ADMIR
GHANA
GEOTECHNICAL SOLUTIONS

Lininig and Drainage of the Tema Landfill

Case Study

- Entrepreneur: Tema Metropolitan Assembly (TMA).
- Planning: A.Y.G.L. Engineering and consulting Ltd.
- Supervision:
  - Tahal Consulting Engineers Ltd.
  - Municipal Development Collaborative Ltd (MDC).
- Earthworks contractor: Rolider Ltd.

Challenge:

- The Kpone landfill site located in Ghana was constructed in the latter part of the 1980's.
- This dumping site was not built to today's green building standards, and as a result caused the plumes of smoke that covered the neighboring cities of Accra and Tema, as well as causing terrible odor nuisances from which all surrounding communities suffered.
- In order to manage the landfill more efficiently and prolong its life span, together with granting some relief to those residents who had taken ill from this ecological hazard, it was decided to establish a new landfill that would meet the required standards and maintain it in accordance to those same stringent standards.

Solution:

At a cost of over eight million dollars, a new 150 dunam (15 hectares) landfill was built, having the capacity to receive the waste from the main cities (Tema, Accra) at a scope of 45,000 tons.

The building of the landfill included solutions to the following fields:

- Sealing of the landfill in order to prevent seepage to the underground water table and prevention the ground pollution.
- Leachate drainage system which consisted of perforated H.D.P.E pipes.
- A system for gas collecting and its removal, composed of gas transmission pipelines set in gabions.

Execution:

- Excavation of four landfill compartments each composed of 28 dunams with the required sloping.
- Placing of 500 gram weight nonwoven geotextyle fabrics to protect the sealing layer.
- Deployment geomembranes made of H.D.P.E 1.5 mm thickness and soldering them.
- Placing of 500 gram weight nonwoven geotextyle fabrics for separating between the sealing layers and the layers above and for protection of sealant system from scratches.
- Spreading layer of sand and pebbles for complete separation between the solid and the liquid waste.
- Excavation of four leachate drainage canals (average dimension of 4000 cubic meters), that lead the leachate to reservoir pools.
- Simultaneously to the work at the landfill compartments, a solution was required for the collection of gas and its transport.

The gas treatment system included:

- Casting of concrete floor.
- Gas transmission pipelines.
- Multi layered gabion walls.

Planning of the system included elevating the gabion system in accordance to the rise in the height of buried waste.

Results:

In total, an area of 150 dunam was sealed for various landfill areas.

The sealing works included:

- Lining of four landfill compartments each being 28 dunam in size.
- Lining of three leachate pools.
- Lining solid waste designated pool.

During the above-mentioned work and with its completion, compressed air testing was performed as well as other field tests. All of the seams were examined and successfully met the standard.

Due to the lining of the various compartments, the site meets the most stringent ecological standards, with strict adherence to the prevention of ecological-health damage.

From the work completion, residents in the area would no longer experience the smoke that covers the site and the strong and bad odor that emanates from the area.

Construction Steps:

Placing of geotextyle fabrics

Welding of the geomembranes

Lining of drainage channel

Gabion walls

Contact Us:

Head Office

Max Nods | MSc Civil Engineer
T: +31 (0) 648 490 764
E: max@admirafrica.com

ADMIR GHANA

Hukportie Kwami Edem | Country Manager
M: +233 (0) 302 335 213
+233 (0) 264 613 226
E: edem@admirafrica.com

Daniel Ackah Brobbey | BSC. Civil Engineer /
MSc. Geotechnical Engineer
M: +233 (0) 241 291 831
E: daniel@admirafrica.com

www.admirafrica.com

ADMIR
GHANA
GEOTECHNICAL SOLUTIONS