Over three-and-a-half feet of sand was removed from No. 13 green front bunker and the grass fingers reshaped to the original height.

And The Sand Runneth Over

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WHAT'S THE PROPER depth for bunker sand? Most would agree that between two and six inches should suffice. In 1981 several of the 193 bunkers at the Seminole Golf Club, in North Palm Beach, Florida, had between two and four feet of sand! Over 50 years of bunker sand accumulation had occurred. Even though digging out this amount of sand would be a sizeable task, the Board of Governors decided to go ahead and re-do the greenside bunkers during the summer of 1981. Their intention was to bring the depths back to conform to the architect's original plans. Donald Ross designed and built this course in 1929, and it was obvious to me, from studying his plans, that no sand had ever been removed from the bunkers.

I was faced with moving approximately 9,000 tons of sand. We rented two nine-yard dump trucks and one Gradeall with an operator. These were used to load and move the sand to the low fairways, where it was used as topdressing. Several of Seminole's fairways are less than two feet above sea level, and this causes a chloride problem. Raising the low fairways one or two inches minimizes the chloride uptake during dry weather. The added elevation also creates drier fairways during the rainy season. The bunker-sand topdressing was applied two inches thick down the middle of the fairways and feathered out to zero at the perimeters. Thus the fairways were crowned slightly. This enables golf carts to be used during marginal weather conditions, as long as they are driven straight down the middle.

Heavy trucks and equipment can cause damage to the golf course unless traffic is controlled. Therefore, the wettest areas were covered with plywood. Plywood was also used when the rubber-tired Gradeall was entering and leaving the bunkers.

I planned to complete the 86 greenside bunkers during July and August, 1981. Several small bunkers would have to be shoveled out by hand because of the elevations of some of the greens. There

was no way to move heavy equipment close enough to complete the job.

Even though Seminole is closed during the summer months, the golf course must be maintained in reasonably good condition. This requires ten full-time employees. During this renovation, half of my crew was needed to help with the bunkers. Two drove dump trucks, one operated the box blade, another dragged the fairway after the sand was dry, and the fifth followed the drag and watered in the remaining sand by using the irrigation system.

THE ACTUAL OPERATION was very simple. The Gradeall operator dug out a place to park his machine and then drove into the bunker. The trucks were parked on plywood at the bunker's edge and were loaded. The sand was dumped in nine-yard piles on each side of the fairways. The sand was then box bladed over the fairways. When the sand was dry, it was dragged into the turf and then irrigated. Due to the heavy topdressing, only half of the sand could be spread at one time. We usually waited three or four days before spreading the remainder.

The fairways were not mowed for seven days prior to the topdressing. This was necessary because some fairways received 220 cubic yards per acre. When sand was applied at that rate, fairways were raised at least one-and-a-half inches. That's a mighty slow way to raise your fairways, but it's faster than lowering the nearby Atlantic Ocean.

It was amazing to view a sand profile three feet thick that had built up since 1929. Both bunkers behind number 14 green were very carefully hand-dug to the bottom. As I stood there looking at the layers of old sand, I couldn't help but wonder how deep this bunker sand was when Pearl Harbor was attacked in 1941. One of the old timers, who had worked for the club for 41 years, explained the black ring about six inches from the bottom. He said, "That's from growing watermelons in the traps during World War II." The club was closed from 1942 through 1945.

The particle size was consistent throughout the profile. Over the years the club had used sand found in its irrigation well field, which is about 2,500 feet from the ocean. This sand conforms to USGA recommendations as far as particle size and shape. Between 75 percent and 80 percent by volume falls between .25 mm and .50 mm in size. The remainder is about equally divided between the coarses and the fines. There is only a trace of extra fines.

A critical factor in the bunker sand removal was an experienced Gradeall operator.

I was hoping the maintenance crew could finish digging out and spreading the sand in about six weeks. After the sand was spread, the bunker fingers had to be reshaped and resodded. New sand four to six inches deep had to be added and spread. All damaged areas around the greens had to be repaired and sodded. Several irrigation lines that were found running through the bunkers were rerouted wherever possible. On holes number 1 and 12, the average water table was higher than the base or bottom of the bunker. Drains had to be installed at the lowest point and carried to nearby drainage ditches.

AFTER FIVE DAYS it was obvious the crew could not complete this job in the allotted time. They finished holes number 12 and 13 the first week. Those two holes have a total of 14 greenside bunkers. I decided the crew would work on this project for six weeks and complete it the following summer. Forty-nine bunkers were finished in July and August, 1981. Progress was slower than I had anticipated due to trucks being stuck, irrigation lines being broken and having to be repaired, and, of course, rainy, wet weather stopping all traffic on the low fairways.

By September 15, 1981, all of the new sand was in place. I had hired six men from the labor force for two weeks to shovel this sand into place. The new sand was smoothed with riding bunker rakes and irrigation used to pack the sand. All of the damaged areas had healed, and the fingers had been resodded. When we finished the job in July and August, 1982, things went much smoother and better. If I had this job to do over, I would give myself more time — perhaps doing six holes each summer.

What was accomplished by all this digging, topdressing, and resanding? First, the bunkers were put back to the depth Donald Ross designed them to be. Several of the bunkers had been raised so high that the center of the bunker was actually higher than the green. Now the golfer can no longer chip and putt from the greenside bunkers, but instead must hit the explosion shot with a lofted club, usually a sand wedge. Second, the centers of the low fairways were raised from one to two inches. This expedites runoff during rain storms and improves the soil profile. Third, except for the sand that has blown out during the past season, the depth is consistent.

In years to come, the low fairways will probably be raised an additional four to six inches. Do you know someone who has 50,000 yards of sand he doesn't need?

(Above) Bunker sand was placed on each side of the low fairways to be used for topdressing.

(Left) A box blade was used to smooth the sand on the fairways.

(Below) The dark layer of sand near the bottom shows where watermelons were grown in the bunker during World War II.