

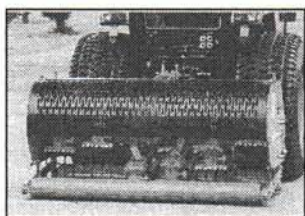
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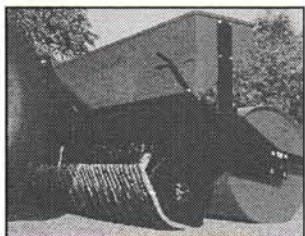
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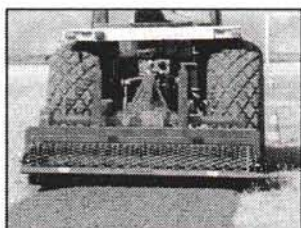
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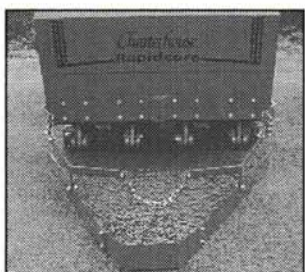
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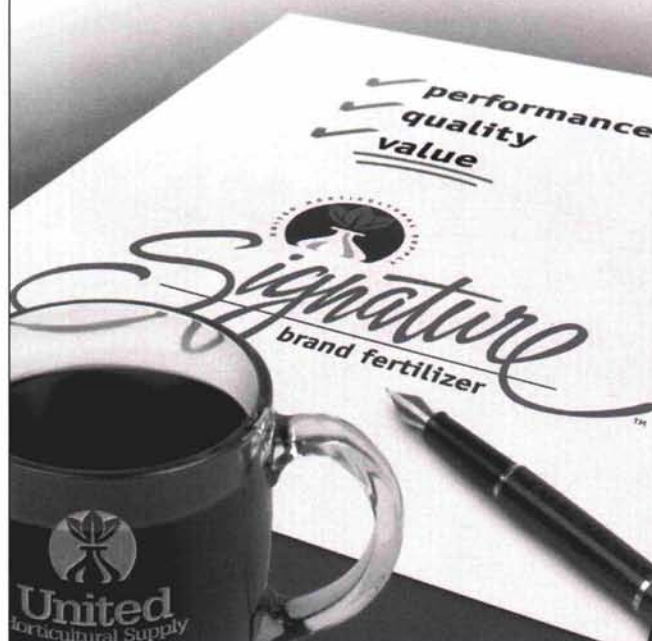
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How Large Is Large Enough? A Mathematical Approach for Determining the Proper Size of a Tee

Tees that are too small to accommodate the daily volume of play are destined to deteriorate during the summer despite the maintenance staff's best efforts.

Golf without grass on the tees hardly sounds enjoyable. There was a time, however, when that was exactly how the game was played. Players would step onto a bare teeing area, reach into a large wooden box (appropriately called the teebox), grab a handful of sand and build a small mound to tee up the ball. Imagine the superintendent's joy when, on occasion, he/she simply had to refill the teebox with sand—or had golfers already started whining about soft sand?

A search of articles written on the topic of tee construction reveals a popular rule of thumb . . . This rule of thumb states that tees should have between 100 and 200 square feet of space for every 1,000 rounds of play per year.

It is too bad the hands of time cannot be turned back to a day when things were much simpler. The fact is, today's golfers are much more sophisticated than those of yesteryear. As a result of watching hours of "made-for-TV" golf, they would feel cheated if they had to swing their super-sized titanium driver on a tee that had no grass. Worse yet, they would probably organize an ad hoc committee to have the superintendent dismissed for not being able to properly care for the course.

In the defense of golfers, however, it should be conceded that the opportunity to play on 18 well-manicured tees is not an unreasonable expectation. Given the right circumstances, a superintendent should have little difficulty maintaining a thick stand of turf. The real problem is that most golfers cannot tell the difference between the right circumstances and circumstances beyond the superintendent's control that lead to bare ground showing up in the middle of the season.

Part of this problem can certainly be traced back to watching golf on television. This lopsided educational experience typically shows impeccably dressed touring professionals playing on large, perfectly groomed tees surrounded by cheering fans from all walks of life. After being exposed to hours and hours of such idyllic scenery, who among us would not lose his sense of reality?

The cold truth is that television golf is rarely identical to golf at the local course. Superintendents who have difficulty maintaining turf are not working on courses with gargantuan tees. They are working on courses with teeny, tiny tees tucked back in the tall trees that golfers, for some perverted reason, think are a benchmark for great architecture. In other words, they are maintaining tees with more bare ground than green grass because they are too small to prevent the reuse of an area battered

by divot removal before it has had time to fully recover.

When faced with the problem of insufficient tee size, the real question at hand is, "How much larger do they have to be in order to be maintained successfully?" A search of articles written on the topic of tee construction reveals a popular rule of thumb published by the National Golf Foundation in *Golf Course Construction and Design*. This rule of thumb states that tees should have between 100 and 200 square feet of space for every 1,000 rounds of play per year. Applying this rule of thumb for a course that hosts 40,000 rounds per year yields reasonably sized tees that range in size from 4,000 to 8,000 square feet.

While at a quick glance the rule of thumb published by the National Golf Foundation seems both straightforward and practi-

(continued on page 15)

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cal, close examination exposes some serious weaknesses. First, the rule of thumb does not specifically take into consideration the par value and hole number of the tee. The difference in par is very significant as golfers customarily use an iron on a par 3 and a driver or fairway wood on either a par 4 or 5. When golfers swing irons, they tend to remove a divot that grows in size as the loft of the club increases. Divot removal imparts greater turf damage, thus more square footage is required to maintain a par 3 tee in good condition. The hole number is also significant as golfers tend to take

numerous practice swings and/or, dare I say, mulligans on the first and tenth tees that cause additional turf damage and, again, require more square footage.

Second, the rule of thumb offers poor guidance for golf courses that host either a small number or a very large number of rounds during a 12-month period. For example, on the one hand, a course that hosts 12,000 rounds per year should, according to the rule of thumb, have tees between 1,200 and 2,400 square feet. If this square footage were divided into three or four multiple

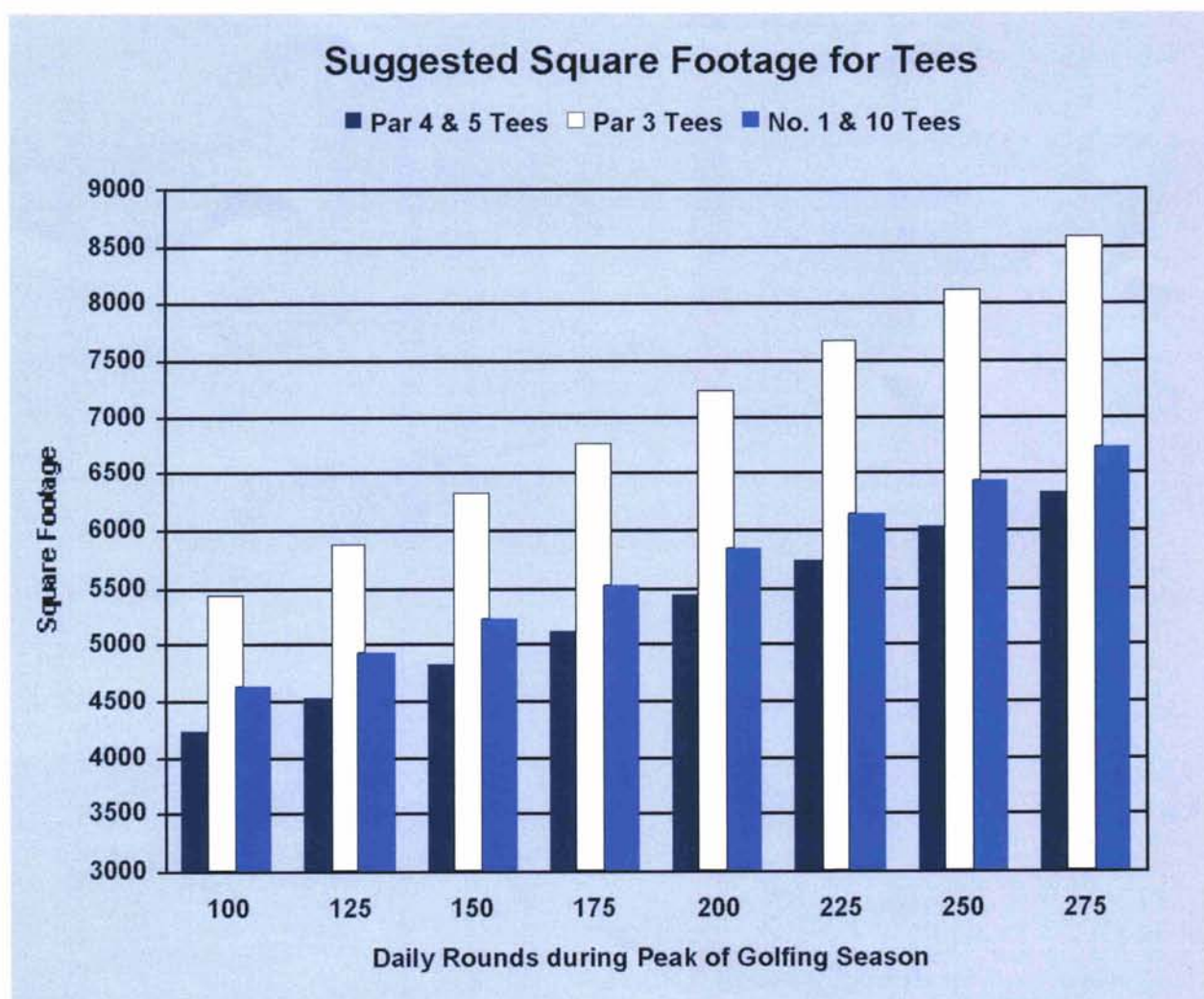
tees on each hole, then each of the individual tees would end up being too small to mow with a standard riding mower. To make matters worse, if the course hosted the majority of the annual rounds during a 12- to 16-week period, i.e. 100 rounds per day during the summer, then the centers of the small tees would be severely worn halfway through the golfing season.

On the other hand, a course that hosts 90,000 rounds per year should, according to the rule of thumb, have tees between 9,000

(continued on page 16)

Table 1

Suggested tee sizes based on calculations that take into account design criteria and agronomic factors.



and 18,000 square feet. Dividing the large square footage into multiple tees would be no problem, but maintaining somewhere in the neighborhood of six acres of teeing ground on a heavily played, 18-hole course would be overly time-consuming. Furthermore, since the only regions where 90,000-plus rounds can be played in a 12-month period are where hybrid bermudagrass grows vigorously most of the time, the excessive square footage is generally not needed because the teeing surfaces heal relatively fast.

In analyzing the weaknesses of the rule of thumb, it becomes apparent that a replacement formula is needed to more accurately account for the many different circumstances across a large geographical region. Starting at the lower end where the rule of thumb underestimates the square footage needed for courses with light play, a minimum size requirement must be established. To apply it to a broad range of circumstances, this minimum size requirement must take into consideration two important design criteria.

First, almost all courses require three or more multiple tees on each hole to accommodate golfers of all skill levels by varying the total length of the course. Second, maintaining tees in an

efficient manner by cutting them with a riding mower necessitates that each individual tee be larger than 800 square feet. Based on these basic design criteria and the fact that par 3 tees and the first and tenth tees require additional square footage, minimum tee sizes for courses with negligible play can be set as follows:

- Par 3 Tees 3,600 ft²
- Par 4 & 5 Tees 3,000 ft²
- No. 1 & 10 Tees 3,400 ft²

To finish at the higher end, where the rule of thumb overestimates the square footage needed for courses with heavy play, two agronomic factors must be considered. First, an area worn by concentrated divot removal takes about 30 days to recover during the peak of the golfing season in most regions of the United States. This conservative timeframe takes into consideration turf species, prevailing weather conditions and customary maintenance practices to encourage divot recovery. Second, the size of the tees must be increased to accommodate incremental increases in the volume of daily play during the peak of the golfing season. Daily play during the peak of the golfing season, rather than annual play figures, must be used because they specifically take into account the

When golfers swing irons, they tend to remove a divot that grows in size as the loft of the club increases. Divot removal imparts greater turf damage, thus more square footage is required to maintain a par 3 tee in good condition.

timeframe when problems with the tees occur. Conservatively, an increase of 15 square feet for par 3 tees and an increase of 10 square feet for both par 4 and 5 tees and the first and tenth tees are needed for each incremental increase of 25 rounds per day.

By combining basic design criteria and important agronomic factors, the following formulas for determining suggested tee sizes are presented in Table 2.


In conclusion, since the very first day golf was played on grass tees, many superintendents have had to repeatedly explain why the centers tend to go bald during the peak of the golfing season. When faced with such unpleasant duties, try using new math to solve an old problem. 

Table 2

Par 3 Tees	=	30 day(s)	x	$\frac{15 \text{ ft}^2}{25 \text{ round(s)}}$	x	$\frac{\# \text{ round(s)}}{1 \text{ day(s)}}$	+ 3,600 ft ²
Par 4 & 5 Tees	=	30 day(s)	x	$\frac{10 \text{ ft}^2}{25 \text{ round(s)}}$	x	$\frac{\# \text{ round(s)}}{1 \text{ day(s)}}$	+ 3,000 ft ²
No. 1 & 10 Tees	=	30 day(s)	x	$\frac{10 \text{ ft}^2}{25 \text{ round(s)}}$	x	$\frac{\# \text{ round(s)}}{1 \text{ day(s)}}$	+ 3,400 ft ²

Note: As a quick reference, a summary of suggested tee sizes based on calculations from the above formulas is presented in Table 1 (see page 15).

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It's A Wonderful Life

In the movie It's A Wonderful Life, George Bailey is rescued from peril by an angel who then takes him on a tour of his hometown. At every turn, it becomes apparent to George that he has had some profound effect on his community and the quality of other people's lives.

... In the wake of this holiday season, in the early days of a new year, I would remind you all to raise a glass to the founders of our wonderful association. These men have made a difference every bit as profound as George Bailey.

I would like to ask the reader to now imagine that the game of golf has been transported to another place and time, not unlike the scenario in the movie. But in this story, the missing entity is the GCSAA.

In this dream sequence, you are paired up with a member of a typical Chicago-area club, and you are eager to get on the course and experience what the game presents. You approach the first tee; you survey the golf hole and detect that it is weed-infested, with large areas of disease-ridden and barren turf. The bunkers are ragged and overgrown. When you reach your fairway lie, the ball is plugged in soft and thatchy turf. Now you come to the green and the roll of the ball is anything but smooth and true. You are amazed to see that your golfing partner is content with all of this. You are incredulous. How can this be? How has the association made such a difference?

Has there never been a man like Bob Williams to selflessly mentor or apprentice talented and gifted assistant superintendents?

What about an Oscar Miles? Has there never been a man to push the industry toward deploying triplex greensmowers, and eventually five-plex machines over fairways?

And where was Joe Dinelli, the inventor of the first mechanical bunker rake; or Carl Hopphan, the inventor of the slit-seeder for golf turf?

Has there never been a Ted Woehrle to experiment with chemicals from the cotton industry on the turfgrasses at Beverly?

Has there never been a Dudley Smith to promote camaraderie and love for each other?

Has there never been a Ray Gerber or Raymond Schmitz to show us how a gentleman carries himself?

Has there never been a Paul Voykin to take up advocacy for the birds and the butterflies?

There is no attention to detail. Maybe there has never been a Randy Wahler to raise the bar.

There is no interprofessional communication because there has never been a Fred Opperman to even bother with the selfless act of getting a newsletter out on time.

There is no Randy Kane to help us with pathology—in fact, there is no interest in cooperating with academia whatsoever, for that would only reveal a culpability for dead grass, and the mercenary superintendent would rather bamboozle the golfer into thinking that dead grass is inevitable.

Golf course superintendents are not especially keen on communicating with their members, because there has never been a Bruce Sering to show them the art of speaking on their feet, or an Adolph Bertucci to show them how to be friendly with all (not just some) of the members.

Has there never been a Julius Albaugh or Albie Staudt to set an example of longevity and dedication to a piece of property?

Has there never been a John Ebel to exemplify simple and genuine faith in God?

Have there never been men like Emil Mashie or Bob Kronn to model the importance of playing your golf course, and playing the game to the best of your ability?

Granted, some of these men might have found the greenkeeping profession, but one cannot help but wonder if all of these men would have gravitated to golf course management were it not for the association that promotes trust, openness and fraternity for the advancement of the game. So in the wake of this holiday season, in the early days of a new year, I would remind you all to raise a glass to the founders of our wonderful association. These men have made a difference every bit as profound as George Bailey.



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- Do people think you have a good understanding of quality?

It would be unrealistic to say that we as superintendents could answer yes to all of the above questions. If we can put ourselves in the shoes of those who are evaluating us as leaders, it would give us a better perspective of the questions that they are thinking of but will never ask. It is incumbent upon us as leaders to understand these questions and strive to answer yes to them each and everyday. 



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