



**The South African Chapter of the  
International Geosynthetic Society**

Established in 1983 and Dedicated to the Scientific and Engineering  
Development of Geosynthetics and Associated Technologies

A newsletter of the Geosynthetics Interest Group of South Africa  
in Association with the South African Institution of Civil Engineering

[www.gigsa.org](http://www.gigsa.org)

March 2007

## **Barrier Systems – Can we ensure negligible impact?**

Formed in Johannesburg in 1974, by Oskar Steffen, Andy Robertson and Hendrik Kirsten, offering services in soil and rock mechanics and tailings disposal, SRK Consulting now employs approximately 600 staff internationally in 28 permanent offices on 6 continents.

The Group's independence is ensured by the fact that it is strictly a consultancy organisation, holding no equity in any project and with ownership primarily by staff. This permits our consultants to provide clients with conflict-free and objective support on critical issues. This also applies to projects that involve the application of geosynthetics.

SRK have specified geotextiles and geomembranes in various applications in the mining, base metal and precious metal industries since the early 1970s.

The Bafokeng tailings dam in Rustenburg is one of the earliest examples where geotextiles have been employed as a separation layer in the under-drainage system of a large tailings dam.

As environmental legislation has become more and more stringent over the past decade, the utilisation of geosynthetics in basal liner application has been the preferred option rather than using a natural or compacted clay liner. This is mainly due to the fact that clay sources have become scarce and that the development of borrow areas for clay importation are not environmentally acceptable. The issue of expansion and contraction due to leachate/clay interaction is also important. However, the design of a natural clay liner from a geotechnical perspective is not that complex and man also has some control over the manner of placement and stress history for

compacted clay liners.

That leaves us with geosynthetic clay liners (GCL's) and geomembranes. The design of composite liner systems typically requires evaluation of water flow, contaminant transport and stability. Careful consideration must therefore be given to the stability of composite liner systems, especially systems involving GCL's and other geosynthetics. The performance of individual components within a lined facility must also be fully understood.

We are of the opinion that these design aspects need to be fully understood and correctly applied in order to ensure negligible impact and a service life in excess of 20 years. It is also very important to educate our clients in this field in order for them to fully understand the complexity involved in the design of a composite liner system.

The challenge is to effectively use the engineered components of the liner system such that the eventual failure of key components does not create environmental problems for our children.

As a proud Benefactor of GIGSA, we strive to provide and promote sound environmental practices to our clients and the geosynthetics society.

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## Note from the President

No sooner is one gearing up for the start of a New Year when suddenly the end of the second month of 2007 is looming!

Greetings nevertheless!

The civil engineering industry is certainly vibrant and keeping us all very busy particularly with the critical skills shortage adding to the pressure.

The GIGSA Committee sat for its first meeting of the year and many topics and items were raised and discussed. The Committee members are featured in this Newsletter.

Needless to say that we have a lot of work to do in the year ahead to meet the schedule that we have set for ourselves.

The last Newsletter carried a brief summary of the 8<sup>th</sup> International Conference on Geosynthetics (ICG), held in Yokohama, Japan in September last year.

A brief report-back was given at the GIGSA AGM in November.

The AGM was not that well attended and we were far too ambitious about getting a reasonable attendance at such short notice. We therefore feel that the "engineering with geosynthetics" fraternity needs to be informed on the latest developments in Geosynthetics as witnessed by the 12 South African delegates to the 8<sup>th</sup> ICG.

The main topical and interesting issues emanating from the 8<sup>th</sup> ICG will be presented at a series of afternoon Report-back Seminars in Durban, Cape Town and Gauteng in May. These state-of-the-art issues will fall under the headings of Waste Containment, Soil Reinforcement, Filtration and Drainage and Coastal Erosion.

Further notices on the venues and dates will be circulated to the membership as well as the civil engineering fraternity.

GIGSA, as with Landfill 2005, are assisting the Landfill Interest Group, Central Branch (part of the Institute of Waste Management), with Landfill 2007 being held at Misty Hills from 12 – 14 September. Two of our Committee members, Peter



Legg and Matthew Gordon-Watt, sit on the Organizing Committee.

GIGSA has started negotiating with a world renowned, research expert on Geosynthetic Clay Liners (GCLs) to visit South Africa as a Keynote Speaker at Landfill 2007.

GIGSA has for sometime been working on the formulation of a GCL Specification for South Africa. A committee of experts representing suppliers, designers and regulators has been working on this project. It is the goal of GIGSA to have this Specification ready in draft format for comment by the end of the third quarter of this year. Hopefully much will be learnt from the visiting expert on GCLs to help wrap up the GCL Specification.

We have therefore taken the bold step to plan afternoon seminars on the Draft GCL Specification in November at venues in Durban, Cape Town and Gauteng.

Our Immediate Past President, Peter Legg, has the honour being appointed as the International Geosynthetic Society (IGS) representative for Africa. His duties will be to promote the IGS in Africa and to investigate the feasibility of holding an African Regional Geosynthetics Conference in 2009. The IGS would like to see an African region developing and the challenge of planning and hosting such a conference is immense. It would certainly put Africa on the Geosynthetic world map. Peter was also nominated onto the Education Committee for the IGS.

Our Regional Representatives, Peter Hardie (W Cape) and Marco Pauselli (KZN) have been encouraged to organize gets together and or site visits in their regions to improve on local communication with our members who are unable to participate in Gauteng meetings or gatherings. The apparent "isolation" is being addressed by the aforementioned afternoon seminars and our coastal members are encouraged to attend and spread the word.

The aforementioned plans clearly follow GIGSA's main goals for the next two years:

- Improve communication with, and service delivery to, our members
- Raise the profile of GIGSA as a respected society
- Establish regular training programmes and seminars on geosynthetics
- Strengthen relationships with affiliated and allied societies and institutions

Enjoy this Newsletter and please let us have your comments and suggestions on anything pertaining to GIGSA.

**Garth James**

**President**

**GIGSA**

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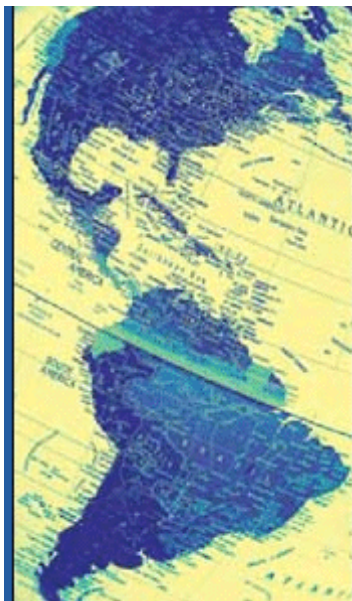
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# GEOAMERICAS 2008 - THE FIRST PAN AMERICAN GEOSYNTHETICS CONFERENCE AND EXHIBITION

2-5 MARCH 2008

HILTON CANCÚN BEACH & GOLF RESORT • CANCÚN, MEXICO

For general questions about GeoAmericas 2008 or to subscribe to the GeoAmericas 2008 E-News Bulletins featuring new sessions and papers, profiled short courses and speakers, industry partners, exhibit hall opportunities, travel and housing information and much more, please contact:

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## GIGSA AWARDS



This is a final call and reminder regarding the GIGSA Awards for the period 2005-2006.

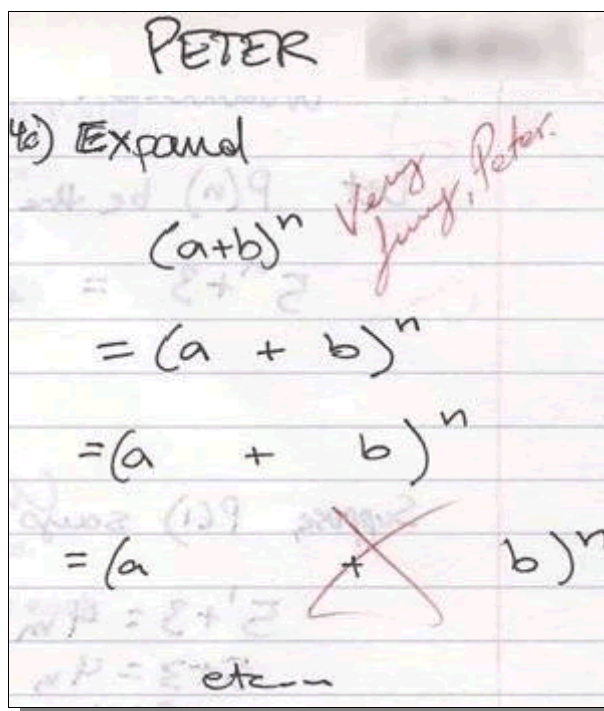
Submissions must be in before 31 March 2007. Guidelines for the submission are available upon request.

The Award categories in the field of Geosynthetics are:

- Development in Technology
- Construction

Submissions should be made to Peter Legg by e-mail: [plegg@qolder.co.za](mailto:plegg@qolder.co.za)

## Maths Genius?



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## Geosynthetic Materials Used To Waterproof The Island Inland Marina At Hartebeespoort Dam

The innovative Island development currently under construction on the shore of the Hartebeespoort dam involves the construction of over 11 km of canals, connecting about 300 freehold stands on an area of 103 ha.



*Northern view of completed phase 1*

Geosynthetic materials are used to waterproof the canals, which link the stands and allow access to the dam via a lock.

Aquatan was approached by the Civil and Structural Engineer, Mr I M Ferreira, to provide and install the critical geosynthetic lining of the canals.

It was decided to use 1,0mm HDPE for the waterproofing membrane whilst 500 Hidrain, a cusped drainage system supplied and produced by Aquatan at their Isando-based factory, was used to provide for pressure release of storm water, groundwater and potential leakage through the liner.

1,0mm Hidriline was installed on top of the 500 Hidrain under the wall foundation stretching from the under-floor drain to the top of the wall on either side.

The 1,0mm Hidriline and Hidrain was first placed on the floor of the canal as the earthworks progressed, whereafter the reinforced concrete floor followed as the liner progressed.

Once the walls were erected the HDPE was formed around the wall bases and attached at

the top of the wall using a synthetic anchor strip to hold the liner in position.



Placing of 1.0mm HDPE liner (Hidriline) on canal floor after excavations



Closer view of Hidriline liner and excavations



Preparation for concrete on floor of canal over 1.0mm Hidriline

Hidrain was installed to follow the 1,0mm HDPE liner to the top of the wall where it too was anchored under the common fixing strip.

Prior to backfilling and once the Hidrain was in place, a geotextile protection layer was placed

over the Hidrain.  
Typical cross section through canal



Detail view of HiDrain drainage layer on outside of



canal walls  
Extended view of HiDrain drainage layer on



outside of canal wall  
The project comprises 120,000m<sup>2</sup> HDPE and 45,000m<sup>2</sup> Hidrain 500.

Interesting challenges include extensive rain which made working conditions extremely difficult.

The behaviour of the HDPE, given HDPE's thermal expansion properties, had to be watched very carefully where it was wrapped around the foundation.

Sealing off to the inlet, overflows and bridges presented challenging situations.

Canal overflow



More than 70 kms of HDPE welding has taken place on site.

Aquatan has a full-time crew on site to do the HDPE welding.

As the liner is covered with concrete immediately following installation, strict quality control, monitored by the client, is implemented on site which was necessary to ensure a successful liner.

For more information, contact Aquatan Managing Director Piet Meyer, on [pmeyer@aquatan.co.za](mailto:pmeyer@aquatan.co.za), or call him on +27 (0)11 974 5271.

This guy was driving down the street in a sweat because he had a very important meeting and couldn't find a parking place. Looking up toward heaven, he said, "Lord, take pity on me. If you find me a parking place I will go to every service at my Church for the rest of my life, and give up alcohol and loose women."

Miraculously, a parking place appeared!

Our man looked up again and said, "Oh, never mind: I've found one!"

## New Transmissivity Tester in Service

Kelvin Legge and Peter Davies, while doing research for their paper “An Appraisal Of The Performance Of Geosynthetic Materials Used In Waste Disposal Facilities In South Africa” (presented at Wastecon 2002 in Durban) unwittingly destroyed Geosynthetic Laboratory’s transmissivity test apparatus by running hot water through it.



Geosynthetic Laboratory’s old transmissivity test rig

Their intent was to determine the effect of elevated temperatures on the performance of geosynthetic drainage materials used in waste-related applications, but while interesting results were obtained (read the paper) the effect on the tester was negative to say the least. The Perspex-bodied machine basically started to come apart at the seams towards the end of the research programme, and never functioned well again after that!

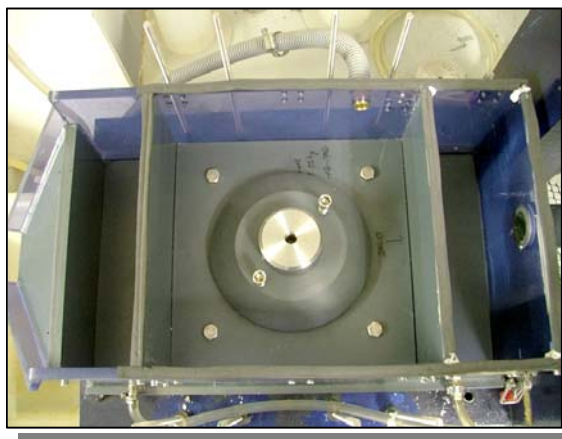


Geosynthetic Laboratory’s new transmissivity test rig

Having kindly decided not to prosecute the contrite Davies and Legge for the damage they

caused, the lab has now acquired a brand-new and improved machine, which has just been put into service. Davies and Legge will not be allowed to do any more tests using hot water on this rig!

The old rig could test to 250 kPa using heavy steel loading plates on a cantilever-loading arm. This was slow and risky to use, but the new machine can test transmissive flow in geosynthetics including geocomposite drainage structures, up to a confining pressure of 500 kPa to test method ASTM D4716-03 and / or EN ISO 12958, using a safe and fast pneumatic loading system.



Top view of new transmissivity test rig showing loading platen

This new test rig is available by arrangement to any client wishing to test the transmissivity of geosynthetic systems. For more information, contact Prakash Julal at Geosynthetics Laboratory on [prakash@geolaboratory.com](mailto:prakash@geolaboratory.com)

We don’t see things as they are, we see them as we are.  
- Anais Nin

## Geosynthetics Pioneer Demonstrates Quality-Driven Approach To Fighting SA Crime

Clifford Gundle (who established GIGSA’s well-known *Benefactor Member* Aquatan in 1961), although temporarily based in London, has retained an abiding love for South Africa. His personal and business ties to the country are undiminished by distance and he continues to serve as chairman of Aquatan. Clifford, well known in SA business circles, is committed to nation building, and has a proven sense of social responsi-



bility that goes far beyond paying lip service or meeting minimum requirements.

Recognising that it is imperative to promote a culture of law and order in South Africa, Clifford has established the *Gundle South African Public Service Fellowship Fund*, with a grant of over US \$ 250 000. The aim of the fund is to enable outstanding South African professionals in the field of law enforcement, criminal justice, policing and public safety to attend one of the world's most prestigious academic institutions: the *John F. Kennedy School of Government* at Harvard University.

Each academic year, the successful candidate will be enrolled in the Kennedy School's Mason Fellows Program, with a view to earning a Master In Public Administration degree. The central aim of the Mason Fellows Program is to prepare proven leaders from developing or transitional countries to initiate and implement major political, social or economic change in their countries of origin. To achieve this, the program offers an intensive, one-year course of study emphasising critical analysis, leadership, and the enhancement of strategic management skills. All this takes place within the broader context of developing knowledge and expertise in a particular policy area, which in the case of the Gundle South African Public Service Fellows will focus on safety and security issues and the combating of crime.

Candidates are required to meet all relevant admission requirements, and will be selected according to broad-based criteria, including their leadership skills, their vision for South Africa and the region, and their potential to make a significant and positive contribution to the country when they return.

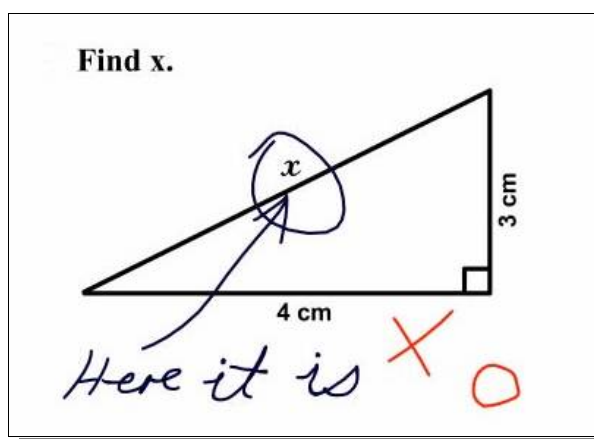
Clifford's vision is that the recipients of this fellowship will be empowered to make a meaningful contribution to improving the safety and security off all South Africans, and that the country will also stand to benefit in monetary terms, with a reduction in crime making South Africa more attractive to foreign investors and tourists.

Crime is undoubtedly one of the greatest challenges facing 21<sup>st</sup> Century South Africa – and one which can have a seriously eroding effect on the nation. There may be no quick-fix solutions – but the Gundle South African Public Service Fellowship Fund offers a quality-driven, holistic approach to the problem. This is in the characteristic style of Clifford Gundle and Aquatan, a company that started out serving the South Afri-

can market, and which has grown into an internationally recognised supplier and service provider in the field of geomembranes and geosynthetic engineering products, with successfully completed projects throughout the African continent, the Indian Ocean region and further afield.

Persons wishing to know more about this grant should contact Aquatan Managing Director Piet Meyer, on [pmeyer@aquatan.co.za](mailto:pmeyer@aquatan.co.za), or call him on +27 (0)11 974 5271

## Maths Genius?



## Editorial Guidelines

Guidelines for submissions:

- Please ensure that articles are written in a professional technical style, and avoid "puffery" (a flattering commendation - especially when used for promotional purposes). GIGSA News will edit out any such content.
- There should be no product or company name in the title of the article. However, product, company or system names may be used and their benefits described in the text.
- Comparisons which purport to illustrate that a given organisation, product or type of product is superior to others on the market will be returned to the submitter for modification.
- Articles that present design or test methods that are related to only one product will not be acceptable.
- If an article includes images, please send these separately as JPG or GIF images, as well as including the images in the document to show preferred placement.
- Any images submitted without captions will not be used.
- Limit submissions to one A4 page where possible (including high-quality photographs and sketches - material that does not print

well, or appear well on computer screens may be rejected).

- Longer articles may be considered if they are considered to be particularly interesting, but there is no guarantee that there will be space for such material in any particular publication.
- GIGSA News is published in two-column newspaper format, and is only issued electronically in Adobe PDF format. Please take this into consideration when composing your submission, as it does affect how it will appear onscreen, and in print.
- Articles will be accepted on a first-come first-placed basis, and this invitation to submit material is open only to paid-up GIGSA members.
- Parties wishing to submit an article should contact the editor and a guideline document on required layout will be sent.
- Please send all material to the GIGSA News Editor: [vanessa@artinctive.co.za](mailto:vanessa@artinctive.co.za)

## Man of the Year 2007:

Nominee # 2:



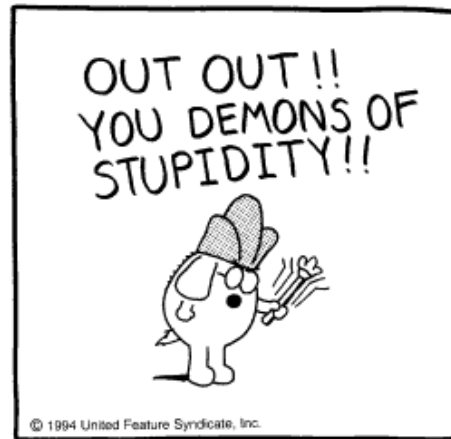
Send us your nominees!



When confronted by a difficult problem, you can solve it more easily by reducing it to the question, "How would the Lone Ranger handle this?"

**E**ngineering is not merely knowing and being knowledgeable, like a walking encyclopaedia; engineering is not merely analysis; engineering is not merely the possession of the capacity to get elegant solutions to non-existent engineering problems; engineering is practicing the art of the organized forcing of technological change... Engineers operate at the interface between science and society..."

- Dean Gordon Brown



From now on, I will not try to reason with the idiots I encounter. I will dismiss them by waving my paw and saying "bah."

- Dogbert



The mission of GIGSA is to be a non-profit organization dedicated to the scientific and engineering development of geosynthetics and associated technologies in South Africa.