BUNKERS: MAJOR CONCERN FOR MAINTENANCE

By LEE RECORD

Mid-Continent Director, USGA Green Section

The self-propelled sand trap or bunker rake has eased to some extent the pain of keeping the bunker playing surface manicured; unfortunately, mechanization is not always the answer. Bunkers are still one of the most costly items on a per-square-foot basis in the golf course superintendent's maintenance budget. How can this expenditure be reduced? What steps can be taken to correct built-in maintenance problems for old, established bunkers as well as for proposed new ones?

Excerpts from the chapter on "Bunkers" in the booklet "Building Golf Holes for Good Turf Management" published by the United States Golf Association and edited by Dr. Marvin H. Ferguson contain many of the answers one would wish to seek out. Highlights of the "Bunker" chapter follow:

> The design of bunkers is governed principally by the requirements of play, topography of the area and aesthetic considerations. From the standpoint of maintenance, however, several other factors must be taken into account. The first thing to be considered is the effect of the design on mowing. Nearly all golf courses have bunkers which require hand mowing to some extent, and this probably cannot be avoided, but, if thoughtfully designed, bunkers can require a minimum of hand mowing.
>
> Fairway bunkers or those in the rough immediately adjacent to the fairway should be so designed that mowing can be accomplished with the standard gang units used for fairways or roughs. Bunkers located within the confines of the fairway should be surrounded by an apron of rough, for two reasons. First, if this is done, the area around the bunker will not require the intensive management necessary for fairways; however, these areas should be maintained neatly. Secondly, sand blasted out of the bunker onto the surrounding turf will not cause the rapid deterioration that would be inflicted on closely cut turf.
>
> For fairway or rough, the use of grass hollows should be given careful consideration. If properly designed, they afford the de-

Surface runoff causes erosion and shoveling problems.

sired test without the additional maintenance required by sand bunkers. Grass hollows should be nothing more than gradual depressions as far as the actual feature is concerned, but provision should be allowed for drainage.

By far the greatest mowing maintenance problem occurs around bunkers in the immediate vicinity of the green. Certainly they must be kept in a neatly manicured condition, and this requires increased mowing. Once again, turf areas bordering the bunker should be maintained at rough height, and design should allow for this.

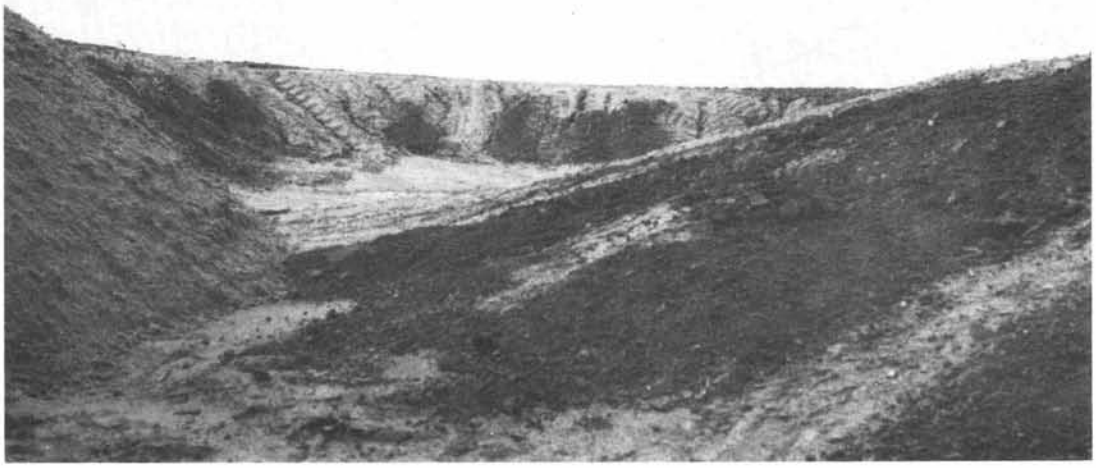
Sometimes architectural considerations necessitate the positioning of a bunker flush against the green or collar. This causes great difficulty in mowing of both the green proper and the narrow area between bunker and green. Sand blasted out of such bunkers damages mower reels and bedknives, and after a period of time sand build-up on the edges of such a green will cause a droughty condition, and thus weak turf.

Whenever shot requirements permit, bunkers should be positioned so that there is at least 6 feet between the near edge of the actual trap and the outer edge of the collar. This would facilitate cutting with a triplex or similar mechanized equipment; blasted sand would be less of a problem, and green mowing could be accomplished with greater ease and safety. In addition, the higher cut around the bunker would tend to accentuate both the sand and the green.

Steep-flashed banks within the bunker are frequently desirable because of the need for visibility, but they present a problem of sand stability, and many prefer to turf such banked areas down to sand level. This causes mowing difficulties if the banks are too steep, and it becomes necessarily a hand operation. It may also result in a hidden bunker. Whether hand mowing of steep banks or stabilizing sand on them is more of a problem is a matter of conjecture. However, if slopes are not severe and mechanized mowing can be accomplished, turf should be more desirable than sand.

Design of bunkers affects drainage not only within the bunker but the area surrounding. This is perhaps a question of location more than any other single factor. Bunkers are sometimes necessarily placed within surface drainage flow areas. If this must be done, care should be taken that drainage into the bunker does not occur. With proper grading and the use of swales, drainage water can be diverted around the bunker and away from areas in play. Don't forget the point that the surrounding area should be drained, too—the bunker build-up should not impede or restrict flow of water.

Drainage within the bunker is of prime importance from the standpoint of both play and maintenance. Poorly drained bunkers hold water for days after heavy rainfall or irrigation, and even after the water disappears the sand is heavy and difficult to play from. Poorly drained bunkers promote washing or move-



New bunker—very steep construction to hold sand or to mow grass.

ment of sand from higher to lower areas. Finally, poorly drained bunkers always appear dirty due to the seepage of soil particles up to the sand surface.

This is strictly a question of design and construction. No degree of maintenance will alleviate the problem. Wherever possible, sand surfaces should be level or very nearly so, to minimize water flow. Where large bunkers are required and proper grading cannot be done, terracing or stepping of sections should be utilized, the areas between the sections being tufted.

In many cases, the tile drainage must be used to eliminate water build-up in bunkers. If the bunker is large and cannot be tiled completely, tile should be placed in or about the lowest point. Slope of the bunker floor should be only enough to allow the water to move. Anything more will cause excessive sand movement.

All the points mentioned so far relate directly to maintenance and therefore the budget. Obviously, golf would suffer without sand, and golf courses would lose some of the beauty and contrast provided by bunkers. However, if poorly designed, bunkers require more maintenance than can be justified, and they become an unfair hazard as well as an eyesore. As a general rule, bunkers should be designed to allow for maximum mechanized maintenance, and this is especially pertinent to mowing and edging. They should be designed to afford minimum sand movement. It is far easier to rake footprints from sand than to move large quantities of sand by hand.

Proper drainage reduces "cementing" of sand particles and thus the need for more frequent raking. The location of greens bunkers can minimize the amount of sand blasted onto the green. This eliminates the damage to mowers and the time required to repair them. These are just some of the ways in which design affects maintenance costs, and it is rather obvious that bunker design has a substantial impact upon the budget.

Location of bunkers definitely affects traffic flow, especially in the vicinity of greens. One must remember that these are limited areas and traffic is extremely concentrated. Bunkers located near greens should take into consideration their effect on entrance areas and departure areas. Departure areas are generally governed by location of the next tee, usually somewhere to rear or to either side of the green.

Frequently, bunkers placed in these areas serve little function other than providing color and texture contrast. Much of the desired contrast could be accomplished by height of cut alone, or in conjunction with grass depressions.

Fairway bunkers most frequently are not really fairway bunkers at all. They are rough bunkers. Why have a bunker at the edge of a fairway or in the rough? This prevents the ball from entering the rough, which is itself a test if it is maintained as rough. The need for framing can be fulfilled by shaping or contouring fairways, placement of trees, and the use of gradual mounds or hummocks.

The role of sand in this great game is

clearly understood, and it is certainly desirable, but it should be used more discriminately. Sand can be used to enhance both play and course beauty without compounding maintenance problems."

The golf course superintendent of today must ask himself when preparing his budget, "Am I kidding myself about the constant shoveling of sand in the 16th green bunker after each rainstorm or should the bunker be rebuilt to correct the condition of improper construction and drainage?"

Frequency of weeding, edging and raking a bunker is easily determined by the demand of manicuring that is desired by the particular club. Mowing around a bunker with a triplex or rotary mower will take a certain amount of time and should be planned in the budget. Frequency will depend upon climate, irrigation and feeding practices within the bunker area.

Often it may not be too steep a bank but rather, the consistency of the sand being used that makes the sand come rolling down during a rainstorm.

Green Section Recommendations For Sand Particle Size Range for Bunker Use

ASTM Mesh 16 to 60
Millimeter 1.00 to .25
Sieve Opening—inches 0.0394 to 0.0098

Sand explosion out on the collar or into the green in time leaves a very droughty condition to sustain plant life. Hand watering may be required to correct this condition, but time and money may not be available. Sand that has built up should be removed and replaced with new soil and sod.

Each bunker has its priorities. Examine the bunker to determine what measures are needed to correct problems and ease your cost of maintenance. As one Superintendent described his bunker situation to me recently, "It is my opinion, we will always have second class bunkers unless we can completely rebuild them from the bottom up, by installing the proper drains and slopes. Perhaps reducing the overall size by increasing the shaping or scalloping of the present 'monsters' would make the bunkers more playable and give the course more eye appeal and depth. Only in this way will be have first class bunkers."

RAIN SHELTERS

By LOUIS F. OXNEVAD

The old rain shelters at Riviera Country Club in Coral Gables, Fla., were built in the 1940s and were sized to hold one golf cart plus riders. By 1974, they were in need of replacement. I presented pictures to the Green Committee of rain shelters I had built at other courses. They could accommodate more than one golf cart and were more attractive than our existing shelters. The Green Committee agreed to the addition; I drew several sketches and submitted them for bids. The lowest bid for three new shelters, which did not include the final roofing material was $9,800. This was more than the budget would allow, so I asked for $3,800 and began making plans and investigating materials and costs. By using the golf course crew, I could reduce labor costs.

The first consideration was the size of golf carts and the number each shelter could accommodate in the smallest amount of space. An octangular shape seemed the most sensible. This would allow four carts to enter from four directions and also give protection from wind and rain on all four sides. Selection of the material was the second consideration. We chose pressure treated lumber that would withstand all types of weather. Galvanized nails were used throughout.

Steel wire was placed within the octangle to reinforce the concrete. We used four cubic yards of 2,800 pound strength and poured the concrete four inches thick, sloping it slightly from the center to the outer edge and filling the eight footing holes.

Before the concrete set we placed metal channels into the eight corner footing holes. These metal channels were made by a local metal shop to our specifications of 24-inches long and wide enough to hold a 4" x 4" stud. Three sets of holes were drilled into the metal channels at distances of four inches from the bottom, four inches from the top and eight inches from the top. An eight-inch bolt was placed through the bottom set of holes for an anchor in the concrete that filled the footing holes.

We let the concrete cure for 36 hours and then removed the 2 x 4's that formed the original shape from the outer edges. The 4 x 4 corner studs were then bolted to the eight metal channels using the