

# Physics and soccer field evaluation

*My web site, The Math and Physics of Soccer at [www.OceansideRevolution.com/EINSTEIN.HTM](http://www.OceansideRevolution.com/EINSTEIN.HTM) mentions the Stimpmeter's possible use in soccer. I had the intention of building my own version of the soccer field gauge before I became aware that turf researchers have already been using them to evaluate fields. Any information or data regarding the "soccer field gauge" would be most appreciated. Do you think we will see widespread use of a device like the Stimpmeter in golf?*

Bill Streifer

**Y**es, there are several devices that have been developed to measure ball roll on soccer fields. In my opinion the most recognized design (in the US) was developed in 1994. As the story was told to me, Dr. Jim Watson (Vice President Emeritus, The Toro Company) wanted to use some type of roll measurement to evaluate the different fields at the nine different venues in preparation for World Cup Soccer in 1994. Steve Cockerham and John Keisling at University of California-Riverside took it upon themselves to design and build a world-class device, and they did. Use of the device was first published in *SPORTSTURF* in July 1995.

In late 1997, Steve was gracious enough to share their designs with me so that I could build the "second one" for research purposes and in preparation for the Women's World Cup in 1999. The "Soccer Field Gauge" actually uses a steeper angle than the Stimpmeter (device used to measure ball roll on golf greens). The Field Gauge was designed to look at more ball action, rather than just ball roll.

At a recent conference, I noticed that an international researcher used a more traditional Stimpmeter angle (could not find reference to the exact angle in my meeting notes) to evaluate their fields for World Cup 2002. After working with our Soccer Field Gauge for a few years, I like the idea of some bounce at the end of the ramp, since a soccer ball typically has some bounce even when passed short distances between players.

The Field Gauge is useful for evaluating uniformity, elasticity, and speed of the turfgrass playing surface. One can easily measure ball roll, ball deflection, and ball hop (with a ball hop indicator or video recording). These data provide an indication of surface trueness, canopy density, and slope or crown on ball performance. Using this device in 1994 and 1999, the research groups were able to evaluate fields and make cultural practice decisions to either improve fields or to make them more similar to a chosen standard. That is pretty much the original purpose of the Stimpmeter.

## Unfriendly design

Unfortunately, the design requirements of a Soccer Field Gauge probably limit its more widespread use. First, you are talking about a large ramp (approx. 10 feet), compared to a Stimpmeter that is closer to 3 feet long. It can be made more manageable by designing the ramp so that it can be broken down into sections. A multi-section ramp requires tight tolerances at the junctions to allow the ball to roll smoothly.

In addition, to prevent ramp flex and to keep from having excess vibration as the ball rolls down the ramp, it must be made of heavy gauge material. Even when made from aluminum and hollowed-out in some areas, you have a pretty hefty ramp (about 30 pounds).



In the end you are left with a pretty heavy and cumbersome device to lug around a field and/or store in your work area. Soccer ball variability is also an issue that has to be addressed. Even with same internal pressure, each soccer ball tends to roll slightly different.

Another limitation to its acceptance is that due to the nature of the turfs that we use, it is very difficult to have a northern field play similar to a southern field on a day-to-day basis. I even see tremendous variability among fields within regions. Field managers at most facilities have so many cultural practices and use issues to deal with just to keep the fields safe with good turf cover, they don't have time to worry if they are "keeping up with the Jones" in terms of ball performance.

I would also add that the Stimpmeter is not always viewed as a positive contribution to the golf course management profession. In the last few years, the Stimpmeter has probably caused more headaches to superintendents due to the demands golfers and/or golf clubs have placed on superintendents to get their greens to roll to a certain distance. I would hate to see that develop within the sports turf profession. Sure there are applications, but outside of research and perhaps tournament set-up, I do not foresee widespread demand for such a device. **ST**

## Have Questions?

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