SAND BUNKERS: *Old and New*

by JOSEPH G. BAIDY
CGCS, President, Golf Course Superintendents Association of America

THE IMPRESSION a golfer receives of a golf course is a composite picture based on individual perceptions. Negative features of the course will greatly influence golfers' opinions, regardless of favorable conditions they may experience. That is just the way of golfers — they are the most critical individuals in any sport.

Among the factors that most strongly influence a golfer's impression of a course are the sand bunkers and their condition. Bunkers play a strategic role and also have a profound influence on the overall character and design of a course. To have your shot land in a bunker would be a satisfying experience if it's intentional, but in most cases, it's just plain bad luck.

Ideally, a golfer should consider playing from a bunker as just another challenge encountered during a round. If the sand bunker is in good condition and maintained properly, the golfer will accept a poorly executed shot as his fault. But, let the sand be wet, puddled, or of inconsistent uniformity throughout the course, and any other bunker shot played during the round may create anxiety. This feeling can cause the golfer to view the course negatively.

The age of a golf course has a direct bearing on the condition of the bunkers. Clearly, there comes a time when renovation is called for. When that time arrives, a bunker renovation program should be built into the club's annual operating or capital budget. The addition of sand annually, in my opinion, is not renovation, and it does not represent adequate bunker maintenance in most instances. The only exception I know about is a golf club that has used the same sand for over 20 years; they use plastic between the sand and soil, and they have been very successful.

Regular bunker maintenance should not, however, be limited to the sand alone. One also must consider drainage and surrounding turf areas, mainly the slopes that are facing the greens, as part of the maintenance program.

At this point I would like to focus on the conditions that can develop with old bunkers. As previously noted, maintaining grass slopes is a critical part of bunker maintenance, and bunker edges can shift constantly, depending on grass types, wind conditions,

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Joseph G. Baidy

and traffic. Edging a bunker incorrectly can be a real problem in terms of losing its original shape and size, depending on the amount of material removed. With sand constantly being blasted onto the slopes, this area can become unstable, and unless sand deposits are constantly removed, the turf can become thin and sparse, eventually resulting in the complete loss of grass on the slopes. This could alter the architect's original design concept for the course. I've seen bunkers shift forward five to 10 feet, and sometimes even greater distances, compared to when the course was originally built.

Steep slopes can present still more problems. Sand washes off the slopes during rainstorms, exposing soil that then contaminates the remaining sand in the bunkers. Silt can then gradually infiltrate into the drainage system, thus creating future drainage problems, and the sand/soil mixture produces a surface inconsistent with the other bunkers throughout the course. The sand/soil mixture eventually becomes dusty, and a hardpan situation can develop.

Sometimes drainage systems also cease to function due to silt accumulation. Instant new ponds will be formed where sand bunkers once reigned. Some golfers find it difficult to interpret the Rules of Golf concerning drop areas, and this can often lead to disagreement. Shoveling sand back in place is both labor intensive and time intensive. Pumping water from bunkers requires equipment, time, and manpower. Adding new sand to the bunker is a waste of money because the next rainstorm probably will produce the same results.

Renovation is the only answer for golf courses suffering through these conditions. The bunkers at Acacia Country Club, over a period of time, suffered the same fate as those just mentioned. Our problem was compounded during the last six years by some of the wettest years ever recorded, alternating with years when drought-like conditions were prevalent. The club then decided to renovate the bunkers.

Since the course was designed in 1921 by the distinguished architect Donald Ross, a return to this style of bunker weighed heavily on the committee. Due to economics, it was decided to carry out the renovation in-house over a four-year period. One advantage of this type of approach was that the club was able to restore the bunkers as closely as possible to the original design without being hindered by any major time constraints. Research of old photos, maps, and members' memories helped guide the renovation process.

Consideration also was given to allow for minimum interruption of play and even to cease work during major club functions. We were able to work on drainage as part of the bunker renovation at the same time. I consider drainage a major component for any successful bunker renovation program. We went to the areas that have a good outlet as well; you have to get water out of that bunker and you may have to go anywhere from 100 to 300 yards, or whatever it might take, to remove the excess moisture and make the bunker playable as quickly after rainfall as possible.

Recognize that there are many disadvantages to building in-house. For example, the golf course was constantly under construction, and the golfers experienced radical extremes in sand playability from renovated bunkers to untouched bunkers. Scheduling of equipment used for other course projects was difficult, and the project with the great

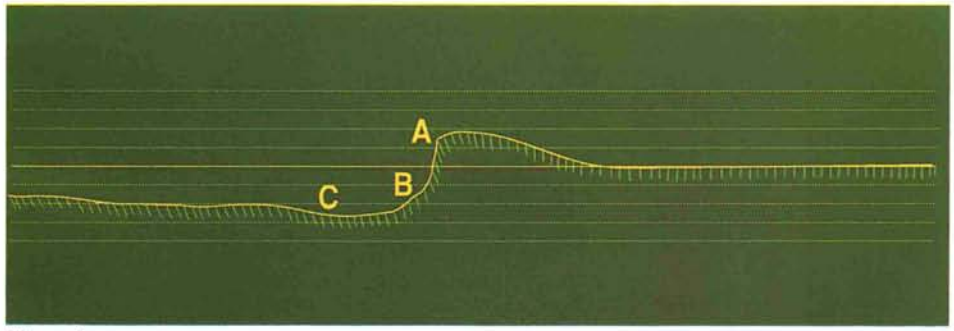

Figure 1

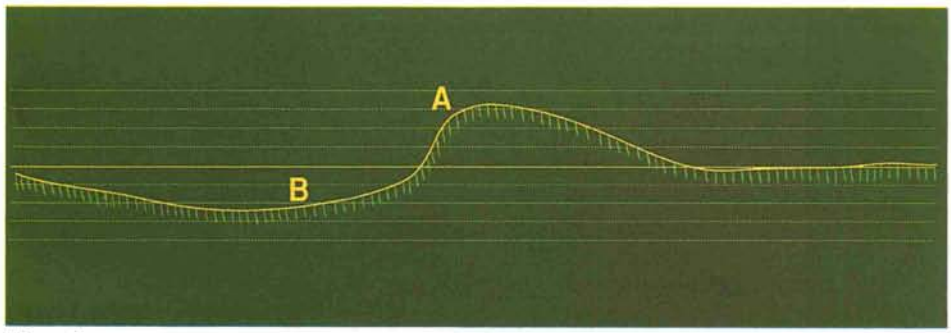

Figure 2

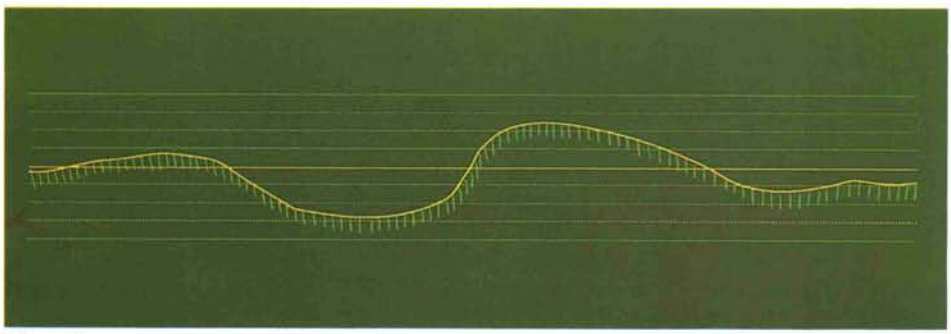

Figure 3

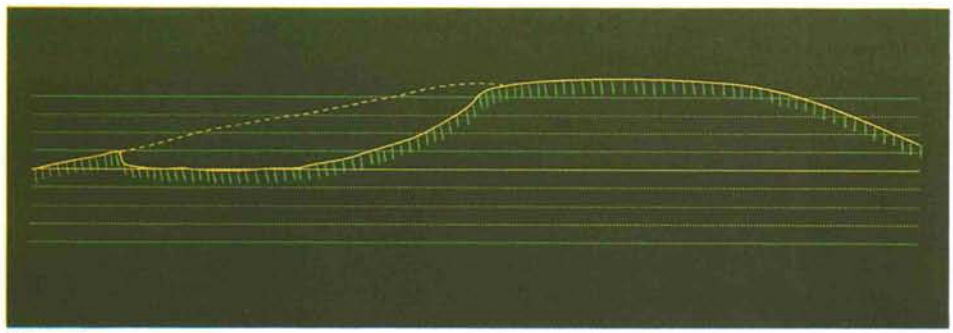

Figure 4

Donald Ross created various mounds and bunkers. Figure 1 depicts a typical bunker face less than 3 feet deep, with a steep slope from A to B and a gradual slope from B to C. Figure 2 is a typical bunker greater than 3 feet deep with a gradual grade from A to B. A depressed bunker with the face raised above the surface is demonstrated in Figure 3. Figure 4 shows a bunker dished out of the face of a mound with a sand face.

est priority was always the winner. Of course, we must not forget the constant training of staff to meet the club's objective. With the positives outweighing the negatives in terms of the work's final outcome, the golf course staff was eager to get started.

First of all, an understanding of the various types of mounds and bunkers that Donald Ross created is important. Figure #1 shows a typical face for a bunker less than three feet from the top of the bunker greenside, halfway down the slope. The slope is very steep as shown from point A to B. The remainder of the slope leading to the sand portion is a gradual grade and is noted as B to C. Figure #2 shows a typical face for a bunker more than three feet. This one has a gradual slope from the top of the bunker from the greenside to the sand portion. Figure #3 depicts a bunker that is depressed with the face raised above the surface. Figure #4 shows a type of bunker dished out of the face of a mound with a sand face.

After carefully studying and reviewing the bunkers throughout the course, it was time to commence renovation. The green committee decided to grass all slopes so that all bunkers would have flat surfaces. At the outset, the face of the greenside slopes had to be removed along with the remaining sand.

Studies and determination of original bunker shapes were made. Sometimes we were lucky to find an original outline of a bunker from remaining ground contours. Another way of finding original bunker shapes was from leftover sand deposits. On some of our bunkers, the tile line provided an indication of where the bunker was originally located, along with the photographs in the clubhouse.

We did not have any plans or drawings for Acacia Country Club, so we went out and did it the hard way — we probed. We tried to find everything possible, from identifying ground contours to talking to everyone who had been at the club for a long time. We were lucky in some instances to find original sand. On the eighth hole, the original sand gave us a complete outline of the whole original bunker. It was completely different from the way it had been remodeled before. The bunker on the back of the 18th green was under five feet of soil that had been brought in to provide a more level playing area, but we located the original sand deposits with the drain tile lines.

The drainage tile system in the bunkers was completely replaced and improved. I might add that the materials surrounding the old plate tile consisted of a cinder-like substance. When removed, it was used to fill the potholes in the maintenance road. This material set up just like asphalt due to the silt accumulation over many years.

After determining the percent slope, depth, and contour of the bunker, the area was staked for visual confirmation of the exact size and location. We drew an outline of the staking pattern, where the flat part of the bunker was going to be, and the area to be grassed in. We made certain that staking was done in such a way that the operator knew what areas to go into, and that we would end up with bunkers conforming to the shape and size we had calculated.

Soil with a high-clay content was used to develop the slopes; we did not want any erosion. This was tamped in place to prevent erosion and to help stabilize the steep slopes. Once the banks were roughed in, an outline

of the bunker was established. Over the years I had used burlap bags filled with soil or strips of plywood staked in position to form bunker outlines. With plywood, the bunkers were out of play until the sod rooted to a sufficient depth and the banks were stabilized. But by using four-inch plastic tile for establishing the bunker edge, once the sod rooted, generally within 10 days, the bunkers were open for play.

Another reason to use the tile method is that when a shot is played near the bunker edge, the normal follow-through that strikes the edge would be soft and safe, unlike that of wood. To further soften the blow, the plastic is covered with sod. When we lay sod, we put it right over the plastic tile. Take it right into the bunker itself and then sand it the same way. This can be left in place for months until satisfactory root depth is achieved. After the needed time, the plastic tile is removed and the edges are trimmed. The bunker is then totally renovated. Using four-inch plastic tile also makes it easy to maintain a four-inch sand depth throughout the bunker, and the plastic tile can be reused in other bunkers. It is best to use unperforated tile instead of the perforated type. The next step is to review the drainage system and determine the additional needed tile lines.

Our golf course is now more in tune with the original design that Donald Ross envisioned, and Acacia golfers now have a fresh opportunity to appreciate that vision.

During the Acacia Country Club bunker renovation, drainage pipe was used to delineate the renovated bunker edge.

THE BEST TURF TIPS OF 1994

No More Rolling Stones

by DAVID A. OATIS
Director, Northeastern Region, USGA Green Section

IT IS NO SECRET that good drainage is a requisite for growing healthy turf on a consistent basis. Regardless of the golf course superintendent's abilities, problems are likely to be experienced if adequate drainage does not exist. Playability suffers, aesthetics suffer, and stress and disease problems are much more common with poorly drained soils. Having said all this, it is clear that most courses have at least a few drainage problems. This can be due to a variety of factors, such as the design or topography of a golf hole or the poor internal drainage qualities of the existing soils, possibly aggravated by compaction.

Regardless of the reasons for poor drainage, installing effective drain lines isn't all that complicated. We can use high-tech tools like laser grading devices, a common land level, or low-tech tools such as a poor man's level consisting of clear tubing attached to a graduated measuring device. Positive and steady fall of 1% or greater is necessary between the drain's inlet and the outlet. The inlet obviously must be located below the area in need of drainage, and the outlet must not be restricted.

Despite the simplicity of the concept, ineffective drainage systems are fairly common. In some cases, the drainage pipe may not be sufficiently large enough to handle the volume, or it may have been installed improperly without adequate fall, making it non-functional. Tree roots can also cause problems with drain lines, but sometimes the drains are simply not put in the right