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SLOPE TESTED, DOT APPROVED

TDOT overcomes steep challenges with a hydraulically applied erosion control blend

By Tom Wedegaertner

The Tennessee Department of Transportation (TDOT) faced a daunting challenge along Highway 109 in rural Gallatin, Tenn. The 5-mile stretch of road, made up of sparsely vegetated rolling hills, was dangerously curved and blamed for a high incident rate in Sumner County. The task was to straighten the road, expand it from two lanes to four and solve the erosion control problem that had taken over as a result of storm water runoff.

Construction plans, which called for a carved path through the hilly terrain, left TDOT crews with slopes of varying lengths reaching up to 150 ft and a varying degree of gradients (up to 2.5:1) on both sides of the road. To make matters worse, the cut slopes along Highway 109 consisted of poor subgrade soils and turned-up rocks, creating an uneven terrain.

After initially applying straw erosion control blankets, only to have them blow away in the wind and end up in



When straw blankets blew away in windy conditions, TDOT introduced a hydraulically applied blend.

storm drains, TDOT engineers decided the job called for a high-performance, hydraulically applied solution. The TDOT Materials and Test Division proposed that engineers demo North American Green's HydraCX² Extreme Slope Matrix. Developed by Mulch and Seed Innovations LLC, Cotton Inc. and the U.S. Department of Agriculture, HydraCX² is a high-performance hydraulic erosion control product made with a proprietary blend of straw, reclaimed cotton plant material, tackifiers and polymers.

Installation

The two most northern miles of the job site, drastically steeper than the remaining land, were sprayed with the product in November 2007, a particularly cold month in Tennessee. Because harsh winter weather was on its way, the application was initially intended to be tested only as a winterizing application. TDOT engineers planned to vegetate the site long enough to last through the winter, until construction on the road could be continued in the spring.

"Our goal was to cover the land with proper vegetation just long enough to protect against the fall rains that might contribute to the erosion problem," said TDOT Project Supervisor John Jones, "but the new growth developed using HydraCX² was surprisingly resilient to the harsh fall weather and maintained its stability and thickness over the course of the seasons."

HydraCX² was sprayed on the west-facing slope, and another hydraulically

applied erosion control product was applied to the east-facing slope. Subcontractor Dickie Alexander of Alexander Seeding and Landscape applied each of the products, first mixing rye grass seed, commonly used for ground cover in Tennessee because of its ability to withstand cold temperatures, directly with HydraCX² for a convenient one-step application.

TDOT Assistant District Engineer Nathan Gregory, who coordinated the project and managed the site's erosion control objectives, could see the difference even before the application. "The HydraCX² fibers naturally separated when it was unpacked, rather than staying compressed in a dense block," he said. "We saved time by not having to separate the mulch prior to agitation."

In addition, the product enjoys a low water-to-mulch ratio, requiring only 100 gal of water per 50 lb of mulch, while other products may require nearly 125 gal per 50 lb. Water-to-mulch ratio is especially important when considering the costs of water and the time, labor and fuel consumption of trips to and from the water source.

"Covering the ground area with HydraCX² required nearly half as much mixture—about a 2:1 ratio," said Gregory. "And the mix created the same substantial ground cover."

How It Works

HydraCX² forms to the rocks and uneven surfaces of the earth. Its combination of straw, reclaimed cotton plant material and a blend of

performance-enhancing tackifiers and additives form a protective web that holds soil in place on slopes as steep as 1:1.

"HydraCX² contains beneficial nitrogen, phosphorus and potassium nutrients that, when made available to the soil, are important for plant growth," said Wae Ellis, vice president of sales and marketing for Mulch and Seed Innovations. "HydraCX² is also highly absorbent and has an excellent water-holding capacity, which assists germination and encourages the establishment of vegetation. Meanwhile, its crosshatching matrix provides air space and porosity for seedlings to push through with little resistance."

Results

Days following the November seeding, Gallatin received heavy rainfall and engineers eagerly waited to see if either application would be washed away. Both sites withstood the downpour, but the slope sprayed with HydraCX² sprouted new growth four days sooner.

"We've tried everything from seeding to straw, and they all become void when hit with a substantial rainfall," Jones said.

After two weeks of growth time and numerous rain events, the slope's vegetation was mature and no erosion was visible. By the winter of 2007, TDOT had added HydraCX² to its list of approved products. **[SWS]**

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