

The New Face of Gast

Since the initial formation of Gast in 1961, Gast has serviced the South African and International markets for over 40 years, bringing innovation and technology to over 15 different industries and even revolutionising some fields.

Through this, Gast has become a household name. The executives and shareholders of the group of companies have realised that times have changed and a new face with modern procedures needs to be adopted.

Being ISO accredited, and having many other accreditations, Gast has taken it upon itself to be able to offer their clients only the best service with the best products at the best prices.

With this, Gast has incorporated a state of the art computerised system for its archives and



central file system, making retrieval of data faster and more accurate.

Gast and all its employees have signed a pledge to uphold and promote quality and service on all its dynamics. Evidence of this commitment is the fact that Gast is approved by the United Nations and World Bank for design, supply and installation of Geosynthetics.

Company Spokeswoman Mrs Jean Munnely

said "Gast has always been seen as the best in their field. Just recently, Gast was appointed by the Sudanese Government to design and implement all water-related socio-economical developments in two provinces of Sudan.

These projects will generate much-needed income for Sudan and assist in further technological development for the Gast Group."



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GAST

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President's Comment

Once again this newsletter is a "bumper" issue, with many contributions received. Remember that it is your newsletter, and articles from different segments of the geosynthetics industry make for interesting reading and dissemination of information about your projects and products. Thanks for all the articles received for this newsletter.

Congratulations to our newsletter editor, Vanessa Davies and her husband Peter (jr), on the birth of their second daughter, Jessica, on June 20.



Jessica Davies

Benefactor Members (in order of joining)

Engineered Linings ♦ Kaytech ♦ Aquatan ♦ Geotextiles Africa ♦ SRK Consulting ♦ Jones & Wagener ♦ DuPont SA ♦ Gundle API
♦ Land Rehabilitation Systems ♦ I-Corp International ♦ Gast International SA ♦ ARQ Consulting Engineers ♦ Naue GmbH &Co.
KG ♦ Reinforced Earth South Africa ♦ Tensar Earth Technologies

Congratulations also to our web “mistress” Lara Deans Peggs, who recently got engaged (lucky guy!) and will be Lara Costa.



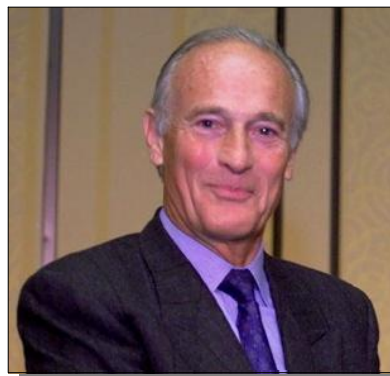
Ray Costa and Lara Deans Peggs

There are only a few weeks to go before the “Landfill 2005” two day Seminar in KwaZulu-Natal, organised by the KZN Landfill Interest Group and GIGSA. With the inclusion of the Mercer lecture by Dr J P Giroud at this Seminar, and the launch of the 3rd Edition of the Department of Water Affairs & Forestry’s Minimum Requirements Series, this has become a high profile event and has necessitated moving the venue to Greensleeves Castle at Camelot Estate in Hillcrest. We look forward to seeing many of you at the seminar. See later in the newsletter for more information on this event.

We are very excited about the imminent visit by Dr J P Giroud and his wife Genevieve to South Africa in October to deliver the Mercer lecture. The title of the Mercer lecture is “Contribution of Geosynthetics to the Geotechnical Aspects of Waste and Liquid Containment”, a topic which is very relevant to the theme of the Landfill 2005 Seminar. The Girouids will be arriving in Cape Town on 13 October, and will leave from Johannesburg on 30 October. Many thanks to Kelvin Legge for organising the Girouids’ itinerary in South Africa, and for arranging hosts and sponsorship for the trip. In line with true South African hospitality, various companies and individuals have come forward to host the Girouids throughout their stay. My thanks to all of you. I am sure that we will all benefit tremendously from Dr Giroud’s knowledge and experience.

As GIGSA members, we are privileged and honoured to have Dr J P Giroud visit us to share his vast knowledge and experience of geosynthetics with us. The timing of his visit is also very appropriate as the 3rd Edition of the

Minimum Requirements takes us into a new era of waste and containment engineering.



Dr Jean-Pierre Giroud

The long awaited 3rd Edition of the Minimum Requirements Series has been distributed to key stakeholders for comment, and is also available on the DWAF website. I encourage you to review the documents, particularly the Landfill document regarding the use of geosynthetics in landfill design, and submit comments to DWAF as soon as possible.

Once again, may I remind you of the call for nominations for the Chapter IGS Student Award. Details of the criteria for nominations are included in this newsletter. The recipient of the award will receive financial assistance towards attendance at the 8th International Conference on Geosynthetics to be held in Yokohama, Japan in September 2006.

Lastly, on behalf of GIGSA, may I say farewell and thank you to Liza du Preez, former Vice President of GIGSA, who has decided to move to Perth, Australia from September. Knowing Liza, I am sure it will not take her too long to get involved with the geosynthetics and geotechnical organisations in Australia.

Best wishes
Peter Legg
peter@jbawaste.co.za

Editor’s Note:

In the last issue, we referred to NAUE with the wrong contact information. Please note that the correct details are as follows:

NAUE GmbH & Co. KG
GewerbestraÙe 2
D-32339 Espelkamp-Fiestel
Germany

Apologies for any inconvenience caused.

Vanchem: A New Lined Residue Disposal Facility



Aerial view of site during construction

Client: Vanchem a division of Highveld Steel and Vanadium Corporation

Location: Witbank, Mpumalanga

Capital Value: R 18 million

Completion Date: July 2005

Project Managers: Anglo Technical Division

Consultant: Golder Associates Africa

Contractor: Fraser Alexander Construction

Lining Sub-Contractor: Engineered Linings

Project Description:

Vanchem is a division of the Highveld Steel and Vanadium Corporation Limited and produces vanadium products related to the steel industry. During the process of liberating vanadium, two main waste streams are generated, notably calcine material and slimes material.

The slimes material is approximately 10% of the waste stream and the separation of the milling circuit from the rest of the plant circuit will allow its disposal on a GB+ site in terms of the Department of Water Affairs and Forestry's Minimum Requirements.

A new three year storage facility with a capacity of 270 000 m³ has been constructed for the slimes material. It is a geosynthetically lined impoundment facility and is part of a modular development over a twenty year life span.

The slimes will be pumped from the plant and deposited by the open-ended deposition method. Return water will be pumped from the surface of the facility back to the plant.

Golder Associates Africa was involved in the design, permitting and construction supervision of the containment facility, delivery system and return water system.

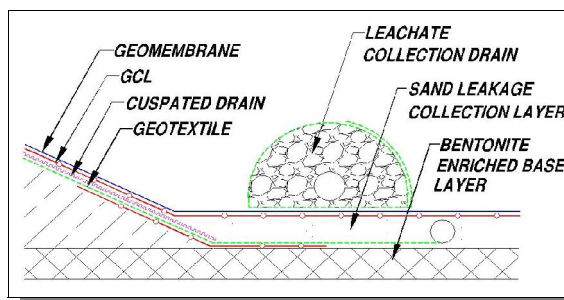
Technical Aspects of Project

Lining:

The lining system for a GB+ classification requires a double lining system i.e. a leachate collection layer, a primary liner, a leakage collection layer and a secondary liner. Due to the waste being in a slurry form, the Department of Water Affairs requested that the primary liner be a composite liner i.e. a combination of a 1.5 mm high density Polyethylene geomembrane and a geosynthetic clay liner (GCL).

The leakage collection layer on the floor of the facility is a 150 mm thick sand layer with perforated pipes wrapped with a geotextile. The inner embankments are sloped at 1:2 and here the leakage layer consists of a cusped drain and geotextile. The secondary liner consists of a 150 mm thick base layer enriched with 10% bentonite. The in-situ permeability of the bentonite layer was measured with a Guelph permeameter with excellent results.

Lining Detail



The leachate collection system consists of two "sausage" drains on the surface of the geomembrane. These drains consist of a perforated pipe covered in stone and wrapped in a geotextile. An external monitoring sump collects the leachate and leakage liquids which will be returned back into the facility.

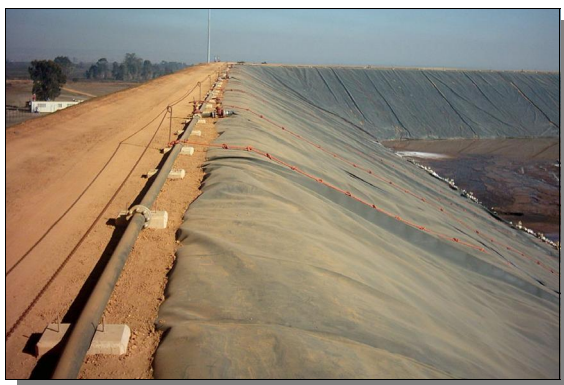
Delivery System:

The slimes material is prepared through a thickening process which achieves a density of 1.35 – 1.40 t/m³. The design of the delivery system was required to be flexible enough to deal with a deposition rate of between 12 and 28 tons per hour. This variation was due to either one or two mills being in operation.

The slimes are pumped by five centrifugal pumps in series via an overland pipeline.

Return Water System:

It was not practical or economical to pump straight from the surface pond of the facility to the plant. This was due to the variable head requirements as the level of the storage facility increased. The return water system was thus designed to operate in two phases.



Delivery line on the wall of the facility

A floating barge houses two submersible pumps. These allow for the pumping of the supernatant water to a temporary holding tank situated on the wall of the facility.



Balancing tank and return water pumping system on the wall of the facility

The water is then pumped from the holding tank with two centrifugal pumps to a clear water tank situated in the process plant. The pipeline is approximately 2800 m long.

For more information contact Philip Addis at Golder Associates Africa:

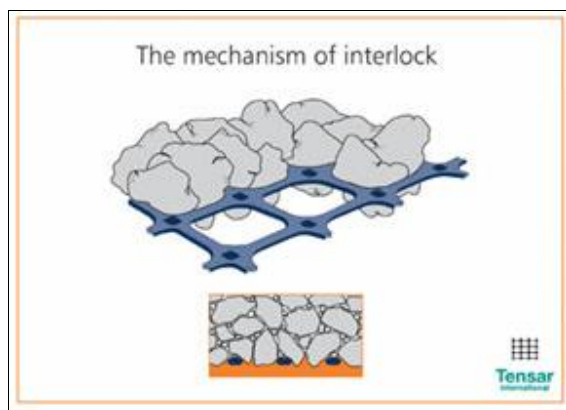
paddis@golder.co.za

Want to read a back issue of the GIGSA News...? Visit www.gigsa.org

This sort-of-quarterly newsletter is produced by GIGSA, and is compiled by Vanessa Davies (vanessa@visiondynamic.co.za). Opinions advanced do not necessarily reflect the views of GIGSA. Contributions, compliments, comments and constructive suggestions are always welcome.

UK Network Rail Code of Practice Encourages Innovative Use of Stiff Geogrid Reinforcement to Reduce Trackbed Maintenance Costs

Railway trackbed supported on low or variable stiffness formation is a major cause of poor track geometry. Until recently the typical response to this problem has been frequent maintenance involving ballast reinstatement and recurring line speed restrictions. However in Britain, Network Rail's revised Code of Practice on 'Formation Treatments', RT/CE/C/039 (Issue 2, December 2003) encourages rail engineers to maintain and renew such trackbed more efficiently, by using innovative techniques.



The revised Code of Practice recognises the structural contribution of stiff geogrid reinforcement to trackbed performance over soft or variable subgrade. This allows the trackbed layer thickness to be reduced without loss of structural performance or, by placing it below the clean layer of ballast, significantly extend maintenance intervals.

Tensar biaxial geogrids, which have Network Rail Product Approval Certification (PA05/02516), have been used for ballast reinforcement in a number of difficult railway sites over the years.

Major full-scale research by British Rail Research, shortly before British Rail's privatisation, was carried out to objectively assess the contribution of Tensar geogrids in trackbed reinforcement over soft substructures.

This showed clear benefits and confirmed the experience from the earlier monitored sites.

Variable ground

Carillion Rail is believed to have completed the first installation to the new Network Rail Code last year on the line between Derby and Birmingham. A 1.5km stretch of the line, had long been affected by a ground formation with highly variable stiffness. This stretch of track had a history of poor track geometry, speed restrictions and frequent maintenance cycles. The ballast and formation were excavated to 400mm below the underside of the sleepers and Tensar geogrid placed at formation. Over this initial geogrid layer, a 100mm thick layer of well-graded aggregate was placed and compacted. Then the upper layer of Tensar geogrid was laid and covered with track ballast to the correct level.

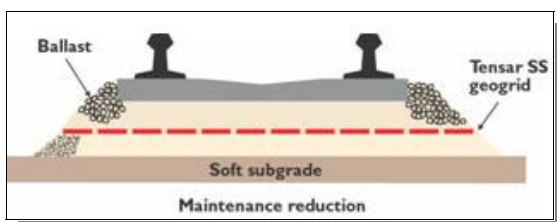


Further research

In order to appreciate fully the mechanisms involved in geogrid reinforcement of trackbed, further research and development is being undertaken by a team headed by Nottingham University and including Network Rail, Carillion Rail, Scott Wilson Pavement Engineering and Tensar International.

The research work involves full scale testing at the University's Railway Testing Facility, examining the influence of different grid properties such as stiffness and aperture size.

This is complemented by monitored Network Rail installations. Initial results from the HSTRV (high speed track recording vehicle) have shown significant improvements of vertical standard deviations on the rail in the reinforced sections compared to the adjacent renewed, unreinforced control sections. Main results are expected later.



For more information on Tensar International, visit www.tensar-international.com or call +44 1254 262431

New Tailings Facility in Saudi Arabia

NAUE GmbH & Co. KG, one of the new benefactor members of GIGSA, has recently been involved in some interesting projects in Saudi Arabia.

John Coulson, the NAUE Manager responsible for the Middle East, comments on one of their recent projects for the Saudi Company for Precious Metals (SCPM).

"SCPM made provision in 2004 for a New Tail-ing Facility at their Sukhaybarat Gold Mine in Qaseem province. This new facility was designed for the containment of the tailings generated from the gold ore process at the mine. The Engineering Consultant, TS Marktecnik AB, were responsible for drawing up all of the detailed Technical Specifications"

The facility is approximately 580m x 380m and is surrounded by a 7 meter high embankment, having a total lined area of 222 100m². The whole facility had a double lining consisting of Carbofol HDPE 406 2mm thick, installed above a Bentofix NSP 4900 GCL layer. On the base area, the lining system was protected with Secutex R504 geotextile prior to the placement of a protective layer of heap leach gravel.



Bentofix GCL and Carbofol HDPE liner being installed

John continues, "Included in the tailings pond design was a protective embankment made up of rock-fill. This protective layer of rock-fill was created at one end of the Tailing Facility to slow down the flow of tailings-sand pouring

into the tailings pond. A separation layer of Secutex R304 geotextile was specified for this area prior to the positioning of the rock-fill embankment. This Secutex R304 was also specified below the drainage material and the drainage pipes”.



Prior to placing the protective soil cover, a Secutex geotextile was placed over the Carbofol

The design of this tailing facility utilised many different geosynthetic products which were all supplied by NAUE. NAUE consists of a large group of companies who specialise in Geosynthetic applications. Within the Group they also offer a design service by BBG, who are able to provide engineering design services to Contractors and Consulting Engineers on all of the varied applications of the geosynthetic products.

The products used in this project include Bentofix® - geosynthetic clay liner, Carbofol® - HDPE geomembrane and Secutex® - needle punched staple fibre non-woven Geotextile. NAUE is able to offer complete packages of geosynthetic products from one manufacturer and this project in Saudi Arabia proved once again how effective this can be.

The installation of the various linings was carried out by Trading and Development Partnership, NAUE's approved installer in Saudi Arabia. They successfully completed the lining of this entire area in 13 weeks, with the hand-over taking place on 28 May 2005.

In South Africa, NAUE have partnered with Engineered Linings and should you have any questions regarding this project or similar projects in South Africa, please feel free to contact John Coulson on +44 7799 115 110 or Peter Hardie +27 21 551 2430.

Engineered Linings – “Out of Africa”

South African lining contractors are again proving that they can hold their own and are well adapted to handle the trying conditions thrown at them on some international projects.

Engineered Linings were recently awarded a demanding and challenging contract for the supply and installation of the geomembrane liner for a heap leach pad in Tajikistan.

Peter Hardie, the Marketing Manager for EL, gives us some details. “A few months ago, we were approached by Avocet Mining, a London-listed mining house to assist them with the development of their heap leach operation in Tajikistan. The mine is located near the village of Penjikent in the Kunjand province (North West corner of Tajikistan).”

“The design called for a 1,5 mm thick mono and double textured HDPE geomembrane. This choice of material for a leach pad seemed strange to us at the time, but once we got on site, it was abundantly evident why they required the extra friction from the geomembrane lining, as the site is located in very hilly terrain with steep slopes.

The logistics of getting the liner material to site proved a challenge on its own. The final route that the 65 000 m² of material took was from our supplier, Solmax in Canada, to the port of Antwerp where the containers were transhipped to Tallinn in Estonia. Here the material was then unloaded and reloaded into Russian rail containers and sent by rail to Kunjand and finally by road from Kunjand to site”.



A view of the pads in the hilly terrain of Tajikistan

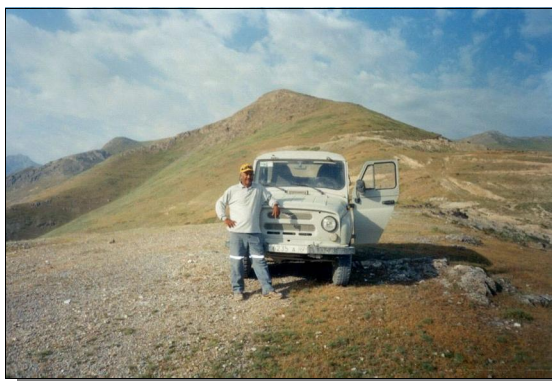
“We mobilised with a relatively small crew from our Cape Town office and again with some very interesting and complex flight rout-

ing, got the guys on site. Once on site, the project ran extremely well, and with the aid of interpreters, our site manager completed the project in 22 days. Due to the remoteness of the project, it was agreed that we would train some of the local skilled workers to enable them to operate the geomembrane welding equipment they have purchased from us. This would leave the mine with a small crew of well trained welders that would be able to effect any maintenance that might be required during the service life of the mine.”

“It was an extremely interesting culture and the ceremony of slaughtering a goat before any work was to start, seemed a bit strange to our crews. This is apparently done to prevent any injuries on site during the construction period. As strange as it was to us, it certainly seemed to work as there were no injuries reported for the whole time we were on site! Other interesting aspects were the age and condition of the earthmoving and other equipment used for the mining. Most of this dated back to World War II and although extremely old, it was well maintained and completed the project comfortably.”



Picture of cable operated crane used to move material on site



The on site transport supplied by the mine

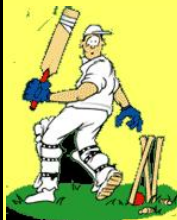
These international projects are certainly not new to EL, who have completed projects in Singapore, Kazakhstan, Mali, Ghana, Uganda, Angola, Congo and many more countries.

They have recently been awarded a contract in Mauritania and we look forward to a report on the project later in the year.

If you have any questions or would just like some information on conditions in some of these countries, please contact Peter Hardie on (021) 551 2430.

Cricket Wicket

As Darryl Cullinan was on his way to the wicket, Shane Warne told him he had been waiting 2 years for another chance to humiliate him. "Looks like you spent it eating," Cullinan retorted.



Sponsorship Interest

GIGSA aims to disseminate state of the art technology at the lowest possible cost to its membership. In doing so sponsors are a key element in delivering this service.

If any person or party is interested in sponsoring a GIGSA event or part thereof you are kindly requested to advise Kelvin Legge at tel: (012) 336 8677 or leggek@dwaf.gov.za.

Kaytech Geogrids Change the "Face" of Wastewater Treatment Structures

Biofiltering is a wastewater treatment system that biodegrades organic matter and the conventional design consists of a large diameter, solid, reinforced concrete structure filled with ballast-size stone through which wastewater is piped to an overhead rotating distributor and dispersed on to the stone fill. It then trickles through the stone bed into an outlet system at the bottom where micro-organisms in the wastewater attach themselves to the bacteria-surrounded stone.

The bacteria subsequently breaks down the micro-organisms which results in the removal of pollutants from the wastewater. However,

high oxygen levels are required to ensure the effectiveness of these bacteria.

The concrete perimeter retaining walls used in the old system are now being replaced with geosynthetic reinforced concrete blocks which are stacked in an open structure. This allows for an increased oxygen flow among the stones. Another advantage of the new design is that manual labour can be used to place the blocks which creates excellent opportunities for the contractor to use local labour.

"This method of wastewater treatment has been around as a "new approach" for about 12 years," says Kaytech's Manie Troskie. "However, it hasn't been the norm although it is catching on slowly. And the introduction of robust geogrids has helped this design to develop. The fact that the geogrids are more cost-effective has made the system more attractive lately."



The placing of the stone at the Delmas project.

"Kaytech is promoting this system now that advanced, strong geogrids which have good long-term strength and creep characteristics have become available, and our Rock GX geogrid range is playing a major role in injecting new life into the system."

Comments Manie: "Rock GX is made from high tenacity and high quality polyester yarn fibres with a maximum elongation at characteristic short-term tensile strength of 11 per cent. The ultimate tensile strength of our product used in this application normally ranges between 35kN/m and 50kN/m.

The manufacturing process is warp knitting, providing significant tensile reinforcement capacity in one principal direction. It is important to specify that the machine direction of manufacture is the required installation direction.

The aperture size is 25 millimetres in the machine direction and 30 millimetres in the cross direction. The open structure provides excellent stone to geogrid interaction which deter-

mines the tensile strain required to attain equilibrium in the structure.

The geogrid is coated with a protective polymer and has high resistance against hydrolysis after 10 000 hours of immersion in water. Rock GX also has good chemical resistance with pH tolerance of 2 – 9.



The biofilter at the Delmas Waste Water treatment works in Mpumalanga was the first to be built using Kaytech's Rock GX

"A continuous flow of wastewater over a reinforcement can cause chemical degradation and ultimately a reduction in the tensile strength," says Manie. "And it was because of Rock GX's resistance to chemicals that the engineers prescribed our product. The polymer also protects the geogrid against any installation damage which could be caused by sharp edged stones used as backfill material."

What this boils down to is that the designer now has geogrids available which give more long-term design strength in terms of Rand value.

For more information:

031 7172300 (telephone), 031 7020435 (fax), e-mail ktechgmi@kaymac.co.za or website: www.kaytech.co.za

Hit for a Six

After going past the outside edge with a couple of deliveries, Shaun Pollock told Ricky Ponting: "It's red, round & weighs about 5 ounces."

Unfortunately for Pollock, the next ball was hammered out of the ground. Ponting to Pollock: "You know what it looks like, now go find it."



Call for Nominations: The IGS Student Award 2004 – 2005 South African Chapter

The IGS student award was established to disseminate knowledge and to improve communication and understanding of geotextiles, geomembranes, related products, and associated technologies among young geotechnical and geoenvironmental student engineers. The award may be made to one student per chapter around the world.

The IGS award consists of a \$1000 that must be used to attend the 8th International Conference on Geosynthetics (Yokohama, Japan, 18-22 September 2006). The first \$750 from the IGS is payable in advance of the conference, with the remaining \$250 payable once the student has submitted a written feedback report on the conference to the IGS within 30 days after the event. Note that the registration fees to the conference are waived by the organisers and a set of conference proceedings will be provided free of charge. GIGSA might, at the discretion of the committee, augment the award amount.



**Airlines we'd prefer not to fly with
(N° 5 in an ongoing series)**

The award will be made to a student younger than 36 in the year of the award (i.e. 2006) studying civil engineering in either the geotechnical or geoenvironmental fields. The student must be a member of GIGSA. The recipient of the award must present a publication at the conference on work in which he or she has been involved. The topic of this publication should preferably be related to their studies and be at post graduate level. Publications on work they have been involved in but do not relate to their studies will however also be considered.

Nominations must define and motivate the piece of work that is proposed to be presented at the conference. Submissions should be limited to 500 words. Preference will be given to submissions of papers that were recently published in conferences associated with geosynthetics. Papers not yet completed will not be excluded from evaluation.

Nominations should be submitted to the Secretary of GIGSA by e-mail (Mr M Gordon-Watt at: ktechmgw@kaymac.co.za) to be received no later than 25 November 2005.

Zen Rules for 2005

Part 2

9. Before you criticise someone, you should walk a mile in their shoes. That way, when you criticise them, you're a mile away and you have their shoes.
10. If at first you don't succeed, skydiving is not for you.
11. Give a man a fish and he will eat for a day. Teach him how to fish, and he will sit in a boat and drink beer all day.
12. Some days you are the bug; some days you are the windscreen.
13. Good judgement comes from bad experience, and a lot of that comes from bad judgement.
14. A closed mouth gathers no foot.
15. Duct tape is like the Force. It has a light side and a dark side, and it holds the universe together.

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.