Correcting a problem area — turf above lip deteriorated and is in the process of being replaced. Baltusrol Golf Club, Springfield, New Jersey.

Sand Bunkers – Keeping That Edge

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FEW PEOPLE INVOLVED in golf would deny the importance of the sand bunker on golf courses today, from both an appearance and playability standpoint. Yet few other features on a course are considered such a maintenance headache as the sand bunker. When everything is considered — including the need for edging, weeding, raking, trimming, adding sand, and occasional renovation or reconstruction, much of which must be done by hand — the claims that sand bunkers are high maintenance features probably have some merit. However, just like every other feature on a golf course, a well-designed, properly constructed, and well-maintained sand bunker need not be a heavy burden for the golf course superintendent.

If design and construction faults are evident, they can often be modified or corrected without major expense. In fact, it is less often design or construction problems that cause labor-intensive maintenance for sand bunkers than the extremely high standards demanded by much of the golfing public.

It is often said that overgrooming is overspending, and this is certainly the case with sand bunkers at many courses.

Changing the public attitude toward grooming standards for sand bunker maintenance is not the only thing that can be done to reduce costs. Maintenance practices that actually increase the cost of maintenance and contribute to bunker deterioration, some of which have been considered acceptable for many years, need to be reviewed and modified.

Establishing an Edge

Maintaining a well-defined edge along the border of the sand bunker is one indication of a properly kept golf course. Not only is this important from a playability standpoint, so that the golfer can determine if he is in the hazard, but the effectiveness of the bunker as a visual component in the landscape may be spoiled or enhanced by the manner the edge is kept.

Sand bunkers may have two types of edges, depending on the design and location of the bunker. A 2- to 4-inch vertical lip should be maintained *only* on a greenside bunker from which it is possible to escape and reach the green by putting and *only* on the edge facing the direction of play. A common mistake is to establish a lip around the entire perimeter of the greenside bunker or on bunkers located away from the green, a practice which serves no practical purpose. A golf ball nestled next to a sharp lip along the back side of a greenside or fairway bunker may not leave the golfer an opportunity to advance the ball toward the hole, a situation which is considered unnecessarily severe. Sand should be raked and kept at the soil line in these areas.

The importance of edging sand bunkers cannot be overstated, and yet it seems that the time and money spent on this annual or semi-annual effort could be reduced by adopting a different philosophy and changing some common practices. Is a sharply delineated, clean-shaven lip or edge really necessary, does it serve a purpose, or is it even really attractive? This type of lip is usually achieved by using a power edger several times each year or by removing several inches of the lip with square-edged shovels. There are many who believe that this look is too artificial and represents overgrooming, though this is really a matter of personal taste. Nevertheless, in these times of tight budgets, perhaps a move toward tidy but less-manicured bunker edges is warranted.

To create a lower-maintenance bunker lip, the establishment of a well-rooted turf along the edge is first necessary. Kentucky bluegrass, tall fescue, perennial ryegrass, and fine fescues all can be found to serve nicely in this role. Because it is deeply rooted, persistent and drought tolerant, yarrow makes a particularly good plant material for bunker lips in some instances. Bentgrass and *Poa annua* do not serve the purpose and should be replaced, usually by sodding, if they predominate along greenside bunkers.

After the turf has become established, leaf blades are allowed to hang down over the edge of the lip, requiring only a quick trimming if they become too long. Actual edging is done only to keep rhizomes and stolons from encroaching into the sand, a process which is sometimes done with a non-selective, short-residual herbicide. Maintaining a higher height of cut allows the grass along the bunker lip to remain stronger and helps to define the bunker visually. In fact, this style of sand bunker maintenance does not generally work well where the turf is cut at one inch or less.

Allowing turf on bunker edges to grow in this manner is not new; it has been practiced on many golf courses for years. It does not preclude the need to rake the sand regularly, eliminate weeds, provide good drainage and trim when necessary, but it can provide a well-defined, stable, attractive bunker edge which takes less time and costs less to maintain.

The Role of The Power Sand Rake

The introduction of the riding power sand rake during the 1970s has had a

(Opposite page) A typical bunker washout after a rainstorm. (Above and below) A way to correct the problem.

significant positive impact on bunker maintenance. One worker can now rake in a few hours what it used to take several men an entire day to do. Not only that, but the weed bar attached to most commercial units has eliminated most of the weeding work which had been such a time-consuming job in the past.

On some courses, this machine has saved many man-hours of labor that can now be put to better use. On others, especially municipal and public courses, it has meant that the bunkers are raked more often, contributing greatly to their appearance and playability. The sand rake is a versatile machine, and it is often used for spiking greens and dragging in topdressing material (with appropriate attachments). It certainly has an important place on many golf courses today, except for those with few sand hazards or with bunkers which are too small or inconveniently designed.

In many respects the increased use of the power sand rake has paralleled that of the triplex putting green mower, and like the triplex mower, the sand rake has produced some undesirable side effects. As a practical matter, the power rake is really not designed to rake the sand in every bunker from edge to edge, even

assuming that the bunker is relatively flat. However, with human nature dictating that a worker will want to spend as little time off the seat as possible, that is what often happens. The result is that sand gets pushed outward over the edges of the bunker due to the outward lateral push of the machine as it travels in a circular pattern around the bunker, and the edges become broad ridges of sand with a few meager tufts of grass. This symptom is most common on any edge where the machine is making a sharp turn.

Another common problem is the trail of sand left outside the bunker at the point where the machine makes its exit. This is caused by the worker who does not raise the rake arm quickly enough, hoping to avoid having to climb off the machine and touch up the exit tracks with a hand rake. Even when the sand is not dragged out over the edge, leaving the bunker at the same location each day may result in the deterioration of the lip or edge, a problem that can be minimized by leaving the bunker from a different location each day, if possible.

The problems inherent with this type of lip and edge deterioration are twofold. From a playability standpoint, the edge of the bunker may become so poorly defined that the golfer cannot determine whether he is in the hazard or not. As far as maintenance is concerned, the bunker lip may have to be partly rebuilt every two to four years in order to reestablish a well-defined edge. This may require digging the sand from the edge, perhaps adding topsoil to establish a lip, and placing sod around the perimeter of the bunker.

Basically, this is a laziness problem, and it need not occur. For best results with the power sand rake, use it to rake the center portion of the bunker, coming no closer than 12-18 inches from the edge. Then have the worker leave the bunker, preferably from one of several different locations, and touch up the sand along the edge of the bunker with a hand rake. Time will still have been saved by using the machine, and quality will not have been lost.

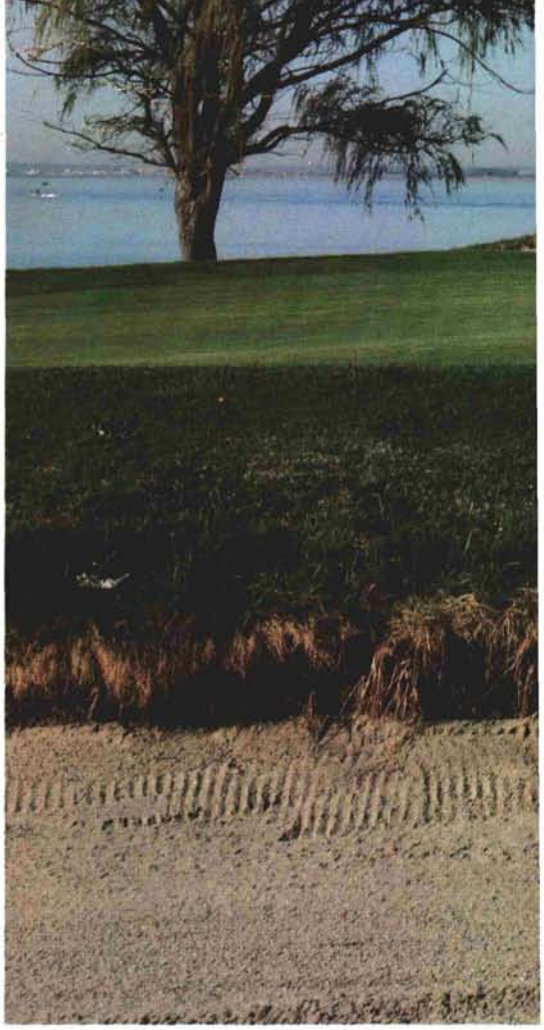
Dealing with Sand Buildup

A problem that every golf course faces through the decades is the buildup of sand in the lips and bank areas adjacent to sand bunkers caused by the blasting of sand as golfers play their shots. The result, over a period of many years, is the gradual deterioration of the established lip or edge and the thinning of turf in this area. Turf damage is caused by drought conditions created by the buildup of up to several feet of pure sand adjacent to frequently used bunkers.

Cutting the turf around the bunker at a higher height, as suggested above, will maintain better turf density as the sand builds up. This is often not possible with greenside bunkers where sand buildup may be occurring in the collar and the green itself. The use of wetting agents can reduce the wilting tendency of turf in these areas. Some have installed perimeter mist-type irrigation systems to supply extra moisture to droughty collars and sand bunker banks.

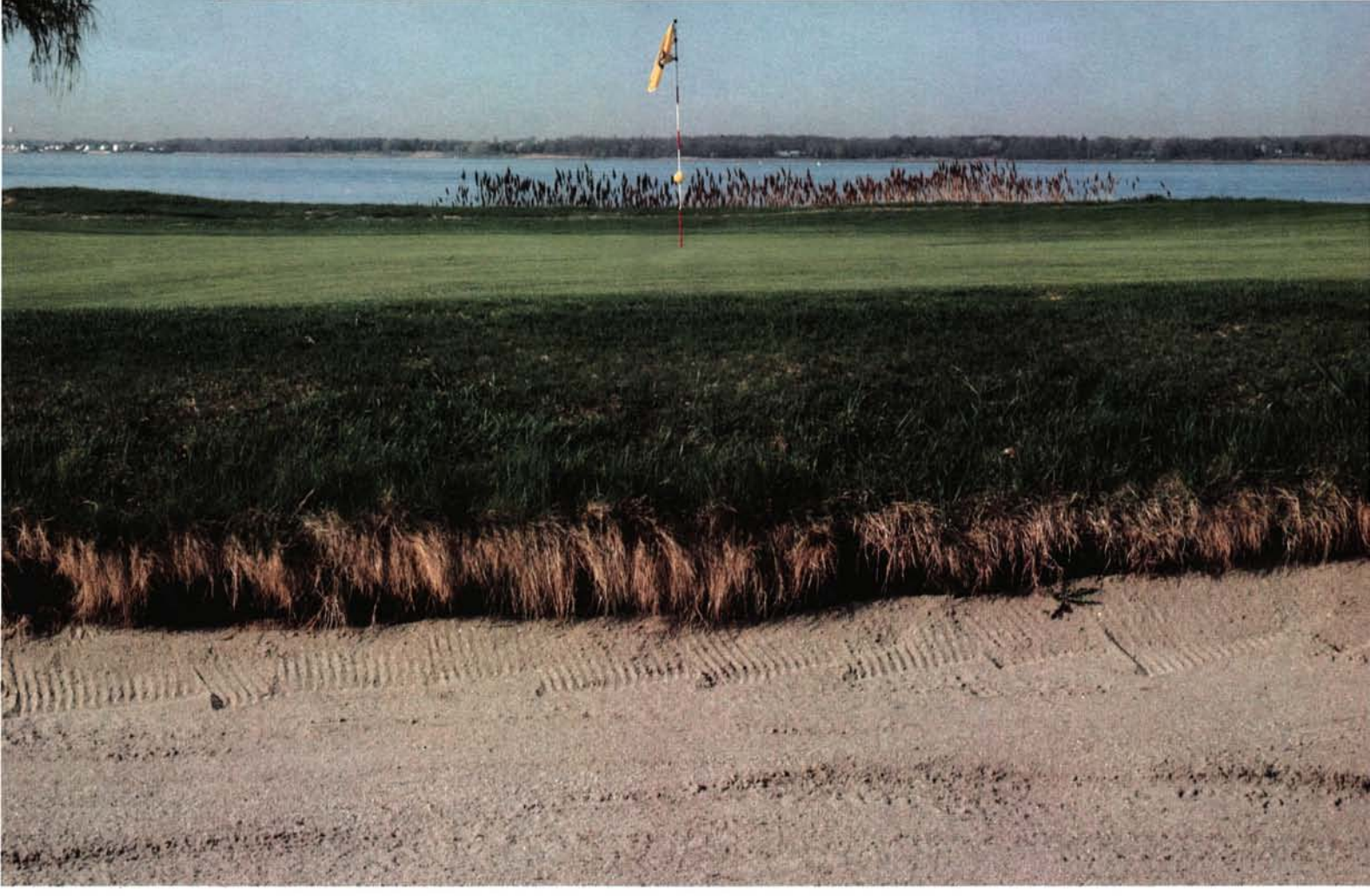
Inevitably, however, turf deterioration continues to such an extent that renovation becomes necessary. When this occurs, accumulated sand must be removed down to the original soil level, topsoil may be added where desired to achieve the final contour, and sod is most often used to resurface the lip edge and adjacent bank.

There is really no shortcut to this procedure. Trying to place new sod over many inches or feet of accumulated sand is usually not satisfactory. However, removing a significant layer of sand may give a very new look to an old area. A decision must be made as to



(Above) An example of a lower-maintenance lip — the natural look. Warwick Country Club, Warwick, Rhode Island.

(Below) Typical problem caused by improper use of the mechanical sand rake — sand raked over the bunker edge.



whether the new (original design) grade is kept or whether the more familiar grade is reestablished by adding topsoil. It provides some food for thought to consider how sand accumulation in greenside bunker banks has changed the playability and appearance of golf holes on the old courses over the years.

The problem of sand accumulation is especially noticeable on the frequently played greenside bunker, where it may take only a couple of years after renovation for turf deterioration to become apparent again. To maintain consistency, the maintenance programs at many clubs include resodding these turf areas approximately every five years, thereby avoiding the major reconstruction work needed when many inches of sand have accumulated.

Concerns With Washouts

Most golf courses experience sand bunker washouts at one time or another, where water entering from nearby areas carries sand off the bunker faces and deposits it in the nearest low spot. At the very least this occurrence demands that the sand be shoveled back onto the faces. But if washouts are allowed to continue, the lip becomes eroded or undermined and requires renovation on a regular basis.

Needless to say, sand bunker washouts are a real maintenance headache and should be prevented if at all possible. There are two good techniques available for dealing with this problem. The first involves the construction of a drainage ditch on the slope above the bunker which would channel surface water harmlessly around the sides during a heavy rainstorm. The required depth and width of the ditch depends upon the volume and surface velocity of the water as it approaches the bunker. Swales are often quite easily created by removing the sod in a 4- to 10-foot-wide strip along the area above the bunker, excavating the soil to establish a gentle, functional ditch, and replacing the sod. Be sure that the ditch directs the surface water toward an out-of-play area and that it is not shaped so severely that it becomes a maintenance headache itself!

Because there is sometimes not enough room to create a ditch, especially when the bunker is located close to a green, a good alternative for preventing washouts is the interceptor drain. This is simply an open stone drain which is installed in the same location where a ditch would be built, on the slope above and to the sides of the bunker. An interceptor drain can be easily installed by digging an 18- to 24-inch-deep, 6-inch-wide trench in the area above the bunker, placing 4-inch flexible plastic perforated pipe in the trench, and re-filling to the surface with crushed stone or pea gravel. The actual width of the trench may need to be increased if water volume and surface velocity so demand. The drainage pipe can be connected to an existing drainage system, directed to an out-of-play area, or ended at a dry well.

This type of drain is designed to intercept surface water during a rainstorm before it reaches the sand bunker and causes washout problems. It is effective because stone is added to the surface, providing surface water with immediate access to the trench. Sod, therefore, should never be placed over the trench. Instead, just allow the adjacent turf to cover over naturally.

If the washout problem is particularly severe, a combination of a shallow ditch and an interceptor drain might be more effective than either one alone.