PROTECTING Environmental Geomembrane Covers

With Suspended 3D GEOWEB System

Economic pressure, the desire for green solutions, and the intensification of climate extremes have converged to create a need for better methods to effect soil stabilization. Fortunately, a proven technology exists that addresses issues associated with these conditions and provides a more stable cover solution for landfill covers, lagoons, stormwater containment basins and other geomembrane covered systems. Soil, aggregate and concrete protective covers over geomembranes can be secured against known gravitational, hydrodynamic and seismic forces using the GEOWEB® soil confinement system.

Soil and aggregate are commonly used as a protective cover over liners on slopes of 3H:1V or less. However, when slope gradients are greater, unconfined soil and aggregate covers are typically unstable and not used. In arid areas, cover depth may range from 75 mm (3 in) to 150 mm (6 in). Where conditions support vegetation, cover depth may range from 100 (4) to 600 mm (24 in) or greater where the final depth is a function of the characteristics of the desired vegetation. Regardless of cover depth, if an extreme rainfall event occurs that is 10%, or greater than what would typically be expected, soil mass increases, assumed friction angles decrease, and factors of safety for soil stability drop to a point where failure of the cover occurs and exposure of and/or damage to the geomembrane results.

Suspended GEOWEB Solution

The use of the GEOWEB 3D slope cover system best addresses critical details when designing or remediating geomembrane covers. With the aging infrastructure of dams, impoundments, and landfills, design engineers are looking for innovative and cost-effective solutions to build and repair new and existing facilities. The adaptability of the 3D system provides geomembrane protection while contributing to an easier and faster installation process.

Structural Support System

Because traditional stake anchoring is not possible due to puncture of the geomembrane, the GEOWEB system is suspended from the crest of the slope through an integrated structure of tendons and load transfer clips. This structural support system directly protects the geomembrane from accidental puncturing and natural degradation--which indirectly prevents soil contamination and erosion. The structural support also allows the GEOWEB system to work on slopes that are much greater than 3H:1V.

A variety of infills may be used, tailored to a project's specific needs. When lining a landfill cover, crushed aggregate or vegetated infills are common because they put less pressure on the geomembrane cover and allow for growth of the landfill if necessary. For more structural projects, such as dam linings, concrete infill may be the better choice and may allow a thinner concrete cross-section for reduced cost. This demonstrates another unique aspect of the geocell system, in that the 3D structure of the geocell can act as the formwork for a concrete pour, eliminating the need for expensive and timely construction techniques. Full design evaluations should be performed in order to analyze the loading, shear forces, and factors of safety on each project.