

CASE HISTORY

High flow triplanar geocomposites for leakage detection under heavy compressive load at Atlantic Waste Disposal, VA

PRODUCT	TENAX TENDRAIN high flow triplanar geocomposites
LOCATION	Waverly, VA, 2000
PROJECT	Atlantic Waste Disposal
ENGINEER	G.N Richardson & Associates



PROBLEM

The bioreactor municipal solid waste landfill has over 80 hectares, and over 100 m in height upon completion. The wastes are brought into this landfill by truck, railroad car and barge, it closes only five days a year. Together with this enormous waste pile is the challenge to manage all the liquids in this bioreactor design. The leachate collection and detection system must be capable of taking huge compressive load and still deliver adequate liquid transmission capacity. Because of the height of the waste, injection pipes will be installed while filling the landfill, this to enhance the bio-reaction to start the decomposition faster. Seven different levels of leachate injection pipes will be installed, with a spacing of 12 m vertical direction, and a horizontal spacing of 30 m. The injection pipes have a dual purpose and will serve as temporary landfill gas collectors as well.

SOLUTION

The Leakage Detection System (LDS) for the Atlantic Waste Disposal has been designed to satisfy the following objectives:

- Provide rapid detection of a major breach in the primary liner system, common requirements are for 24 hour maximum detection time; and
- Limit the head acting on the secondary liner to less than the thickness of the LDS or 0.30 m, whichever is less.

TENAX triplanar geonets and geocomposites provide the most efficient material for rapid leakage detection under normal loads of this magnitude ($>1000\text{kPa}$). Geonets have very limited fluid storage capacity and much faster fluid transmission speed than granular soil drain. The triplanar structure of TENAX TENDRAIN was engineered to maintain flow rates under sustained heavy loads. Transmissivity was measured under 22000 kPa for this project with soft boundary conditions. Its structure is capable of taking such a load at 25000 kPa and still maintaining a 50% thickness.

CONCLUSIONS

TENAX geocomposites allowed the design and solution to a very challenging project in which the surcharge pressure was in excess of 1000 kPa and the required long term flow rate was potentially high due to the leachate recirculation induced by the bioreactor process. Ad Hoc long term compressive tests and transmissivity tests performed on TENAX TENDRAIN allowed the engineer to safely design and predict long term performance of the landfill.