Feedback on 'Drainage in Landfill Containment'

Lecture by Alan Bamforth

On 10 April 2013, Mr Alan Bamforth of ABG Geosynthetics (United Kingdom) gave a 2 hour lecture on Drainage Composites in Landfill Containment, hosted by the Geosynthetic Interest Group of South Africa (GIGSA). Mr Bamforth was requested by GIGSA to present this lecture, firstly to provide a European perspective rather than a North American perspective on landfill drainage, and secondly to gain from the United Kingdom's experience in geosynthetic use in landfill caps. Given that the use of geosynthetics in landfill containment is set to increase with regulatory changes, the geosynthetics community of South Africa would be well advised to learn from others.

Mr Bamforth's design expertise, extensive experience, practical know-how and recommendations for addressing stability made this a really worthwhile event, receiving high praise from those who attended.

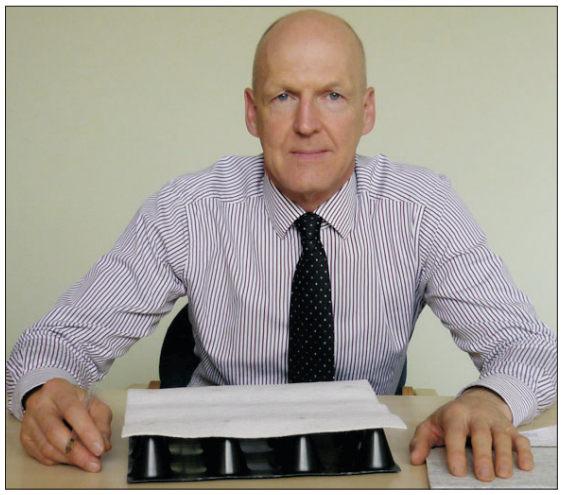
Topics covered included:

- the importance of drainage in landfill containment
- equivalence of geocomposite drainage to crushed stone drainage
- practical pointers for designing landfill drainage systems incorporating drainage geocomposites;
- the importance of site specific testing and especially in specifying testing conditions;
- interpreting manufacturer's data sheets;
- capacity design for construction and operation;
- as well as slope stability.

Basal drainage applications were also mentioned (which have been permitted on UK basal side slopes since 2002) and in particular the use of Stepped Isothermal Creep Tests ASTM D7361 to determine accelerated creep performance of geocomposite drainage under high confining pressures. Mr Bamforth illustrated the use of the cylinder test (EN 13719 Annex B) for assessing the protection of geomembranes in the United Kingdom.

Key take home points were:

- the use of soft versus hard platens in flow testing (ASTM D4716, EN ISO 12958) based on adjacent materials,
- equivalence to crushed stone drainage is by in-plane flow capacity (with FoS for storage) and not hydraulic conductivity
- calculating the hydraulic gradient under which the drainage geocomposite is expected to act



Mr Alan Bamforth of ABG Geosynthetics

- compressive strength is irrelevant without an associated in-plane flow capacity at that strength
- use site specific shear box tests and use material specific reduction factors,
- the care required during construction to ensure the subsequent functioning of the layer,
- pushing soil up rather than down a geocomposite drainage layer when covering to reduce destabilising forces,
- ensuring that toe drains are not dug out following construction.

There were numerous others.

Mr Bamforth noted that landfill capping in Europe was driven by new regulations in the mid 1990's (Groundwater Directive and Landfill Directive). What followed was European wide capping and restoration of former industrial tips as well as the on-going capping of active landfill cells. Many European landfills are commercial ventures and the pressure to maximise void space led to steep slopes of 1 in 3 or 2.5. These slopes are stability critical and whilst the majority of cappings have been successful, there have been a number of failures. Mr Bamforth noted that it often takes two inexperienced people for a failure to occur, be that the supplier, consultant, installer and /or construction quality assurance personnel. **GIGSA members, we have been warned!**

Mr Bamforth was accompanied by Mrs Liz Bamforth, who is the International Director for ABG Geosynthetics. GIGSA thanks the Bamforths for visiting South Africa for this lecture, and for the time taken to prepare and present such useful information.