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## Bunker maintenance in mind

Some golf course superintendents have asked me about my thoughts about how individual bunker design relates to maintenance. Well, I've been thinking about bunkers a lot lately, given the golf economy's downturn and the rising standards expected of bunker maintenance.

Bunker maintenance requires time and money, particularly when you think about how golfers expect bunkers to be perfect playing surfaces. During the past 40 years, I've seen the quality of greens progress from bumpy to perfect, tees maintained to former green standards, fairways maintained to former tee standards, and roughs maintained to former fairway standards. Now the focus is shifting to make bunkers better, if not perfect, playing surfaces. The goal seems to be that they're groomed to make bunker shots just as difficult as fairway shots.

But to me, a lower standard of bunker maintenance would save money and restore integrity and meaning to bunkers. It would be a cheaper, easier way to make a course more challenging, in contrast to the expense of earthmoving, grassing, irrigation, cart path construction and subsequent maintenance required to extend tees for more length.

The standard, preferred course of action seems to be to spend more on bunker construction and maintenance. Bunkers always have been considered more expensive to maintain than turf, although in the old days, raking them three times a week versus mowing rough three times a week shouldn't have cost substantially more. Nowadays, higher bunker standards require daily hand-raking and edging and weekly leaf/clipping blowing. Some courses deep-rake bunkers to loosen sand for better play when there's been too much rain and water bunkers to firm them when there's been too little rain.

With high standards desired, bunkers consume a far higher percentage of maintenance dollars than their total and relative acreage would suggest. Bunkers cover no more than two to three acres or about 2 to 3 percent of the 100 to 150 acres typically maintained. But they might consume 20 to 30 percent of the maintenance budget if all maintenance actions are accounted for.

To facilitate desired conditions, bun-

kers are constructed with a bunker liner to separate sand from subsoil and full herringbone tile with flush-outs or large clean-out boxes. Some have experimented with the equivalent of choker and gravel layers for better drainage. Many course managers think nothing of using sand from a thousand miles away because it's whiter or eliminates plugged lies because of its angular structure. Buying this type of sand is expensive because of the special screening required to make it fit USGA recommendations perfectly and shipping costs. And it's not just a one-time expense because the sand must be replaced every so often.

Despite these higher construction standards, bunkers still cost a lot to maintain. Superintendents say liners reduce, but don't eliminate, their maintenance problems of clogged drains, sand that washes from rainfall and the need to replace sand from wind loss or contamination. The consensus is that sand needs to be replaced and bunker drainage rebuilt every three to five years without a liner or every five to seven years with a liner. Perhaps some of that rebuilding is because of rising golfer expectations as much as it is contaminated sand, which might still play acceptably long after it's lost its color from contamination.

### Changing style

Architects are focused on bunker design and placement to enhance play, but I've changed philosophies of bunker style to accommodate new expectations – and budget realities – to reduce bunker maintenance.

One way is to reduce the number of bunkers. Given that few sites have the natural sandy soil, it's hard to justify bunkers as natural design elements. Architects probably have overemphasized the use of steep-sloped cape-and-bay-style bunkers, morphing them into visually dramatic and artistic elements that can be a signature design. Many golf architects prefer the look of cape-and-bay-style bunkers with sloped sand. Fabric bunker liners were supposed to make these more practical, but they don't eliminate sand washing completely.

I've flattened my cape-and-bay-style bunkers, reducing maximum slope from 25 percent to 12 percent, which usually allows them to hold up in moderate rains. However, attaining the same visibility us-

ing half the slope doubles the bunkers' front-to-back dimensions, increasing size and daily hand-raking.

We can creatively use fairway slopes, grass bunkers and mounds, steep banks and good old-fashioned depth perception tricks to make shots challenging. In many ways, using different hazards should allow us to make each hole a bit more unique. For instance, aren't there too many greens with bunkers left and right already?

Another style change is to reduce bunker sizes. Before, a maintenance-friendly bunker had 16- to 20-foot-wide minimum bays to turn mechanical bunker rakes at the bunker ends comfortably, making for fairly large bunkers. Smooth curves and edges allowed courses with a tight budget to rake right to the bunker edge with power rakes.

Smaller bunkers should reduce raking time as well. Aesthetically, this is often an improvement because smaller bunkers are often in better proportion to the greens and create the right aesthetic balance. Superintendents are finding hand-raking consumes as much labor as power-raking because they always use two-man crews (one riding the power rake and another to hand-rake edges). And while hand-raking takes more time, travel time of utility vehicles is greatly reduced.

Generally, superintendents prefer flat sand bunkers with steep grass banks. They accept the regular schedule of bunker-bank hand maintenance – or look the other way as employees push the limits of riding mowers – more than the unpredictability of sand shoveling.

In this instance, players side with superintendents. In a cape-and-bay-style bunker, a shot missing the green by 5 feet often plugs in sloping sand, while a 10-foot miss finds flat sand and a better lie. In flat-bottom bunkers, the 5-foot miss deflects off the grass bank and lands lightly in the flat bottom, giving all misses better lies.

Bunkers are placed and shaped at the discretion of the architect. If money is a factor, it makes sense to use discretion to build bunkers that are more easily maintained. If I do, my bunker designs will less likely be eliminated during the next recession, as has happened to so many bunkers during times when money is tight. GCN