

without tines; grooved flaps with or without tines; and the old cutter bars with flaps. It isn't surprising to find private clubs and public courses using different schedules. Resorts may only see their guests once and so they tend to rake more often. Private clubs tailor their routines to the members wishes and hopefully see a higher level of golf etiquette and participation than public venues.

Edging routines also varied widely depending on practices, available labor and expectations of the clubs. Weekly and bi weekly routines were common, followed by monthly and bimonthly to a minimum of three times a year. String trimmers, stick edgers, and reciprocating edgers have become the predominant edging tools.

Only four superintendents reported using non-selective herbicides to chemically edge bunkers. On the other hand, eleven courses reported using PGRs to reduce flymowing. Only four courses said they overseeded bunker lips.

On the issue of correcting soft bunker conditions, suggestions included: Using proper sand; reduce raking frequency and use of tines or cultivators; hand water; tamp; use granular wetting agents; tire packing (a PGA recommendation); drag mat and rental compactor.

Concerning wet conditions, the offerings are: Install drains; repair and flush drains; shovel silt and debris before raking; use tines to break up crust; increase use of tines and raking frequency; allow to dry before raking (USGA recommendation). For water damage and washouts the first response is judicious use of push blades on sand rakes to put sand back in place. Good old shovel and rake work is also required.

Chronic washout areas are corrected in the long run only by diverting runoff from the bunker or sodding or rebuilding a bunker face that is too steep. Remember "angle of repose" as one of those critical factors in sand selection? Construction sand has an angle of repose of 35 degrees. Any bunker face steeper than that defies the laws of physics. Golf course architects take heed!

Last but not least is a discussion of where to put hand rakes. Sixteen of the courses put the rakes on the course.



Photo by Darren Davis

*String trimmers, reciprocating edgers and stick edgers (pictured) have all but replaced square point shovels and halfmoon spades for edging bunkers.*

Nine said they put the rakes *in the bunkers*. Three said definitely on the course but *out of the bunkers*. Four more just said *on the course*.

For your information, the USGA recommends that rakes be placed outside of the bunkers. The other fourteen courses put the bunker rakes on the golf carts. The big drawback for rakes on carts is that golfers are forever forgetting to bring the rake back to the cart.

Cary Lewis at the Stouffer Vinoy GC has a great idea to help alleviate that problem. At the Stouffer, they have two remote rake stations stocked with extra rakes on holes #3 and #13. Those with rakes on the course cite member preference as the dominant reason followed by walking golfers. Those with rakes on carts cite aesthetics, theft, damage and labor savings as the reasons for their choice.

Bunker management is entering a new era. The demands and expectations of improved playing conditions includes bunkers. Materials, equipment and techniques are improving rapidly. I hope this overview helps. Check out the next article to see how Mike Hamilton solved some specific problems at his course.

## Bunker Maintenance at Grey Oaks C.C.

BY MIKE HAMILTON, CGCS

At Grey Oaks Country Club we have 96 large bunkers with steep faces, so it has become essential for me to find ways to efficiently maintain them. With the help of a Trims computer program, I have always tracked the labor at Grey Oaks. The highest labor area has always been our bunkers.

In our first year of existence we spent 16,250 hours in labor on bunkers, which was 14.2% of our overall labor. The following year we spent 15,000 hours in labor on bunkers, which was 9.3% of our overall labor. This year that percentage is down further to 8.7%. How have we reduced the labor on our bunkers? With chemicals, new equipment and training.

It is truly amazing how far bunker maintenance has come since I was on a crew. On a good day three people could edge 15 bunkers a day.

Today, I can send two people out and they can neatly edge all 96 of my bunkers in one day. Wow! Now that is a big-time money saver. How is it possible to do

this? I stay on a scheduled program of chemical and mechanical edging, and also use growth regulators.

About a year ago I purchased a 15-gallon battery-operated sprayer with a coiled hose. At the end of the spray wand we attached an inverted funnel with square edges. Once a month, one person driving a utility vehicle and one steady-handed well-trained person using the spray device and a non-selective herbicide can neatly chemically edge all 96 bunkers in one day. Because the funnel is square and open ended, I do not get the jagged edge I used to get with a shield attached to a spray wand.

Chemical edging does not eliminate mechanical edging, but it does reduce it tremendously. Back in the old days, if we were to keep our bunkers neatly edged all the time we had to mechanically edge them 15 to 20 times a year. Today, because of chemicals, I need only mechanically edge bunkers four times a year. In the last few years I have discovered the *stick edger*. A stick edger is simply an



*An inverted square-mouthed funnel attached to a spray wand gives a nice crisp edge when chemically treating bunkers.*

Photo by Mike Hamilton

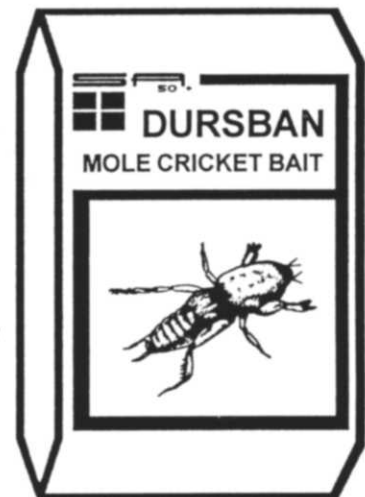
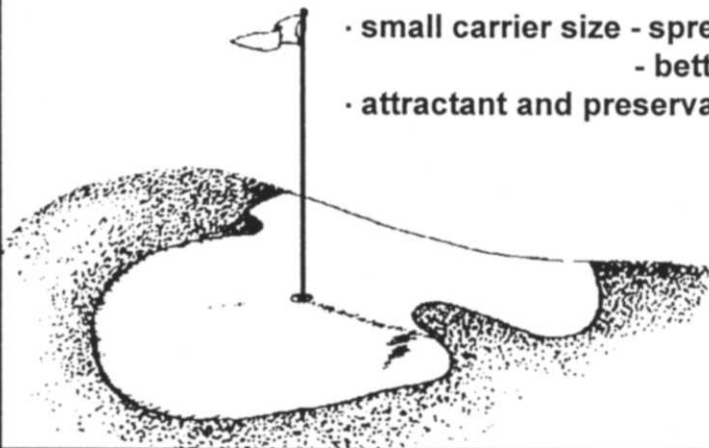
edger blade attached to a weedeater.

The speed at which an operator can trim edges, and the mobility they have,

has made mechanical edging fast and easy. One operator edging and one person with a leaf rake can edge and clean all

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*Mike Hamilton demonstrates his modified version of the Flymow.*

96 bunkers in a day, and if I am closed one person can do all 96 bunkers. The small amount of debris that is clipped off will be tilled into the sand the next day with the mechanical rakes.

Another big labor item for me has always been mowing the step bunker faces. When I first arrived at Grey Oaks, it took 84 hours a week to mow the bunker faces. Although my budget is not bad, it is by no means exorbitant, so I had to find a way to reduce that labor. By modifying my flotation mowers and with the use of growth regulators, I have reduced that 84 hours a week to 84 hours a month.

The worst part about spending all that time mowing bunker faces was that even though I was mowing them once a week, they were still always brown, either from scalping or stress due to the run off of water, nutrients and chemicals. I knew the higher I could maintain the turf, the easier it could cope with the stress of this severe environment. The problem was that the highest my flotation mowers would cut was 1½ inches. We came up with the idea of mounting a 1½-inch PVC pipe to the bottom of the mower to raise the height to three inches. The three-inch height seems to be a better one for the turf under the extreme conditions.

Growth regulators have also become a

part of my bunker maintenance program. Because we are cutting bunker faces at three inches, I can use high rates of the regulators without the turf going off-color. The higher rates allow me to mow the bunker faces on a monthly basis rather than weekly. The turf tightens up and rarely gets scalped when we mow it. At first, I was concerned that the three-inch turf would look out of place with our normal rough, but it doesn't. The slopes

are steep enough that very few balls get hung up in the face of the bunker. I get more compliments because the bunkers are green than I get complaints because someone lost their ball in the turf. The growth regulators also help me with my bunker edging.

I have my spray technician treat the entire edge of the bunker when he is spraying faces, and it reduces the runners in the bunkers tremendously.

I don't think enough can be said about how training employees properly can make any task more efficient. We spend a lot of time with our bunker crews to make sure we are getting peak performance out of them because it is such a labor-intensive area.

One of the most important persons on that crew is the person who does the chemical edging. If that person is not meticulous in his task, he could cause more work than he reduces. Make sure you spend a lot of time with that person, and make them realize how important the task is.

Using these techniques I have reduced our labor on bunkers by 5.5%, and our bunkers are always well-kept and manicured. That reduction in bunker labor has benefited the entire golf course, because we can concentrate more labor on other parts of the course.



*Photo by Mike Hamilton*

*Crew member, Gene Paul, drives while Jose Godines chemically edges a bunker at Grey Oaks with a modified spray wand attached to a 15-gallon electric sprayer.*