



Keeping Soil on Course

Golf Courses Reduce Pollution and Cost Using North American Green

Why is Erosion Control Important?

Seeing golf course plans become reality often requires extensive excavations and topographical changes to the land, as well as dramatic changes in vegetation patterns. It is no secret that during course construction there is great potential for damaging soil erosion if proper steps are not taken to prevent such problems. However, preventing soil erosion is not difficult. Proper planning and use of Best Management Practices (BMPs) during golf course construction and maintenance will reduce the risk of adverse environmental impacts in and around the course. In addition, adamant use of BMPs, such as rolled erosion control products (RECPs), ensure a reduction in expenses normally associated with repairing eroded areas.

Because of the emphasis on aesthetic appeal, golf courses have every incentive to take proper, proactive measures to con-

trol soil erosion. Establishing grass in a dense, uniform manner is an obvious construction objective. Hence, the loss of fertile top soil due to erosion can hinder efforts to establish vegetation after construction ceases, not to mention added cost for regrading and possible course opening delays. In addition, topsoil lost to erosion is generally bound for the nearest waterway where sediment laden runoff not only degrades the water's aesthetic appeal, but more importantly, degrades habitat for fish and many other aquatic organisms.

A number of products are currently available from North American Green for effective erosion control during golf course construction and maintenance. In particular, both temporary and permanent RECPs have proven their effectiveness and gained preference with many golf course superintendents throughout the nation. This is due to the versatility and proven



performance of North American Green's RECPs in controlling soil erosion on slopes, in drainage channels, and along shorelines, while also promoting the rapid, dense establishment of vegetation so critical on golf courses. As illustrated here, specific applications require specific RECPs.

Where Hydroseeding Fails, North American Green Blankets Prevail

In the final construction phase of the Longaberger Golf Course in Newark, Ohio, turf establishment on parts of the course was addressed by hydroseeding a vast area of gently rolling hills totaling over 9 hectares (22 acres) of the 203 hectare (500 acre) course. The contoured landscape resulted in small 3:1 to 5:1 (H:V) slopes with many shallow drainage swales tracing the course like narrow veins. Initially, erosion control measures were thought to be unnecessary because of the limited slope gradients. However, subsequent summer storms proved detrimental to the first hydroseed application. Rainwater impacted heavily on the bare ground, dislodging and transporting seed, soil, and fertilizer down the small hills into the drainage swales below. As a result, concentrated rainwater in these small swales caused excessive soil erosion, necessitating additional expenditures for regrading, along with another hydroseed application. Again, rain washed large amounts of soil, seed and fertilizer from the course, leaving the course's superintendent looking for a better way.

In the shadow of two consecutive hydroseeding applications ending with less than desirable results, the course's superintendent, Mark Rawlings, found a more effective solution to his turf establishment and soil erosion woes with North American Green's line of temporary erosion control blankets. North American Green's single-netted straw erosion control blanket, the S75, was used on the rolling hills to control sheet flow, reduce raindrop impact, hold seed in-place, and retain moisture at the soil surface to increase the rate of seed germination. Unlike hydroseed or hydromulch alone, the S75's agricultural straw matrix is sewn to a single photodegradable netting on 3.81 cm (1.50 inch) center to effectively retain the straw matrix. Again, the site was hydroseeded; however, this time the S75 was stapled down over the hydroseeded surface to ensure that seed, fertilizer, and soil remained undisturbed while vegetation became established.

Because of the drainage swales' concentrated flow, a higher performance erosion control blanket was needed to prevent excessive soil erosion prior to vegetation establishment. North American Green's SC150 extended-term, 70% straw/30% coconut fiber erosion control blanket was selected to provide this increased protection because of its ability to withstand expected flows of up to 86.40 Pascals (1.80 lbs/ft²) of shear stress. Due to the addition of coconut fibers and heavyweight top net, the SC150 has a typical functional longevity of 24 months, allowing ample time for thick

The shoreline along any water hazard suffers from the most severe erosion. The action of wind and waves, not to mention golfers wading in after their golf balls, causes the shore to recede. C350 Composite Turf Reinforcement Mats can prevent erosion and subsequent regrading.

vegetative establishment in the swales before the protective blanket degrades.

The S75 and SC150 effectively stopped erosion where they were applied and limited further expenses associated with repairs. Ultimately, over 30,100 m² (36,000 yds²) of erosion control blankets were installed throughout the site. In testament to the blanket's effectiveness, only a few weeks passed before the golden sheen of erosion control blankets was transformed into a green expanse over the rolling hills as seeds quickly germinated and began to grow.

Turf Reinforcement Mats Revolutionize Erosion Control Design

Traditionally, even the low-flow drainage ways and small ponds were commonly lined with rock riprap or some other form of "hard" treatment mainly because alternative treatments were either unavailable or not well understood. However, in the last 10 years the introduction and proven performance of turf reinforcement mats (TRMs) have dramatically changed the way golf course architects and contractors view permanent erosion control. The distinct advantages to using TRMs are evident in the extraordinary erosion control capabilities of reinforced vegetation, the greater aesthetic appeal of vegetative liners, and substantial cost savings over the conventional "hard" options.

Protecting Golf Course Shorelines With C350

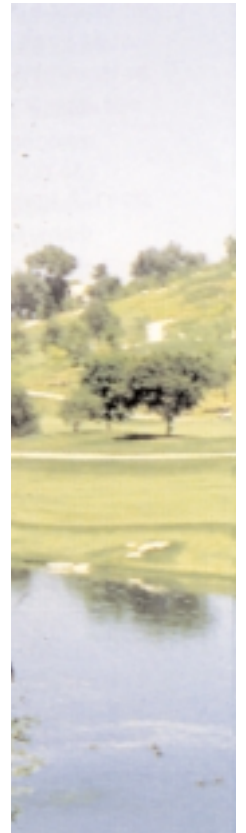
From small public courses to championship links, the advanced erosion control performance of North American Green's TRMs can be utilized with equal ease and success. The Tournament Players Championship (TPPC) courses, for instance, are some of the most prestigious courses in the United States. Boasting large budgets, PGA endorsement, and difficult layouts, they are also some of the more challenging courses to construct and protect. The TPC of Twin Cities in Blaine, Minnesota was no exception.

Plans for the TPC course in Blaine, Minnesota included construction of 25 hectares (61 acres) of water features including lakes, ponds, and streams. In order to enhance the aesthetic appeal of the ponds and lakes, as well as maintain safety, course designers elected not to use rock or concrete as a means for shoreline erosion protection. Instead, shorelines were seeded with a mixture of wetland plants and North American Green's C350 Composite Turf Reinforcement Mat (C-TRM) was surface applied to retain the soil and seed.

Although seemingly minor, the repetitive action of wind-driven waves across lakes and ponds can gradually erode shorelines to a point where they may encroach upon nearby homes or landscape features. Repairs for such receding shoreline damage can be very costly if the problem is not promptly addressed. Prevention is certainly the best medicine. By installing the C350 both above the high water line and below the low water line,



Rock and concrete ponds typical of many older golf courses are no longer acceptable at today's PGA rated courses. Instead, erosion blankets are used to create a more natural looking environment that will grow into the landscape.



shorelines can be protected against erosive action throughout yearly precipitation cycles.

The C350 was chosen for this course because of its proven turf reinforcement capability and innovative construction using three permanent, heavyweight polypropylene nets with a dense coconut fiber matrix sewn between the bottom and middle nets. The middle net in this configuration is crimped to give the C350 a sustained three dimensional structure, even after the coconut fiber has degraded. While intact, however, the coconut fiber matrix regulates heat and moisture at the soil surface to promote rapid seed germination, while controlling erosion before vegetation becomes established. In just two short weeks, vegetation at Blaine had become 70 percent established and fully established in only one month. This established vegetation is now reinforced at the stem by the C350's permanent net structure, forming a permanent barrier to forever protect the shorelines against erosion.

As golf courses become more prevalent fixtures in many urban and suburban landscapes, and erosion control laws become more stringent, the benefits of proper RECP use are needed more than ever. In both long-term maintenance and initial construction, use of North American Green's products will enhance your course's natural and financial resources. **LCM**

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Coconut fiber matrix forms a dense three dimensional structure that regulates heat and moisture at the soil surface to promote rapid seed germination, while controlling erosion before vegetation is established.





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From Highways to Fairways.

For years North American Green's erosion control blankets and turf reinforcement mats have been successfully used to stabilize critical slopes and channels along our highways.

But you know what they say about all work and no play.

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— North American Green's full line of temporary and permanent erosion control products are your ace in the hole.

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