

## Reducing Golf Course Maintenance Costs by Lining Sand Bunkers with Permanent Non-Woven Polyester Geotextile Fabrics

by Joseph F. Barney, Eastern U.S. Sales Rep.  
Warren's TerraBond™

Sand bunker maintenance is a routine task most superintendents prefer to spend as little time on as possible and still keep the membership happy. In the last few years hundreds of golf courses, during the scheduled re-furbishment of their bunkers, have lined the entire bunker with a geotextile fabric before putting in new sand. They have done this to drastically reduce the time and materials formerly used to maintain those bunkers in acceptable playing condition. And the superintendents are happy not to have to spend so much time on bunker maintenance.

### Problems in the Bunkers

The following routine tasks contribute to bunker maintenance costs: (1) pumping out standing water after rainfall. (2) servicing clogged drainage lines. (3) removing rocks from the sand. (4) removing clods of soil from the sand. (5) raking sand up onto the bunker slopes after rainfall or irrigation. (6) mechanical, or hand, raking to keep the sand "fluffed" and cleaner looking. (7) adding new sand to help mask dirty sand. (8) edging to cut back encroaching turfgrass. (9) removing weeds.

### What a Proper Liner Can Do

One superintendent in the Northwest, we have heard, reported that after lining his sand traps with Warren's TerraBond™ Polyester Geotextile Fabric, he has reduced his bunker maintenance costs to two functions: (1) edging and (2) occasional addition of sand to replace that blown, out, chipped out

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and/or volatilized by the sunlight. Using a liner, if a properly designed one is used, will keep the drain flowing, stop rocks from moving upward into the sand from the soil, stop the sand from mixing with the soil, greatly reduce sand wash-down from slopes during rainfall, and reduce or prevent weed growth in the bunker.

The overall end result, the "bottom line", is less time devoted to bunker maintenance, better appearing and more playable bunkers, a far longer time span between sand replacement and bunker reconstruction, happier members and a happier superintendent.

### Fabric Liner Selection

The sand bunker liner must be resistant to sunlight (Ultra Violet light) breakdown, hydro-carbon breakdown caused by spilled hydraulic fluid or gasoline and fertilizers being used on surrounding turf, be extremely supple — yet very strong — so as not to tear during installation, and have excellent filtration capabilities which lets water-born particles of silt pass through its body without clogging.

A non-woven, needle-punched continuous filament, polyester fabric like Warren's TerraBond meets these qualifications.

The fluffy matt of supple, strong, polyester fibers allows the roots of the perimeter sod to grow through the TerraBond and anchor into the soil below. Below the bunker sand, water passes easily between and **along** the polyester fibers, yet rock, pebbles, and native soil (which often discolors the sand and impedes water flow in the sand) find their upward journey difficult if not impossible.

### Site Preparation and Application of the Fabric Liner

The first step is to construct the drainage system! After removing the old trap sand and bringing the bunker to the desired shape and grade, excavate the drainage trenches with the exit point at a depth below the lowest point of bunker bottom. Then line the trenches with Warren's TerraBond, place a layer of gravel, the 4" flexible perforated drain, and additional gravel to the grade line of the bottom of the bunker. Fold the fabric over the top of the gravel and itself, thus encapsulating the drainage structure with TerraBond. TerraBond's sieve size, or E.O.S. of 70 to 100 mesh, permits fine particles of clay (those which make muddy water, muddy) pass right through. Yet the drain system will not clog with mud or sand, thus ensuring no more puddles of "casual water" in bunker bottoms! Set the sod cutter blade to a depth of 1" minimum and cut back the sod 12" around the desired perimeter of the final bunker shape.

Excavate the soil directly below the upper edge of trap slopes to a right angle (90 degrees), to a depth of 6" to 8". (This technique helps prevent erosion of the sand around the steep slope perimeter areas of the bunker during periods of heavy rainfall or irrigation due to surface run-off).

The bunker is now ready for application of the TerraBond liner. Roll the TerraBond across the bunker and trim with a TerraBond geotextile knife (available from dealer). Overlap 3" to 4" until the entire bunker is covered (including the 12" perimeter where the sod will be replaced). The TerraBond will closely follow all the little contours and corners. Lay back the overlap areas and apply a generous bead of Goodrich construction and sub-floor adhesive. This technique helps prevent mechanical rake entanglement, and insures "one piece" liner integrity. (It is suggested to step on the glue bead along its entire length to squeeze the adhesive into the polyester fiber of both pieces of fabric before backfilling with sand.)

Replace the sod atop the TerraBond around the perimeter of the trap and keep watered to promote "knitting" through the fabric and into the native soil. This is the key to permanent anchoring of a fabric liner, and the permanent elimination of soil erosion of the perimeter of the bunker!

Future edging of the bunker is done quickly and efficiently with saturated wick applications of Roundup herbicide and/or rotary string trimmers!

### Sand Selection

Bunkers should be re-filled with sand that meets USGA specifications. Playability and permeability are the most important considerations. The particle shape should be angular, free of silt and fine clay particles, and range in size between 1.00 and 0.25 millimeters (75% in the .50 to .25 range minimum). Deviation from these sizes should be larger, not smaller, to prevent wind erosion where this is a problem.

### Conclusion

Lining sand bunkers with a geotextile fabric is now a well-accepted technique across the U.S. It is a proven method for drastically reducing bunker maintenance costs. Be certain, however, that the correct geotextile is used, not necessarily the cheapest one or just because it is called a "filter fabric" or a "landscape fabric" or geotextile. Make certain it is long-lasting, strong, supple needlepunched (mechanically bonded) polyester. Some superintendents have done otherwise and made even bigger ponds out of their bunkers after spending a lot of money on reconstruction.



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