



The design and construction of 550 feet long geogrid reinforced slopes at the Auburn, NY Landfill closure

In the late summer and fall of 1993 over 105,000 yd² of **Fortrac® 110/30-20** polyester geogrid were installed at the Auburn, NY Landfill Number 1 South Slope Closure Project for the purpose of maintaining stability within a soil cover placed over a drainage geocomposite and a 40 mil VLDPE liner. One unique aspect of this project was the design configuration and layout of the geogrid system as well as the lengths of the slope which required reinforcement. The slopes at the Auburn Landfill are up to 550 feet in length. The extreme length of these landfill slopes created concern that potential instability at the soil geocomposite or geocomposite liner interface would occur without the use of a high strength geogrid to provide cover soil layer reinforcement.

The final closure project required the placement of a multi component capping system over the south slope of the landfill so that the cap could be merged into the existing north slope landfill closure. The landfill south slope was comprised of a crescent shaped area of land roughly 23 acres in size. The steepness of the slopes varied from almost 2.1 to 4.1 (H:V) as the slopes curved around the side of the landfill. In order to maintain landfill capacity within property restrictions, flattening of the slopes to achieve cover soil stability was

not considered an option. Other options, such as the use of textured liner, were also eliminated because of the unique geometry of the slope itself. The choice of a high strength geogrid reinforcement as a means of increasing the stability of the landfill cover was determined to be the optimum solution to the problem.



Design selection

The contractor, Tug Hill Construction Inc. of Felts Mills, NY, chose a final cover design option which utilized a 5 millimeter drainage geocomposite for moisture collection and transmission. The geocomposite was placed directly on top of the VLDPE liner, and the **Fortrac® 110/30-20** geogrid was placed directly over the geocomposite.

Cover System Installation

The landfill cover system was installed in stages beginning in the summer of 1993. A granular gas venting layer was installed first with the liner system, geocomposite, and geogrid following closely behind. The geogrid chosen by the contractor was **Fortrac® 110/30-20**, a high strength polyester geogrid manufactured by HUESKER Inc. The geogrid reinforcement was installed by rolling the geogrid down the landfill slope.

Fortrac® 110/30-20's exceptionally long roll length (164 and 328 feet) and width (16.4 feet) helped the contractor cover a large amount of area in a relatively short amount of time. The entire quantity of geogrid and barrier protection soil was completely installed by the end of November, well in advance of the major winter storms which would later pass through the region.

The barrier protection soil was placed over the geogrid by backdumping from the top of the slope and spreading the fill down the slope with a bulldozer. This type of construction eliminated the buttressing effect of the lower soil lifts, and required the geogrid to hold the soil on the slope entirely through the frictional resistance of the geogrid/soil interface.



Post construction performance

The geosynthetic cover system and barrier protection soil installation was completed by the first of December, 1993. Over the winter season, over 14 feet of snow fell on the site creating excessive snow loading over the landfill cover soil. Despite this additional load, no movement in the **Fortrac®** reinforced cover soil was observed. In the spring of 1994 the contractor began placing and seeding the 6 inch topsoil layer. Grass growth took place throughout the summer and into the fall. The grassed topsoil layer protects the barrier soil from erosion due to surface water run-off, thus providing additional protection to the final cover system.

Summary

The use of **Fortrac®** geogrids to reinforce the barrier protection soil layer allowed the rapid and effective placement of an engineered cover system for the Auburn Landfill final closure project. This application illustrates the unique ability of **Fortrac®** geogrids to provide tensile reinforcement to cover soil systems which have low soil-liner/geocomposite interface friction angles. The Auburn Landfill project also proved how **Fortrac®** flexible geogrids provide quick and easy installation because the wide and long rolls of geogrid minimize waste and cover large areas in a very short period of time.

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