

## GOLF SHOE STUDY II

The Swilcan Bridge (of St. Andrews fame) is over 800 years old. For centuries it has withstood the trodding of townspeople and traders alike from harbor to town. Well before and after Columbus sailed for America, it has endured the crossings of St. Andrews' golfers. And, if your mind follows a logical bent, the Bridge must be one of golf's greatest contradictions, mysteries and miracles! How has this graceful granite arch held its ground against the onslaught of man, shoe and club all these years? It is a miracle!

One of the reasons for its endurance, at least for the first 750 years, may be that the Bridge never had to contend with the conventional spiked golf shoe! Allan Robertson, the world's first professional (1858) or even Old Tom Morris probably did not tread Swilcan in them. In fact, the earliest evidence so far of golf shoes with protrudences from the sole comes from an 1893 photograph of players in New Zealand's First Interprovincial Contest between Otago Golf Club, Dunedin, and a Christchurch team. Hobnail shoes are plainly seen on two of the golfers.

In this country, at the turn of the century, red rubber sole shoes were in vogue. In his book, "The Walter Hagen Story", The Haig recalls his attire for the 1913 U. S. Open, including his wearing "red rubber sole shoes" at The Country Club. The following year he wore the same general getup except for the shoes. "I slid all over the course at Brookline in wet weather (in 1913)", he said and bought a pair of hobnail shoes for the 1914 Open. He won!

We know the Englishmen Harold H. Hilton won the U. S. Amateur Championship in 1911 in sneakers and that Gerome D. Travers also appears to be wearing sneakers in his 1907 victory. But there is no doubt, the hobnail shoe was coming into its own. Bob Jones wore them at Merion in the 1916 Open and Jess W. Sweetser (1922 Amateur Champion) remembers "golf shoes with spikes" as standard foot gear by 1919. The trend was on and the boding not good for the growers of grass.

In the modern era, the spiked golf shoe has long been of interest to the Green Section. The first scientific studies were undertaken in 1958-59 by Dr. M. H. Ferguson to determine the effect on wear and putting qualities of different shoes on putting green turf. The conventional metal spike shoe, the 'ripple sole' shoe and a modified golf shoe spike (with recessed or flattened spike shoulder) were tested.\*

The conventional golf shoe spike not only caused severe damage to the grass plant, but the rounded shoulder of the spike also caused significant soil compaction and delayed grass recovery for weeks beyond that of the other shoes. The ripple sole shoe soon dropped from the golfer's favor (and was banned by some clubs) because of the distortion it caused to the putting surface. The modified golf shoe spike, a by-product of the experiment, proved to be an important innovation. It was less damaging to soils and turf and is still manufactured today for golfers requiring spike shoes but still concerned with preserving putting green quality.

Course superintendents and green chairmen were also concerned. Charles Cogan, Green Chairman at Irvine Coast Country Club, California, undertook his own study of spike shoe damage to greens in 1960:

"The average golf shoe has 12 spikes; i.e. 24 spikes per golfer. I have found golfers take an average of 26 full steps (52 paces) per green. Therefore, each golfer leaves (26 x 24) 624 spike marks on each green. On 18 greens, he leaves 11,232 spike marks. If there are 200 rounds of golf played a day, there are 2,246,400

spike marks left behind. If this goes on for 30 days, you have 67,392,000 spike marks per month. And now, you wonder why you can't sink a putt?"

Both players and grass grower has a right to be concerned over golf shoes and what they are doing to the playing quality of our turf. But there is another, albeit less visible, factor that also deserves attention. There is increasing concern over the added costs in labor, aerifying, topdressing, mowing, weed control, cup changes, etc. brought about by spiked shoes. Some conservative estimates suggest a minimum of \$10 million a year; and that is in course conditioning alone. What of the additional costs in replacing pro shop and locker room carpeting, asphalt and concrete paths, door sills, wooden steps, benches, electric cart flooring and dashboards, tee markers, etc.? Does the spike cost golf \$15 million or \$20 million a year? Whatever it is, there is no doubt of its destructiveness.

But who among us is crusader enough with courage to ask and optimism to expect today's golfer to readily give up wearing shoes with spikes? The golfer has been conditioned. He believes he needs the spike shoe and, no doubt, some golfers probably do. The power behind the 'big drive' in golf (250 or more yards), it is said, comes from the legs. Powerful legs need a secure grip. But not everyone who plays this game for the fun of it drives 250 or more yards! Not every golfer has that kind of leg power. Furthermore, not every round of golf is played under wet, slippery conditions. Fortunately there are increasing numbers of golfers today, including many club professionals, who enjoy the game and play it very well in shoes without spike or stud. Indeed, most golfers could easily play and enjoy the game, especially on dry days, in spikeless shoes. Hooray for them, for they shall lead the way to better putting turf at a lower cost.

### The New Shoes

In 1982, a dramatic change in the design of golf shoes took place. New, multi-stud sole shoes were introduced into the United States. The studs are made of either rubber or a composition material. Advertising claims of "better traction" and "no damage to greens" were widely circulated. In one case, it was proclaimed the new shoes were "USGA approved"; a statement with no basis in fact.

As more and more of the "new shoes" came on the market, reports from golf course superintendents began to grow and that the new shoes were, contrary to the advertising claims, significantly damaging greens and adversely affecting putting surfaces, especially wet ones! Claims and counterclaims multiplied. The time was right for Green Section Golf Shoe Study II.

### The New Study

Early in 1983, an experimental plan was developed at the University of California, Riverside, to evaluate the effect of four different type golf shoes on turfgrass quality and injury to putting green turf. The experiment and lessons from earlier shoe studies were incorporated in this plan. The new study got underway in May, 1983.

At Industry Hills, California, General Manager Bill Bryant offered the use of one of the Penncross bentgrass nursery greens for the experiment. The turf was nearly a year old and had developed approximately a 1/2-inch depth of thatch. It was mowed daily at 3/16-inch. The nursery green itself was built three years earlier to USGA Green Section Specifications. It received no other traffic than that imposed by the experiment plus normal maintenance procedures. Four types of shoes were used in the study:



- 1) The conventional metal spike golf shoe.
- 2) One of the popular, new multi-stud sole golf shoes.
- 3) A new "spikeless" golf shoe with very small suction-type cleats.
- 4) Another one of the new multi-stud sole shoes but with a different sole design than Number 2.

The overall experiment was designed for Three Phases:

**Phase I** was to evaluate the shoes under normal weather conditions. This phase would require six weeks of testing.

**Phase II** would immediately follow Phase I and be a subjective test of the putting qualities of each plot. Two golf professionals and one amateur golfer would, in a prescribed manner, individually putt and rate the plots.

**Phase III** was to evaluate, under extremely wet conditions, the four shoes as to wear injury effect over a period of three weeks.

#### PHASE I

After a brief preliminary investigation, the study commenced on May 2 and continued through June 13, 1983. Each plot measured 4' x 14' and was separated from adjacent plots by a 2' path. There were five randomized plots (one for each shoe type plus one check plot) in each replication and four replications used in this experiment.

Four men, wearing a different type golf shoe each day (in a predetermined order), walked and putted the plots designated for that particular shoe. They followed a prescribed walking and putting traffic pattern. Each completed pattern was considered to be one "treatment" and each plot received four treatments daily. The men, wearing a different shoe type each day (in the predetermined order), carried out the treatments for four days, took the fifth day off, and so continued throughout the six-week span. Ratings were taken every two weeks using a scale of 1 equaling no visible damage to 10 equaling bare ground.

#### The Walkway Ratings

Turf damage to the walkway areas was rated on May 26 and June 13. Since there was no visible damage to the walkways on May 10, no ratings were made.

On May 26, 24 days after beginning the experiment, Shoe #1 showed the most damage to the walkway area. Shoes #2 and #4 showed slight damage. Shoe #3 and the check plot had no visible damage.

On June 13, the turf damage on walkways was more severe. Again, damage from Shoe #1 was clearly more severe than the other shoes, followed by #2. Number 4 and #3 shoes were about alike in damage. All shoes gave statistically greater damage than the untreated check plot.

#### The Putting Area Ratings

Apparent damage to the putting plots increased throughout the duration of the study. Shoes #1, #2 and #4, in that order, gave the most damage. Shoe #3 caused some wear but considerably less than the other shoes. On the final day of these ratings, all shoe plots showed significantly more damage than the check plot.

The Penncross creeping bentgrass had poorer color, decreased density and a scruffy, ragged appearance showing mechanical damage. These plots also had a noticeable surface depression and overall unevenness.

#### PHASE II

Immediately at the conclusion of Phase I, the subjective determination of the putting qualities of each plot was made. Paul McGuire (PGA), Julie Lynd (LPGA) and Ross O'Fee (Amateur Golfer) cooperated in this experiment. They followed a putting pattern. Ratings were made from 1 (excellent putting qualities) to 10 (totally unsatisfactory putting qualities).



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Putting ratings were made on the walkways as well as the putting areas of each plot. The only noticeable shoe influence however, was observed on the concentrated 'putting areas'.

These results show that, when putting across plots where Shoe #1 was worn, a decided poorer quality putting rating was given by the golfer. On the plots of the other shoes, there was no noted statistical difference between them under the conditions of this experiment; i.e., normal weather.

#### PHASE III

This study was to evaluate the effects of the four shoes on putting green turf under very wet conditions. Earlier reports indicated that the multi-stud shoes caused considerable damage to wet putting surfaces. In some cases they have actually been banned from use on some golf courses in this country.

In Phase III, the individual plots measured 2' x 10' and consisted of straight walkways over which 25 round trips were completed each day for three weeks. There were no putting areas in this test. All plots were replicated four times and again, the four men changed to a different type of shoe (in a predetermined order) each day and walked only those plots designated for that particular shoe.

Every day, just before walking began, the test area was heavily and thoroughly hand watered. The surface area was saturated until water was standing on it. It was allowed to drain and then the plot was again irrigated to saturation and standing water. Immediately following the second drainage, walking began. At the end of three weeks, the plots were rated on the same scale as before: i.e., 1 equals no damage and 10 equals bare ground.

The ratings showed that damage from Shoe #1 ► Shoe #2 ► Shoe #4 ► Shoe #3 with all showing more damage than the untreated check plots.

#### Discussion and Conclusion

From an overall view, the results obtained on turf damage  
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and putting quality were due to the physical damage to the turfgrass plant and/or the surface disruption caused by the shoe soles. These results reconfirmed those of the Golf Shoe Study 25 years ago!

#### SHOE #1

This was the most damaging shoe tested. It also caused the longest lasting damage. In fact, four weeks after concluding the Phase I experiment, turfgrass damage was still apparent on all Shoe #1 plots. The length, shape and metallic nature of the spike as well as the limited number of metal spikes on each shoe are factors that account for most of the observation of this study. The effect of compaction, caused in large part by the weight-bearing shoulder of the metal spike as well as the limited number of 'bearing surfaces' (i.e., 11 or 12 spikes per shoe) was pointed out in the 1958-59 studies. The contention that the metal spike helps (aerate) the upper soil surface is without factual basis.

#### SHOES #2 and #4

Shoe #2 and #4 were the second and third most damaging shoes in this study. The slightly less grass damage caused by these shoes seems attributable to their greater total surface contact area (i.e., more, wider studs or nubbins) on the shoe soles. The studs are shorter than metal spikes, more blunt and tend not to pierce the plant tissue.

Conversely however, these shoes under wet plus certain other conditions, have a marked tendency to ruffle or disrupt otherwise smooth putting surfaces and cause a 'waffle-like' imprint. Because the studs are blunt (and there are approximately 108 of them per shoe), they each cause a larger area of depression than the metal spike (11 or 12 per shoe) which slices through the surface and into the ground. How long the multi-stud imprint remains on the grass may depend on many factors including; the type of grass, how wet the surface, general drainage characteristics of the green, thatch density and depth, height of cut, rooting depth and soil types heavier than those encountered in this experiment.

#### SHOE #3

Shoe #3 was the least damaging of all to the turf and putting surface. Again, this seems attributable to the very high surface contact area, no great protruding spikes or studs and a non-metallic sole composition. The sole is comprised of approximately 750 small rubber cleats.

In summary:

SHOE #1	Metal spikes Long, pointed spikes Mechanical tearing, piercing Low surface contact area 11 or 12 spikes per shoe Spikes with shoulders
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#### HIGH TURF DAMAGE

SHOE #2 & #4	Composition sole Shorter, blunt spikes Medium surface contact area Approximately 108 spikes per shoe
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#### MEDIUM TURF DAMAGE

SHOE #3	Composition sole No spikes High surface contact area 750 small rubber cleats
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#### LOW TURF DAMAGE

#### Some Concluding Thoughts

The standard golf shoe spike, or any other shoe with nobs, studs, or protrudences of any kind, unquestionably cause greater damage to the grass and adversely affects putting qualities more than flat-type shoes. Golf is one of the few,

Continued



and perhaps the only sport where the player's own equipment (spike shoes) directly, undeniably and significantly adversely affect the most critical playing surface of the game — the putting green. Even baseball and hockey smooth over their playing surfaces half-way through the contest! Golfers can't do that and, day after day, step after step, the spike golf shoes takes its toll. Only a ballet slipper might do more damage.

Is there a compromise? Is there some way out of this dilemma of self-destruction? In this technical age, lurking somewhere, there may be a new idea for golf shoes. Perhaps it is here or very near. Surely it is possible to develop a sole that will give good ground purchase and security without tearing the grass plant asunder.

Perhaps, instead of one pair of shoes for all seasons, golfers should have two pair of shoes for two seasons; a spikeless shoe for normal weather conditions and a spike shoe for wet days. Oh! What a relief THAT would be! It would save our putting greens, our clubhouses and our maintenance budgets millions of dollars a year. And yes, it could well mean at least another 800 years for the Swilcan Bridge. That alone would make it worthwhile!

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 \*See USGA Green Section RECORD: November, 1958 & September, 1959 issues.

### MORE VALUE FOR OUR TIME

With Fall coming it will soon be time to put your golf courses to bed for the winter. Since most Superintendents and Salesmen spend a great deal of time and money on shows on meetings, I thought the following article from our DuPont newsletter might be an interesting note for October. Perhaps the suggestions here will help us get more value for our time and dollars spent.

Are you tired of going to meetings? Do you find them boring and time wasting? If there's nothing else you can do to avoid or improve the meetings, at least try the following:

1. Study the agenda; think about the topics to be discussed. Try to have something worth contributing.
2. Sit with strangers or at least with people you don't see on an everyday basis.
3. Try to keep an open mind toward the speaker and the subject.
4. Take some notes on key issues.
5. If a meaningful question occurs to you, raise it.

Then, if the meeting is a total loss, it won't be your fault. And it probably won't be. If you try, you'll get something out of it.

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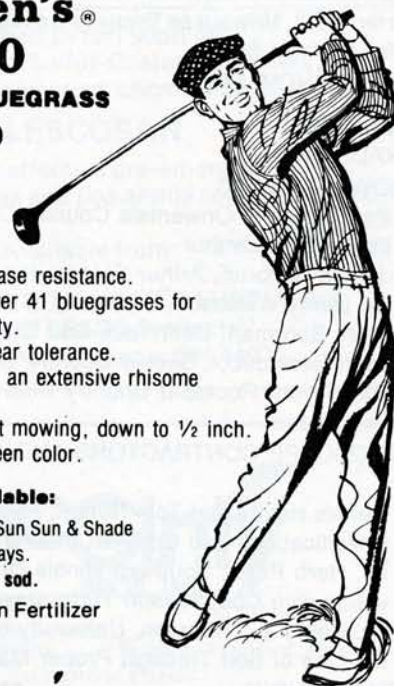
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