

*"When you aim for perfection, you discover it's a moving target."*

— George Fisher, former CEO of Motorola

**G**olf course superintendents always have focused on delivering almost perfect turf conditions. However, striving for perfection might not always deliver the results they expect. For example, what defines a perfect bunker?

Conventional wisdom describes an ideal bunker as firm. No matter where the ball hits in the bunker, it ultimately comes to rest at the base of the bunker. Once in the bunker, a ball's lie is similar to that found on a cement roadway. The antithesis of the perfect bunker is one that produces a buried or fried-egg lie.

However, in producing a firm and ideal bunker, it's been revealed that the bunkers are no longer much of a penalty for professional golfers.

But in the last few years, opinions about what constitutes an ideal or perfect bunker has changed. According to PGA Tour statistics, 149 professionals averaged at least 50 percent sand saves in 2000. In 2005, just 85 players executed sand saves at least half the time. What caused the drop in sand-save efficiency? One reason is the construction or renovation of bunkers that has made them deeper. Depth increases bunker difficulty. The downside to deeper bunkers includes cost of construction and increased difficulty for recreational/amateur golfers to play out of them.

In concert with bunker renovation, the desirable characteristics of the sand have changed subtly. Bunker sands are characterized through a series of laboratory tests (Brown & Thomas, 1986). One of those tests is called the "Fried Egg Lie Development." In this test, a ball is pressed into the sand using a penetrometer. The force needed to create a fried egg is measured. The less force needed, the higher the tendency to bury the ball. Under the concept of firm bunkers, desirable sands were classified as having a "very low tendency to bury the ball." [Editor's note: a high penetrometer measurement is greater than 2.4 kilograms per square centimeter (kg/cm<sup>2</sup>).]

# Staying Ahead of a Moving Target

BY KARL DANNEBERGER



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Currently, the bunker sands being used at some of the tournament golf courses have been changed to give a "slight tendency to bury the ball." These measurements fall in the 2.2 to 2.4 kg/cm<sup>2</sup> range. Golf course architects and builders often refer to these sands as "2.3 sands" in reference to the penetrometer measurement. Not only do these sands provide a degree of partial burial, the raking of these sands tend to be less consistent, which creates soft ridges that result in the ball settling in the grooves.

At the 2006 Memorial Tournament at Muirfield Village Golf Club, Jack Nicklaus and superintendent Paul B. Latshaw took raking one step further. Using deep-toothed rakes, the bunkers were furrowed perpendicular to the line of play. The furrowing of the bunkers was reminiscent of the original furrowed bunkers of Oakmont Country Club in the 1910s and 1920s. Although furrowing was criticized by the professionals back then and in 2006, it does have some advantages.

Furrowing provides a consistent penalty. The ball always tends to settle in the furrow. Thus, golfers all receive the same lie. Another advantage is that furrowing is accomplished easily for tournament play, and then bunkers can be raked out for everyday member play. Furrowing also helps mitigate the need for digging bunkers deeper and the associated cost.

The changing view of what constitutes a perfect bunker is a reflection of how perfection can change — ever so slowly and often in the eye of the beholder. Perfection is attained by slow degrees; it requires the hand of time. And sometimes it needs a little nudge from an innovative superintendent.

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*Karl Danneberger, Ph.D., Golfdom's science editor and a turfgrass professor from The Ohio State University, can be reached at danneberger.1@osu.edu.*