the so-called speed war. Eventually, greens slowly deteriorated from low mowing and excessive grooming; in some cases, they died completely. In some areas of the country, it is sad but true that battles in this war are still being fought. With human pride being what it is, this war could rage on into the 21st century.

In the 1990s, advances in technology have significantly increased the tolerance of the turf to those practices that must be used to produce high Stimpmeter readings. Probably the most meaningful technology is the bulldozer, which has transformed poorly drained putting greens, incapable of supporting turf at speeds greater than eight feet, into ones that can be groomed to roll nine feet plus if necessary, other conditions being favorable.

Determining the biological limit of your own greens can be difficult and has been the subject of many articles in the *Green Section Record*. But rest assured that if your greens die every other summer while rolling nine feet six inches, you have gone too far. At that point, there are two choices. The first is to raise the height of cut on the mowers and grow healthy turf at a slower speed. The second is to reconstruct the greens with the goal of maintaining faster speeds in mind. Depending on what the golfers expect in regard to speed, either choice can be appropriate.

Principal Resources

As important as the current status of the turf are the principal resources available for maintaining the greens. To produce greens that are both consistent and fast requires intensive maintenance using the most sophisticated technology available. It cannot, and should not, be accomplished by simply lowering the mowers one afternoon and going out the next morning to shave the greens down to the crowns.

In preparation for U.S. Open Championships, greens are placed on an intensive schedule of light topdressing, vertical mowing, brushing, rolling, spiking, aerification, fertilization . . . you name it. It's all required to produce a consistently fast putting surface. Such a schedule requires manpower, a large stockpile of materials, and plenty of equipment.

Under no circumstances should "life on the edge" turf management be attempted without the required resources. The results will always be short-lived, because the turf will invariably experience problems. The best-managed courses use the resources available to them, and they do so to their fullest potential.

Environmental Conditions

Ask any superintendent who has been knocked out in the first round. The true champion of the turfgrass industry is Mother Nature. During certain times of the year, depending on location, prevailing environmental conditions can dramatically reduce

the ability of the turf to survive. During these periods, Stimpmeter readings should be reduced without hesitation by raising the cutting height.

When common sense doesn't prevail, some people desperately want to believe that because today's technology can place a man on the moon, greens can be maintained at a speed of 11 feet regardless of the stress on the turf. This assumption is, of course, ridiculous. At the time of year when Mother Nature is in control of the fight, it is clearly unwise to consider risking the survival of the greens for a few extra inches of speed.

Because at the present time there are still no guaranteed means of successfully maintaining fast putting speeds during unfavorable environmental conditions, a few words seem in order about scheduling special events. Ideally, it would be best to plan tournaments, such as the Club Championship, during a time of year when the turf can handle a temporary increase in speed. The U.S. Open Championship, for example, is scheduled in mid-June.

Mindful scheduling would create an opportunity, if desired, to give the greens the extra attention required to bring them into championship condition. If tournaments must be scheduled when Mother Nature is in control, then playing the greens at a slower speed would be better than jeopardizing their condition through excessive mowing or grooming.

Expertise of the Player

Clearly, a few golfers at every course have a higher level of **e**xpertise than the majority of golfers. When highly contoured greens are maintained at Stimpmeter readings in excess of eight feet six inches, the expertise of a professional golfer can be required to sink a putt in two strokes. Taking this into consideration, it stands to reason that greens should generally be maintained in a manner that best suits the vast majority of users of the course.

At courses where the handicaps of many golfers are in the single digits, it would be appropriate to maintain fast putting greens, other conditions being favorable. But at courses where the large majority of golfers have high handicaps, the greens would be more enjoyable to the majority if they were maintained at or near eight feet six inches.

Design

Because the game of golf has become so popular, the damage caused by traffic should always be considered when determining the optimum putting green speed for the course. According to their **d**esign, the number of available hole locations decreases as the speed of the greens increases. The reason is that some contoured or sloped areas of the putting surface can no longer be used for hole locations. In short, a putt that misses the hole placed on a slope on a fast putting green will not come to rest near the hole. By reducing the number of reasonable hole locations, the greens can become subject to damage caused by heavy golfer traffic.

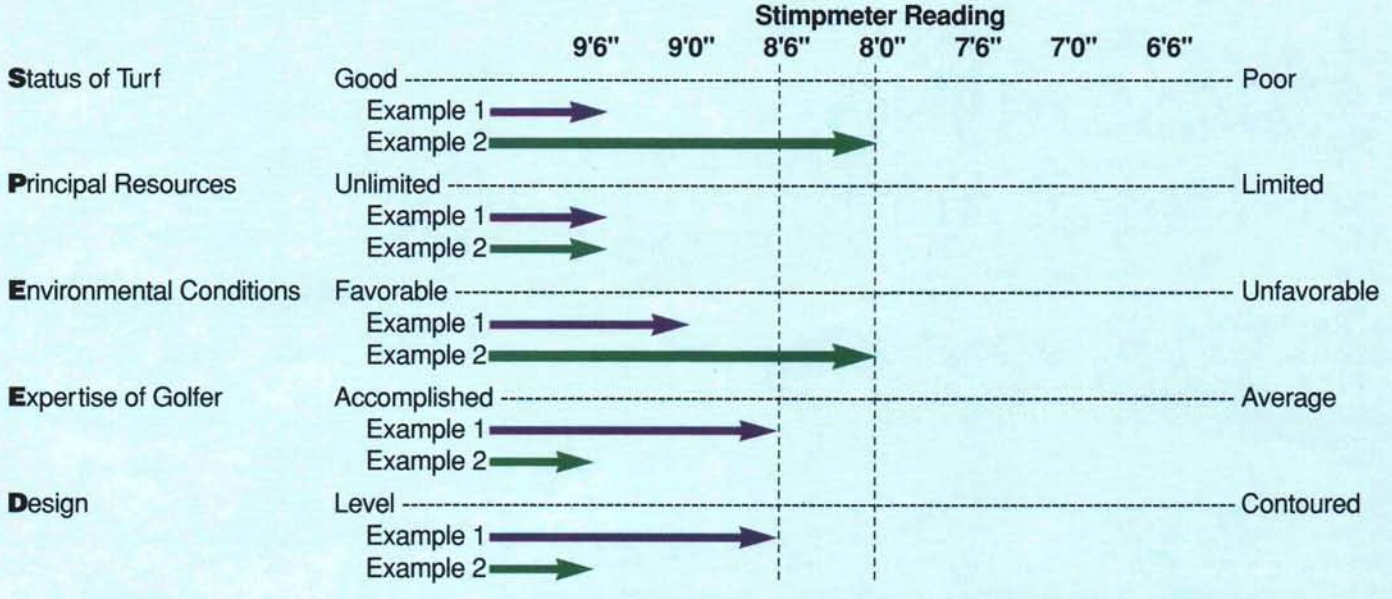
And, if the number of reasonable hole locations drops below seven or eight per green because they are being maintained too fast, the course may become less enjoyable to play regularly because the setup is always similar. For example, a green that would have seven or eight hole locations at a speed of eight feet six inches might have only three to four at a speed of ten feet six inches. For a three- or a four-day tournament at a speed of ten feet six inches, this would be adequate. However, for daily play the hole would end up in a particular location more than once per week.

In conclusion, every golf course is unique because of its agronomic **s**tatus, **p**rincipal resources, **e**nvironmental conditions, golfer **e**xpertise, and physical **d**esign. In determining the optimum green speed, course officials should seek input from the superintendent, the golf professional, and outside sources, such as the USGA Green Section staff.

It is incorrect to state that only fast greens are good and that all slower greens are bad. Also, because the hallmark of a good course is consistent putting, the Stimpmeter is as important for maintaining putting greens at ten feet as it is for eight feet. Gone are the days when fast was always good, and faster yet was even better!

Table 1

To determine the optimum Stimpmeter reading for each course, analyze the criteria represented by the acronym S.P.E.E.D. The limit for putting green speed should be set by using the lowest speed of all five criteria.



Example 1 — Optimum speed set by the contouring of the putting greens and the expertise of the golfers.
Example 2 — Optimum speed set by the status of the turf as dictated by prevailing weather conditions.