



## **Training and Application for the renovation of existing bunkers at Oubaii Golf Club**

This report was compiled by

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Ernie Els Design, an industry leader in golf course design has once again demonstrated their ingenuity and ability to consistently improve and advance new techniques of course design by using an environmentally safe and technologically advanced nano technology polymer based liquid soil stabiliser for the renovation of the bunkers at its first signature course in South Africa, the Oubaai Golf Resort.



Golf Data is a premier force in the South African golf, construction and services industry and is the construction partner of both Nicklaus Design and Ernie Els Design in South Africa. Golf Data is dedicated to providing hands on service combined with the innovated use of modern technology. As Golf Data continually strives to raise the standards of all aspects of golf course construction and maintenance they were eager to use this non-traditional polymer based liquid soil stabiliser for the renovation and stabilisation of the bunker faces at Oubaai.



On-Course Solutions is the authorized and exclusive distributor for a highly technologically advanced and environmentally safe soil stabilizer. From Hydro-seeding to golf course bunkers and cart path construction, On-Course Solutions has earned a reputation for providing engineered and innovative solutions specifically designed to meet the clients needs.

Bunkertac offers a number of advantages, which include:

- Providing a flexible bound surface with high load bearing and shear strength capacity while still allowing for proper drainage and germination.
- Prevention of erosion, contamination, run-off and disfigurement
- Reduced maintenance costs
- Ease of repair to a damaged area

Is completely environmentally friendly, safe for animals, wildlife and vegetation and dries clear and transparent; leaving the environment in its natural state As a result Bunkertac will significantly decrease the environmental footprint of golf course developments, while at the same time allowing for superior treatment of several areas and significant cost reductions.



**Exposed Geo Fabric on bunker faces and edges**



**Exposed Geo Fabric on bunker faces and edges**

Oubaai Golf Resort opened in 2004 and after 4 years of use the bunkers are in need of renovation as the geo textile fabric originally used to stabilise the bunkers and hold the sand in place has become damaged and exposed in many places. Extensive and successful case studies were conducted at Serengeti Golf Estate (Nicklaus Design) in Johannesburg, South Africa (Nov 2007-May 2008), which demonstrated various different application methods and results through various weather patterns on the stabilization of newly constructed bunkers.

After separate visits to Serengeti by Dave McIntosh, Sue de Zwart and Charl Blaauw (Course Superintendent at Oubaai) a decision was made to use Bunkertac for the renovation of the bunkers at Oubaai. On-Course Solutions was contacted to conduct a site assessment; provide recommendations and on site demonstration and training. Oubaai purchased the recommended equipment kit and product.

Once everything was delivered on site and ready, On-Course Solutions working together with Charl Blaauw and his crew from Golf Data Maintenance applied several applications of the soil stabilizer to the bunker faces. Bunkertac is usually used to stabilise the bunker base as well, at management at Oubaai had taken a decision to use gravel and shade cloth for the bases.

Preparation of the bunkers to be renovated included the following:

- The removal of the sand from the bunker
- The removal of the existing geo textile fabric including all staples holding it in place
- The repair of the existing drainage system or placement of a new drainage system
- The repair and patching of all damaged areas from the removal of the geo fabric
- Compaction of the bunker (but not over compact)
- Trimming of the overgrown grass edges back to the original edge of the bunker
- The digging of the trenches for the shade cloth
- The placement of the gravel and shade cloth
- The removal of all loose aggregate using shovels and brooms
- Moistening of the soil to bring it to the desired moisture level
- Testing of all equipment to ensure proper operation

***Due to the timing of the training session a decision was taken that Bunkertac could be applied before the placement of the gravel and the installation of the shade cloth, but for best results when using this method for the bunker bases it is recommended to have the gravel and shade cloth in place prior to application.***



**Placement of shade cloth over gravel base**



**Digging of trench for shade cloth**





**Repaired Drainage System**



**Sweeping of loose aggregate material**



**Slight moistening of the soil before application**



**Removal of geo fabric and staples**



**Repair of area where geo fabric was removed**



**Trimming of overgrown grass back to edge**



**Sweeping of loose aggregate throughout bunker**



**Removal of overgrown grass back to original edge**



**Properly prepared bunker for application**



**Bunker prepared for application**

## **EQUIPMENT USED FOR BUNKER APPLICATION**

Trailer with 1-ton capacity (\*)  
 Roller used for compaction (\*)  
 1,000-litre container (\*)  
 Rakes  
 Shovels  
 Brooms (whisk)  
 Ratchet straps to hold container in place  
 5.5 hp Rhino pump  
 50 mm cam lock female

### **Container connection**

50 mm cam lock female  
 50 mm cam lock male  
 50 mm barrel nipple  
 50 mm reinforced hose 400 mm  
 50 mm hose clamps x 2

### **Container Decanter**

50 mm cam lock male  
 50 mm barrel nipple  
 50 mm right angle elbow  
 50 mm swage adaptor

### **Spray gun**

20 mm barrel nipple inside thread  
 20 mm barrel nipple outside thread  
 Reducer from 25 mm to ½ inch  
 Spray Gun Filter with ½ inch female ends

### **Discharge and return pipes**

Reducer from 50 mm to 20 mm  
 20 mm stand pipe 250-300 mm long x 3  
 20 mm stand pipe 300-400 mm long  
 20 mm right angle elbow  
 20 mm "T" connection  
 25 mm barrel nipple x 2 (Threaded both ends)  
 Reducer 25 mm to 20 mm x 2  
 25 mm ball valve x 2  
 25 mm cam locks female x 2

### **Return hose**

25 mm hose 10 meters long  
 25 mm cam lock male  
 25 mm barrel nipple  
 25 mm hose clamps x 4  
 25 mm right angle elbow

### **Discharge Hose**

25 mm hose 20 meters long  
 25 mm cam locks male x 2  
 25 mm hose clamps x 4



**Trailer with container**



**specially designed spray lance**



**Trailer with container and pump**



**20 meter x 25mm round hose**



**Brooms used for sand placement**



**Shovel used for sand placement**



After the bunkers were prepared for application the empty 1000 litre container and 5.5 hp pump were loaded into the trailer and then using the 400 mm reinforced hose and cam locks the pump was connected to the container. Next the 20-meter hose and spray lance were connected together and then attached to the pump. Then the return hose was also attached to the pump. After all equipment was assembled and the pump filled with petrol and oil water was put into the container and all equipment was tested for proper function ability.

After ensuring the proper function ability of the equipment the Bunkertac and water dilution was loaded into the container at a predetermined ratio of 100 litres of Bunkertac to 900 litres of water (1 to 9 ratio).

***NOTE: When preparing the mix dilution the Bunkertac is added last, directly into the water and circulated through the return valve of the pump.***

***It is recommended to have a toolbox containing all of the tools necessary to completely strip the pump and spray nozzles on hand in case of a malfunction during application.***

***Having the pump and container with the dilution loaded on a trailer has proven to be very efficient allowing for ease of movement and little down time when moving from one bunker to another after each application coat of Bunkertac.***

The Bunkertac was applied evenly over the bunker faces using two passes with the specially designed spray lance to ensure proper coverage and limited run-off.

Due to the high clay content in the soil and large areas of the bunker getting limited exposure to the sun each application coat, the Bunkertac was given up to 24 hours to allow for proper penetration and drying time before the next coat was applied.

Immediately following the third coat, a thin layer of sand was placed over the treated areas of the bunker faces. This sand was placed by using a specialized throwing technique using shovels and then brushed into the edges using brooms in an upward motion to ensure proper force and placement of the sand. This process is repeated immediately following the sixth coat.



**Training of the proper broom motion & force**



**Specialized throwing technique with shovel**





**Application of first coat to practice bunker**



**Practice bunker immediately after first coat**



**Charl Blaauw applying first coat to bunker**



**Ndiphiwe Melityala applying first coat to bunker**



**Application of first coat by Ndiphiwe Melityala**



**Bunker during application of second coat**



**Charl making sure to apply directly to the edge**



**Bunker on hole 1 after second coat**



**Golfers playing during application of product**



**Brooming of sand into edges using upward motion**



**Placement of sand immediately after third coat**



**Bunker face following sand placement after 3<sup>rd</sup> coat**





Bunker face following sand placement after 3<sup>rd</sup> coat



Sand placement during application of third coat

## **Observations and Conclusions from training and application**

- Bunker base must be moist (OMC) prior to application of product.
- All equipment must be tested (off-site if necessary) prior to product application to ensure proper functioning.
- Spray nozzles should be set to provide an even spray coat over the bunker with minimal running or draining of the diluted product mix.
- Full and proper preparation of a bunker is essential to ensuring successful results.
- All of any previous product used in the bunker must be removed.
- If drains are in place, the product must not be applied to the marked drainage areas.
- When preparing the mix dilution, the Bunkertac is added last, directly into the water and circulated through the return valve of the pump.
- For best application, a firm round hose may be more effective than a flat hose in order to prevent kinking and allow for a smooth continuous flow rate.
- During the application each coat must be allowed to penetrate or "soak in" before applying another coat. In winter this can take up to 24 hours.
- Compaction of the bunker should be done 2 to 3 days prior to application.

- All equipment used must be rinsed off thoroughly as soon as possible after application before the product has a chance to dry or cure.
- After application bunkers must remain free of watering, rain and any human traffic for a minimum of 24 hours. (48 hours during winter months)
- The placement of a thin layer of bunker sand into the bunker immediately following the third and sixth coats of Bunkertac before the product has a chance to dry or cure helps to “glue” the bunker sand in place.
- Bunkertac provides a flexible bound surface with high load bearing and shear strength capacity while still allowing for proper drainage and germination.
- Repair and maintenance of damage to the treated areas is simple, efficient and quick (not labour intensive or time consuming)
- Spraying the product around the perimeter and high sides of the bunkers will assist in the prevention of contamination from fugitive material transported from fairways and landscaped areas nearby.
- The use of a tractor and trailer containing the pump and dilution container for ease of movement, after each coat is applied, between the bunkers proved to be very efficient and will allow for the maximum number of bunkers to be treated over the course of a day.
- The container must be secured to the trailer using a strap for safety purposes

**For more detailed information regarding how On-Course Solutions can assist you on your golf course please contact us today.**

**We offer training on the process so that your on site crews can perform applications and maintenance.**

Contact us directly for further information:

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