



2014 Winter Olympics Erosion Control Project Worthy of Zeus' Attention



The world was watching

A television audience of more than 3 billion from around the globe tuned in to the 2014 Winter Olympics in Sochi, Russia. In addition to skiers, biathletes and ski jumpers, viewers saw the finished results of one of the largest infrastructure projects ever.

That infrastructure work was estimated at \$50 billion USD. The improvements included a truly colossal erosion control and vegetative establishment project, led by Russia-based ECTM Ltd in fellowship with Profile Products. The Chicago-based manufacturer consulted on the project to determine the specific solution that eventually shaped an area of mountainous terrain into the smooth, winding slopes that later allowed the world's best athletes to show off their skills to a global audience.

Project challenges in Sochi

From an erosion control and vegetation establishment standpoint, the soil and slopes in Sochi presented the hardest challenge for Profile Products, ECTM (the project's erosion control supervisor and supplier) and Rosengineering (the "turn-key" contractor).

"There were a lot of site-specific conditions in Sochi that created a lot of high-level risks to controlling erosion and establishing vegetation," says Steve Zwilling, Profile

Products Market Development Manager. "Agronomic factors were in play that would influence seed germination, while the location and topography of the site itself contributed to high erosion risks. There were project management issues to navigate through, too."

The soil was poor in every way imaginable. It was rocky and compacted with little organic value present. Soil compaction led to poor water infiltration. Low Cation Exchange Capacity (CEC) and nutrient values resulted in unfavorable conditions for plant establishment. The underground water breaching cut slopes created additional risk of erosion in rainfall events. These conditions, combined with the steepness of the slopes, created accelerated sheet flows so erosion was going to be a huge issue throughout the project.

The sheer magnitude of the project made it very difficult to manage. Specifications and schedules were often revised, which made it more difficult for the supplier and the contractor to meet the deadlines.

High altitudes (3,000 - 7,000 ft; 914.4 - 2133.6 m) and alpine terrain ranked high on the list of challenges of the Sochi project. Getting water to the site and securing equipment was quite an effort requiring skill and sometimes even daring. Time constraints meant seeding

was necessary during both the wet winter months and the hottest, driest summer months to finish on schedule.

“It’s never an ideal situation to attempt to establish vegetation in winter temperatures or the summer months that lack precipitation,” says Mikhail Teterin, of ECTM. “But we only had a finite amount of time to complete the project, so we had to work year-round regardless of the season.”

Seeding was carried out in the rain, snow, sun and fog. The altitude of the mountain ranges and vast distances of the steep slopes meant a lot of hose work, very often with a harness for the applicator to ensure safety. Oftentimes the distance from the staging area and a hydroseeder to the application area required over 1,300 ft (396.24 m) of hose.

“For even the easiest erosion control and vegetation establishment projects, you need a lot of things to go in your favor,” says Yelena Ponomaryova, Profile Products Market Development Manager. “While this project had hurdle after hurdle, we were fortunate to have a tailored solution specific to the Sochi site’s challenges in place to overcome the obstacles.”

Tailored solution for maximum results

Several site visits and soil tests helped determine the makeup of the tailored solution, which ultimately comprised of a combination of two soil amendments and two erosion control solutions.

The soil was amended at a rate of 40 pounds per acre (44.8 kg/ha) to address the low organic matter and encourage germination with a pair of biostimulants: JumpStart™ 5 and BioPrime™. The two soil amendments are part of Profile’s ProPlus® Prescriptive Agronomic Formulations.

When the soil conditions were addressed and made more conducive to plant survival, the task was to protect the surface and the seeds until germination. The highest performing hydraulic mulch product available, Flexterra® High Performance-Flexible Growth Medium™ (HP-FGM™), was applied at a rate of 4,000 pounds per acre (4,480 kg/ha). Flexterra HP-FGM was

chosen because of the project site’s high erosion potential, slope length and gradient, and functional longevity needs because the seeds would need protection for an extended period of time.

The erosion control project team paid special attention to seed selection. With extreme climate conditions and timing constraints in mind, the grass species were required to have versatile characteristics, such as drought resistance and shade tolerance, high rate of winter survival, quick germination, extended root system and ability to grow in extremely poor soils. The final seed mixture met the project requirements and delivered excellent results.

Many areas of the project required a different erosion control solution: areas of concentrated water flow, water diversion channels, extreme slopes. To ensure vegetation establishment in those areas, the GreenArmor™ System was installed. The GreenArmor System is a cost-effective green solution of protecting high-discharge waterways and extreme slopes. Where the slopes were unstable, the GreenArmor System was additionally armored by rockfall protection (double twisted steel mesh and percussion-driven earth anchors) creating one multi-level soil stabilization system.

Let the games begin

In all, 82 acres were covered with 19,000 bales of Flexterra HP-FGM at a rate of 4,000 pounds per acre (4,480 kg/ha). Some of the area was covered twice to ensure the soil would hold and vegetation would take root along the slopes.

“When all was said and done, this was an absolutely incredible undertaking by all parties involved,” says Pavel Greskov, of ECTM. “From the research done ahead of time by ECTM and Profile Products to prescribe the best solution for the Sochi environment, to the distributor delivering the needed materials, to the contractor’s ability to wrangle a large crew in extreme conditions and get the job done, it took a herculean effort to pull off what everyone should be proud of.”



KEY PRODUCTS

Flexterra® High Performance-Flexible Growth Medium™ (HP-FGM™)

- Immediately bonds directly to soil upon application, and is 99% effective in minimizing soil loss.
- Fastest growth establishment and a 1500% water-holding capacity to deliver moisture to the seedbed and accelerate growth.

GreenArmor™ System

- Flexterra® HP-FGM™ sprayed into Turf Reinforcement Mat (TRM) for cost-effective protection of steep slopes.
- Installation cost is 30-50% less than hard armor (concrete, stone, gabions, etc.).
- Immediate erosion control and twice the erosion resistance of natural vegetation.

Profile Soil Solutions Software (PS³)

- Web-based tool for selecting the right products, addressing a site’s physical and chemical properties for critical design elements: soils, vegetation species, erosion and sediment control material, installation, and inspection/maintenance.
- FREE soil test/analysis at www.ProfilePS3.com lays the foundation of holistic, sustainable erosion control and vegetation establishment.



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