



Case Study

application | Haul Road Construction
location | International Falls, MN
product | Mirafi® HP570

job owner | United Taconite
contractor | Hoover Construction

TenCate™ develops and produces materials that function to increase performance, reduce costs and deliver measurable results by working with our customers to provide advanced solutions.

THE CHALLENGE

The mining of iron ore in Northwestern Minnesota has contributed to the steel industry for many years. However, recovering iron from taconite creates a soft soil by-product that does not release water well. These soil “wastes” are spread over a designated area that is not being used. However, when the area needs to be accessed later in the mine’s development, issues arise when accessing parts of the site beyond these spoil areas. These areas are full of mining debris and will be trafficked by heavy off road trucks with up to 100 passes per day.

THE DESIGN

Multi-axial extruded geogrids had been used by the mine previously. The geogrids were placed over relatively dry and stable soils. Since the application was not too demanding, the geogrids appeared to perform adequately. When the development of haul roads was required at this site, the same practice was put into play. However, since the soils were saturated, bearing capacities were much lower than previous jobsites.

THE CONSTRUCTION

The multi-axial extruded geogrid was placed and a 6” lift of crushed stone was loaded directly onto the geogrid. A Caterpillar D3 bulldozer was used to push stone out onto the geogrid. The geogrid apertures began to break under the load and the bulldozer was pulled back for safety reasons. Mirafi® HP570 woven geotextile was deployed next to the area treated with multi-axial extruded geogrid with the same site conditions. The same aggregate lift was placed and again the bulldozer went out over the fill. Mirafi® HP570 performed flawlessly and the fill was then able to be placed over it as was originally planned for the failing multi-axial extruded geogrid.



Mirafi® HP570 placed next to multi-axial extruded geogrid.



Contractors can walk across the spoil area covered with Mirafi® HP570 without sinking.

THE PERFORMANCE

Mirafi® HP570 is a stronger material when comparing tensile strengths based on ASTM and EN ISO laboratory testing than any of the multi-axial extruded geogrids. However, this is only part of the story. In this and many other applications, separation is a key component to a successful haul road or access drive. Strength at low strains, in conjunction with separation, drainage and filtration, created a solid platform for the work at this site. Separation holds the soft soils in place, eliminating “contamination” of the placed engineered aggregate by the soft, wet subgrade soils. The aggregate layer maintains its design strength and thickness and the subgrade soil is able to consolidate and gain strength as water passes through the Mirafi® HP570. This timeline is enhanced by Mirafi® HP570’s apparent opening size (AOS) for filtration, and its high permittivity which provides a 30 gpm/sf flow rate.



Soft soils migrate through the geogrid apertures due to its lack of separation capacity.

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