

IGS NEWS



NEWSLETTER OF THE INTERNATIONAL GEOSYNTHETICS SOCIETY

Dedicated to the scientific and engineering development of geotextiles, geomembranes, related products, and associated technologies

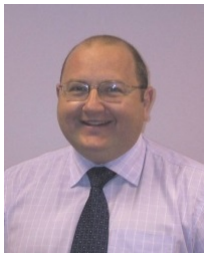
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President's Corner



Russell
Jones

Dear members of the IGS,

Welcome to the first IGS News of 2015! This edition of our newsletter is one of the largest ever produced, so I must thank our IGS News Editor, Gerhard Bräu, and his team of reporters and contributors, for all their hard work in putting this together. Inside this newsletter, you will find a report on the 16th IGS Council meeting held at the 10th International Conference on Geosynthetics in Berlin, which details some of the successes of the IGS committees and task forces over the last four years, and presents the goals set by the Council for the next four years.

It is always pleasing to see IGS members being recognised for their work. This newsletter includes details of the 2014 photograph contest winners – which include some truly stunning photographs – and also two further summaries of papers which won the 2014 IGS Award. As our industry matures, it is important to ensure that new developments are underpinned by sound technical research to fully understand the geosynthetics performance.

I would urge all readers of IGS News to get involved with the Society. There are plenty of opportunities with both national and international events and I would particularly suggest that you submit abstracts to the three regional conferences which will be held in 2016 in Miami, Istanbul and New Delhi. It is very pleasing to see that the organisers of the GeoAmericas 2016 conference are structuring the conference sponsorship packages to include support for the construction of a school and orphanage in a small town in Haiti which was so badly affected by the 2010 earthquake. This is an excellent opportunity for us to support less privileged communities with the sustainable use of geosynthetics.

Finally, I just wanted to remind you that IGS is now active on social media and you can follow your society on LinkedIn, Facebook, and Twitter (@IntGeosynthSoc). If you're not already following IGS, take this opportunity to communicate with your peers via social media.



D. Russell V. Jones
IGS President

General Information for IGS Members

16th IGS Council Meeting Report Berlin, September 2014



Elizabeth
Peggs

An Overview of the IGS Council Meetings Held at the 10th ICG, abridged

We gathered with our colleagues in geosynthetics at the 10th International Conference on Geosynthetics on 24 – 26 September 2014 in Berlin. The event provided the backdrop for the 16th IGS Council Meeting wherein council members took the opportunity to discuss and present on topics that matter most to their members. It was also an occasion to reflect upon accomplishments and progress during the four preceding years (going back to May 2010's 9th ICG); and to use all that had been accomplished and learned in setting goals for the 2014 – 2018 council term.

Also held in Berlin was the concluding one-day meeting of the mid-term 2012 – 2014 IGS Council. This gathering was held ahead of the conference and served as a reporting meeting at which committee leaders and contributors created a legacy of information for the terms beginning in 2014.

These were not the only IGS-affiliated meetings. The conference hosted an exhausting schedule of technical committee meetings, task force meetings, and IGS leadership meetings, including the now-traditional meeting of the attending IGS Chapter Presidents and the first-ever meeting of the IGS Chapter Secretaries.

In my 9.5 years working with the IGS Council, I can say, with certainty, that Berlin hosted the most productive and exciting IGS Council working meetings in my tenure. Thank you to everyone who contributed be-

fore, during, and afterwards to create such a productive environment!

IGS Council Members submitted major accomplishments and discussed areas in which they would like to see development and expansion during the next four years and beyond. The 2014 – 2016 IGS Council met in a 90-minute plenary session and solidified a short list of goals. Once those goals had been established, each of the committees met and faced the task of figuring out what it would contribute to help lead the IGS toward achieving those goals. Here, we provide the highlights of those meetings.

This list is by no means comprehensive; rather, it is representative of the amazing work that our members undertake on a daily basis to further the mission of the IGS.

But first, let's acknowledge that the IGS is healthy and growing, and that its reach has extended far beyond its membership. From 2010 to 2014, overall membership increased by 58 percent, corporate membership grew 23 percent, and even the number of chapters increased (+34 percent).

Currently, the IGS has 43 chapters, 3,000+ Individual Members, 400+ Student Members, and 160+ Corporate Members.



A heartfelt thank you to Council Members who concluded service in 2014

Retiring Past President

Fumio Tatsuoka – Japan

Council Members

Juan Carlos Rivera Baca – Peru

John Cowland – Hong Kong

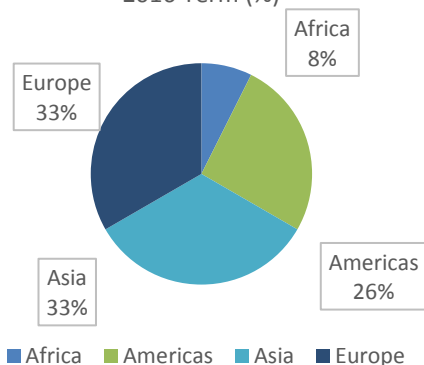
Neil Dixon – UK

Jun Otani – Japan

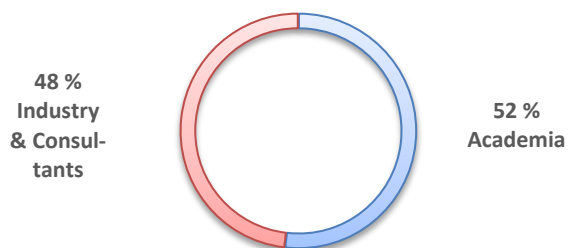
Pedro Abad Santos – Spain

XiaoWu Tang – China

Council Representatives by Region for 2014 - 2016 Term (%)



Council Makeup



Moving Forward

The IGS Council set several goals to carry the society through 2018.

One which took a major step towards achievement happened at the conference. The IGS Council decided to increase the number of Technical Committees to at least six by 2018. At the time of the council meeting, three technical committees existed. Recommendations for new TCs were put forth.

The IGS TC on Hydraulics was established swiftly with broad interest expressed. Its committee is already well on along the path to full formation. (See related report by Chair Pietro Rimoldi in this issue of IGS News.)

It is worth noting that while many of the ideas for technical committee development come from within the council, any member of the IGS may draft and submit a committee creation proposal. Proposals are both welcomed and encouraged. Please write IGS Secretary Elizabeth Peggs, Elizabeth@geosynthetica.net, if you would like more information.

Other items:

- Staying in touch with your Chapter will be easier than ever with the launch of the new IGS website (Summer 2015). Besides its fresh, professional look, the site will enable IGS Chapters to maintain unique profile pages. These pages will detail key leadership, promote activities, and connect visitors to dedicated chapter websites.
- Regarding the chapter growth goals, keen interest in chapter development has been expressed by the geosynthetics communities in Algeria, Austria, Costa Rica, Israel, Mozambique, Switzerland, Tunisia, UAE/Saudi Arabia, and Venezuela. Creation of chapters to support professionals in these and other countries is crucial to sharing

the IGS mission with a larger audience.

The IGS is moving ahead, step by step, and taking on issues that matter most to our members. This has guided the society in the past and will continue to guide us going forward.

A summary of accomplishments and projects from 2010 – 2014 follows. This list includes examples of the IGS's work through its Technical Committees, Task Forces, and Regional Activities Committees (RACs).

Communications Committee

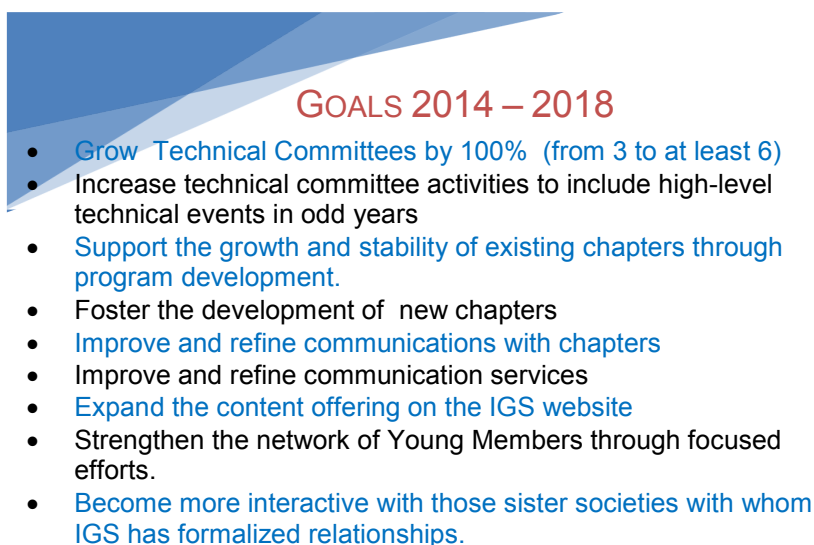
- The new and improved IGS website is months away from launching. One stand-out feature will be the presence of chapter-specific landing pages. Members can visit their chapter's page for updates and information specific to their area while still within the overall IGS website at which they enjoy other unique benefits (e.g., the members-only proceedings archive).
- The IGS hired Katie Wesftall as Communications Coordinator, to further meet the growing needs of our organization. (If you get an email from her, be sure to return it on the double!)
- The Proceedings Library content has been increasing in size and is a major driver of traffic to the website.
- The IGS now has a presence on LinkedIn, [Facebook](#), and Twitter (@IntGeosynthSoc). If you're not already following us, take this opportunity to communicate with your peers via social media.

Young Members Mentorship Task Force

- A primary goal of this new committee, which could also be called an achievement, is to solidify a network of young professionals from throughout the industrial, academic, and professional aspects of our community.
- The young member committee is actively working to create young member specific activities during each of the regional conferences and during other events. The first of these major activities took place in Berlin.
- The IGS has a phenomenal repository of leaflets, many of which have been translated by chapters throughout the world. The young members committee is working to continue this work and expand the number of languages into which the IGS leaflets and other documents are written.
- The committee is forming a plan to create a repository for PhD theses relating to the field of geosynthetics.

Education Committee

- The Education Committee spearheaded the development of the *Geosynthetics for Sustainable Development* video.
- The Educate the Educators (ETE) Program developed. The concept was inherited from a program run by the Geosynthetic Institute (GSI) in the early '90s. The fundamental purpose of the program is to provide professors tools and information about how to incorporate geosynthetic instruction in their undergraduate programming. ETE may be initiated by any chapter of the IGS and with the support of the IGS. ETE was successfully conducted in Poland and Argentina, and there are ETE programs in each of the IGS regions under development for 2015 – 2016.
- The Education Committee completed a survey of geosynthetics information in undergraduate geotechnical engineering textbooks. Thorough review of geosynthetics "content" was led by Erol Güler. The Young Members were also engaged in this task. Recommendations are to come.



GOALS 2014 – 2018

- **Grow Technical Committees by 100% (from 3 to at least 6)**
- Increase technical committee activities to include high-level technical events in odd years
- **Support the growth and stability of existing chapters through program development.**
- Foster the development of new chapters
- **Improve and refine communications with chapters**
- Improve and refine communication services
- **Expand the content offering on the IGS website**
- Strengthen the network of Young Members through focused efforts.
- **Become more interactive with those sister societies with whom IGS has formalized relationships.**

African Regional Activities Committee

- Completed planning and execution of GeoAfrica 2013 (Accra, Ghana).
- Established an ambassadors program in Morocco and supported the establishment of a Moroccan chapter
- Currently planning GeoAfrica 2017 to be held in Morocco.
- Participated in the XVI African Regional Conference of ISSMGE in Tunisia.
- Supporting the Educate the Educators program.

Pan-American Regional Activities Committee

- IGS Peru organized its 3rd National Conference on Geosynthetics (November 2014).

- IGS Argentina is organizing a short course on soil reinforcement with geosynthetics at the Pan-American Conference on Soil Mechanics and Geotechnical Engineering (XV PCSMGE).
- IGS Brasil is holding an IGS Brasil Case Histories Contest and contributing to Brasil Technical Recommendations.
- New Chapter Possibilities: Ecuador, Venezuela, Costa Rica, Dominican Republic, Panama.
- Aims to facilitate the activities of two new working groups through the website – Spanish and Portuguese-speaking chapter groups. An effort is being made among common language speaking chapters to form a working group to exchange documents and experiences.

Asian Regional Activities Committee

- The Indonesian Chapter held a short course in Makassar (September 2013).
- First National Conference on Geosynthetics in Vietnam took place in December 2014.
- The Vietnamese Chapter conducted training programs in Hanoi and Ho Chi Minh in December 2014.
- The West Pacific Chapter was renamed Chinese-Taipei Chapter.
- An Iranian geosynthetics group is merging with the IGS Iranian Chapter.
- A series of annual geotechnical engineering conferences are being planned in Iran, following the successful one-day seminar from the IGS Iranian Chapter in 2013.

European Regional Activities Committee

- Finland and Slovakia now host official IGS Chapters.
- The European RAC is in the initial stages of organizing a symposium on pavements, including working platforms and sustainability in 2015.
- Is supporting the Educate the Educator program. An event was held in Poland and future events are being arranged in Portugal and Turkey.
- Prepared for Rencontres Géosynthétiques conference (March 2015).

Technical Committee – Barriers

- The Technical Committee – Barriers organized workshops and seminars on hot topics.
- Created a new leaflet on barriers. It is available at www.geosyntheticsociety.org.
- In France, the committee supported the publication of a summary of recommendations for the use of geosynthetics for drainage and filtration, as well as a guide related to the acceptability criteria for seams. These documents will be made available to IGS members when the new website launches.
- The committee is currently working on a video project on geosynthetics installation and is requesting installation videos from the membership.
- Monitoring Wikipedia content on geosynthetic barriers to identify and correct mistakes.

Technical Committee – Filtration

- Kelvin Legge presented the current status on the progress of the ICOLD Bulletin 55 that approaches the use of geotextiles in dams. Kelvin requested suggestions, comments, and criticisms on the ICOLD document from members of the IGS TC on Filtration.
- Some discussions took place on restarting the GeoFilters conference series. After some comments and proposals, Sam Allen offered to organize it in the USA, probably during 2015.

Corporate Committee

- A Case Histories Contest is being developed. Details will be published on the IGS website.
- A New Corporate Membership logo and terms of use document was developed.
- A review of Corporate Member benefits with a focus on enhancing some of those benefits has been established.

Conference Proceedings Task Force

- To date, a total of 15 conference proceedings, including more than 1700 papers, have been uploaded.
- The conference papers are available to **members only, to access the proceedings first log-in to the IGS web site then go to [Resources](#)>> [Proceedings](#).**

If you would like any additional information about the IGS Council Meetings please don't hesitate to call or write to the Office of the Secretary.

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Diana Davis, Secretariat Manager, IGSsec@GeosyntheticsSociety.org, +1.561.768.9489 *IGS Office*,
Diana.Davis.IGSsecretariat *Skype*

*Reported by
 Elizabeth Peggs, IGS Secretary, and Katie Westfall*

2014 IGS Photo Contest Winners

The Aesthetics of Geosynthetics

The entries into the 2014 International Geosynthetics Society Photo Contest were showstoppers. From mountain tops to sea, IGS Members provided a stunning array of photography that is sure to inspire future projects and photographers.

The IGS Photo Contest is held every four years in conjunction with the International Conference on Geosynthetics. The photo contest was first held in 2010 in conjunction with the 9th ICG. The second photo contest held at 10ICG in 2014 brought in 142 submissions from around the world, and the competition was unbelievable! Each photo was evaluated on three criteria:

- Demonstration of "geosynthetics in action"
- Aesthetics
- Clarity of the photo

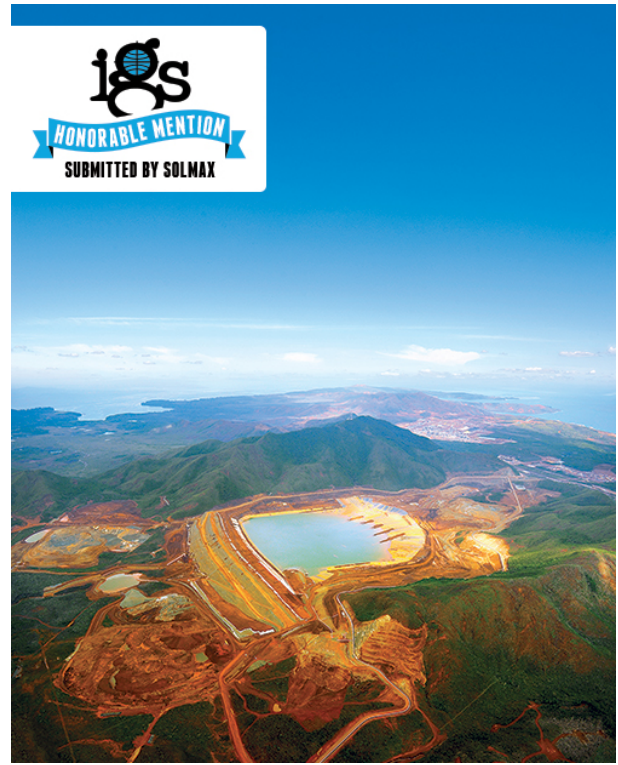
Five judges were charged with scoring each of the photos, and the photos with the highest composite scores were selected.

The Photo Contest Winners were announced along with other IGS Award Winners during the General Assembly held on 24 September 2014 at 10ICG. IGS Awards are granted to individuals or groups of individuals who have made an outstanding contribution to the development and use of geotextiles, geomembranes, related products or associated technologies through their scientific and technological achievements. (To read about IGS Awards given for outstanding research, click [here](#).)

It's never too early to start thinking about the 2018 IGS Photo Awards, so have your cameras at the ready. And read on to see this year's IGS Photo Contest Winners.







Reported by
Elizabeth Peggs, IGS Secretary

New IGS-created video: Geosynthetics for Sustainable Development

New IGS-created video shows how the industry is at the crux of the sustainability conversation.

Geosynthetics for Sustainable Development, the new video produced by the International Geosynthetics Society Education Committee, asks the question: "What defines quality of life?"

It's a question that's being answered by a call for solutions that are sustainable and protect the earth and its limited resources. More and more, sustainable infrastructure solutions are being addressed with high-quality, engineered geosynthetic materials. As the increasing demand for improved living conditions is driven by the growing world population, consumption is outpacing supply of virtually all resources. The video seeks to show how geosynthetics are a solution to building sustainable civil, geotechnical and environmental infrastructure projects.

The creation of the video was spearheaded by Sam Allen, vice president of TRI/Environmental, Dr. Neil Dixon (UK Chapter) and Dr. Gary Fowmes (UK Chapter), both of Loughborough University, with support from one of the founders of the IGS, Dr. J. P. Giroud, and the IGS Secretary Elizabeth Peggs. The beta version premiered at 10 ICG in Berlin, and now it's available to the public on IGS's YouTube channel.

"While sustainable development has increasing international commitment, its successful implementation requires us to employ state-of-the-art technologies and materials to both conserve energy and promote more durable, sustainable structures. Adoption of this approach mandates the awareness and robust use of geosynthetics and the realization of their long-term benefits." – Sam Allen, Immediate Past Chairman of the IGS Education Committee

In a fast, engaging format, Geosynthetics for Sustainable Development shows that sustainable solutions are needed to create the infrastructure necessary for the quality of life desired by a growing world population. Appealing to a wide variety of viewers, the video makes the case for geosynthetics as a fundamental building block that is integral to building a sustainable future.

Touching on geomembranes and geosynthetic clay liners, geonets and drainage geocomposites, geotextiles and geogrids, the video goes on to explain that this group of materials will assist in reducing the carbon footprint contributed by infrastructure development while minimizing the use of natural resources. How exactly do geosynthetics improve infrastructure? The video highlights just a few of the ways:



- Improve road construction
- Develop safe, long-lasting slopes
- Control evaporation
- Preserve water
- Protect the environment
- Control surface erosion
- Enhance longevity, resilience and safety of critical infrastructure

All of these aspects are central to the current sustainability conversation, and the video does a wonderful job of showing how the geosynthetics discipline and the IGS are helping to frame a dialogue that moves us toward a more sustainable future.

We invite you to share the video so that IGS can spread the word. Here's a link to Geosynthetics for Sustainable Development.

*Reported by
Katie Westfall*

IGS Students Awards: 2013 to 2016

The success of the IGS Student Award program will continue, now with its seventh award period of 2013 to 2016.

The Awards will be assigned in the year 2016-2017 and all successful candidates will be invited to attend one of the IGS regional conferences in 2016, i.e., GeoAmericas 2016, EuroGeo6 or Geosynthetics Asia2016, or GeofAfrica 2017.

The IGS student award was established to disseminate knowledge and to improve communication and understanding of geotextiles, geomembranes and associated technologies among young geotechnical and geoenvironmental student engineers around the world.

The IGS student award will consist of US\$1,000 to be used to cover travel expenses of each winner to attend a regional conference. The US\$1,000 will not be distributed without such attendance. If the student receives funding and subsequently does not attend the conference the Student's IGS Chapter will be responsible for the refund of the award. This award amount will be assigned to only one student per IGS Chapter. The selected student should have been an undergraduate, M.Sc. or Ph.D. student during the period 2013-2016.

The IGS is interested in encouraging the involvement of the students during the selection process. To ensure student representatives from each chapter participate in the program to the fullest extent possible, the chapters must accomplish the following:

- Chapters must organize a contest or conduct a nomination process to select the student candidate to represent the chapter. The process should include submission by the student candidates of abstracts and preparation of a technical paper for one of the IGS regional conferences in 2016 or 2017.
- While the IGS chapters are free to define the characteristics of the nomination/competition process, this process should be documented and provided to the IGS.
- Chapters must notify the IGS of the name of the student selected. Communication will be made by the IGS to all chapters as regards the deadlines for those two actions.
- The winner student should provide the IGS in parallel to the conference organizers with the abstract and paper submitted.

While this year's process requires careful documentation of the nomination process, the IGS Awards task force is available to help in the preparation of such process.

The IGS will transfer US\$1,000 to the student upon receipt of the draft paper. IGS Student Award winners will participate in dedicated sessions at their regional conference, where they will present their paper.

IGS Student Awards recipients will be required to submit a written report to the IGS on the regional conference and on the IGS-related conference activities. This report should also be provided by the Student Awards winners to their own chapter.

In recognition of the IGS Student Award winners and to maximize benefits to the students, the organizers of the regional conferences are required to hold a dedicated session in which the student papers will be presented. They must also provide the students with a copy of the proceedings and admission to the sessions and the exhibition. In addition, a comprehensive student program will be organized in each regional conference to maximize their exposure to geosynthetics and the IGS. This includes a recognition ceremony during the conference as well as their participation in corporate receptions, social functions, and activities specific to each conference.

Please feel free to contact the IGS Secretary, Elizabeth Peggs (elizabeth@geoindex.com) or Nathalie Touze-Foltz (nathalie.touze@irstea.fr) with questions about the IGS Student Award Program.

*Reported by
Nathalie Touze-Foltz (Chair of the Awards Task Force)*

Awarded Work of IGS Award Winners 2014

It is good tradition and part of the IGS Awards procedure to have summaries of the awarded work of the winners published in IGS News. The first part is published in IGS News 03/2014, two more follow in this issue and the placement will be continued.

Field Scale Evaluation of Wrinkles in exposed HDPE Geomembranes

Melissa J. Chappel, R. Kerry Rowe,
Richard W.I. Brachman and W. Andy Take

Drs. Chappel, Rowe, Brachman and Take have made a significant contribution to enhancing the understanding of the potential leakage under high density polyethylene (HDPE) geomembrane wrinkles in composite liners through a series of related journal publications.

Chappel et al. (2012a) quantified geomembrane wrinkle formation at a landfill cell during composite liner construction over one sunny day. They provided evidence that the hydraulically significant wrinkle length could be limited by placing a number of sand bags in a drainage trench, thereby reducing the area available for development of connected wrinkles. In addition, they provided quantified evidence that the time of day is a powerful indicator of potential wrinkle length on a sunny day.

The field study (Rowe et al. 2012) was the first multiyear field study of geomembrane wrinkles at an exposed composite liner site with weather and temperature data. This study examined the geometric properties of individual wrinkles (length, average width, and area) and the fluid transport properties of hydraulically connected wrinkles (connected length) in exposed black HDPE geomembranes at the field scale. Solar radiation was the prime energy source causing wrinkling, while air and soil temperatures contributed to maintaining wrinkles later in the day. Sufficient solar radiation ($>600 \text{ W/m}^2$) and geomembrane surface temperature ($>30^\circ\text{C}$) created conditions where hydraulically connected geomembrane wrinkles were long enough ($>500 \text{ m}$) to allow significant leakage through a composite liner (assuming good construction quality control and assurance limited the number of holes to typical design value of less than 5 holes/ha). It was indicated that these leakages agree reasonable well with what has been measured in leakage collection systems.

Chappel et al (2012b) used the data from Chappel et al (2012a) and Rowe et al (2012) as well as additional data from other field sites to examine the effects of different conditions (exposure, subgrade, surface type, size). The quantitative results support general observations about wrinkles: wrinkles increased from the fewest in the morning, to a maximum just after noon and then decreasing in the afternoon. They suggest that wrinkles should be prevented from forming in areas larger than 0.05 ha to limit maximum potential leakage through a composite liner. It was also recommended that the geomembrane should not be covered when the longest wrinkle is $> 200 \text{ m}$.

Literature:

Chappel, M.J. (2012). A field scale evaluation of wrinkles in exposed HDPE geomembranes. Ph.D. Thesis, Queen's University, Kingston Canada, 341p.

Electro-Kinetic Geosynthetics (EKG) and Electro-Osmosis Theory

Yan-feng Zhuang, School of Civil Engineering, Wuhan University

Introduction

Increasing environmental concerns as well as land demands has led to a growth of reclamation. Hydraulic filling has become an important method for land reclamation. For these hydraulic-filled areas, surcharging and vacuum preloading are currently major methods for consolidation. Usage of PVD in China tops up 30 billion RMB (~5 billion USD) per year. However, methods of surcharging and vacuum have similar limitations when it comes to sludge. It takes long time for consolidation to complete and effect of treatment for deep soft ground is poor.

Electro-osmotic consolidation can be an alternative method which can provide quicker and better effect of consolidation for soft ground with high water content and low hydraulic permeability. Electro-osmosis is a kind of electro-kinetic phenomenon that moisture in the soil migrates from anode to cathode under DC field. This phenomenon has been discovered for over 200 years (Reuss, 1809). People have seen great potential of its application in ge-

otechnical engineering. However, this technique has been restrained by corrosion of electrode and deficiency of electro-osmosis theory. The author's work is to remove these barriers for the application of electro-osmosis. There is still lots of inspiring work to do in this area and major contributions up to now are presented in the following.

Novel EKG product

Concept of EKG was presented around 20 years ago by Prof. C.J.F.P. Jones et al. However, ability of mass production of EKG was just recently (Zhuang et al. 2012a).

Once the challenge was to find a suitable electric conductive polymer as source material for EKG. Analysis shows that the electric resistivity of EKG should not be higher than $10^{-3} \Omega \cdot m$ (Zhuang 2005; Zhuang et al. 2012b) and it shall have enough strength and flexibility at the same time. This challenge has been overcome after numerous times of trials. Some trial samples are shown in Fig.1~3 and Fig.4 presents the final patented EKG product (Zhuang et al. 2006; Zhuang et al. 2012a; Zhuang et al. 2013).

The novel EKG product is like classical PVD in appearance. It is made from conductive polymer with resistivity of $10^{-3} \Omega \cdot m$. Two copper wires of $\Phi 1 \text{ mm}$ are embedded inside the polymer for better distribution of electric current and for convenience of wiring. With the help from geosynthetics industry, this EKG product can now be mass-produced in China.

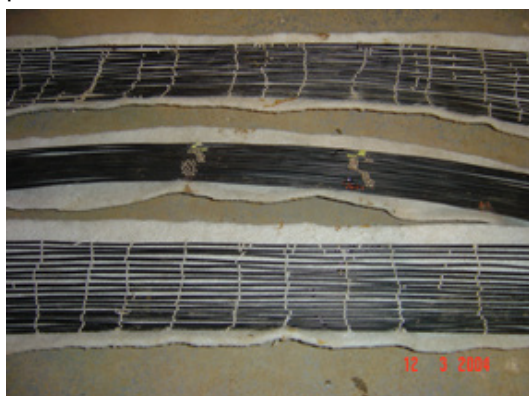


Fig.1 EKG sample in 2004



Fig.2 EKG with conductivity of 10^0 S/m



Fig.3 EKG with conductivity of 10^1 S/m



Fig.4 EKG product patented in 2012

The EKG product solved the problem of electrode corrosion. With high conductive and corrosion-proof polymer the energy consumption of electro-osmotic consolidation is within 10 kWh/m^3 only, which is similar to that of vacuum consolidation.

Electro-osmosis theory

Current theory for electro-osmotic consolidation is based on Esrig's theory proposed in 1968. This theory is deficient for design in geotechnical engineering. Firstly, it provides no information on electric current and power, which are very important issues for design. Secondly, Esrig's theory is inconsistent with some experimental results. For example, it cannot explain current variation pattern after current intermittence or polar reversion.

To improve this deficiency, energy analysis model and electric charge accumulation theory was developed (Zhuang et al. 2004; Zhuang et al. 2005a; Zhuang et al. 2005b; Zhuang et al. 2008; Zhuang et al. 2011 and Zhuang et al. 2012c). These two theories bridge the gap between micro-mechanism and macro-behavior of electro-osmotic consolidation. They describe the pattern of current variation, which provides a basis for power source selection and circuit configuration in electro-osmotic consolidation design. Dewatering process predicted by these theories provides an estimation of consolidation effect and time required for the consolidation to complete.

Automatic DC power source

According to the electro-osmosis theories proposed, electric field has to be adjusted flexibly both in direction and intensity during electro-osmotic consolidation. For this purpose, a novel automated electric power source was developed (see Fig.5). The power source is able to work under constant-current mode and constant-voltage mode. It

can be manually controlled and program controlled. The open programming interface allows people to customize their program so that to adjust the electric field as they want during the electro-osmosis process, including switching between constant-current and constant-voltage mode, polar reversion quickly (once per second for maxima) and alteration of electric field intensity. A control program based on new electro-osmosis theories is provided as well (see Fig.6).



Fig.5 Automatic DC power source

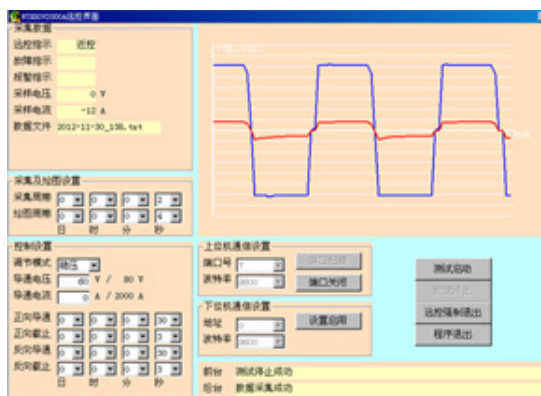


Fig.6 Control panel of program for power source

Field application

A 19 m × 15 m hydraulic-filled area was treated with electro-osmosis technique using EKG. The area was filled with 5.8 m thick of dredged pool sludge. After 36 days of treatment, including 16 days of intermittence, the average water content of dredged sludge was decreased from 62% to 36% and the soft ground was improved from a fluid-like status to a bearing capacity of 70kPa. The average energy consumption for this treatment was 5.6kwh/m³. Comparison of the soft ground before and after E-treatment is shown in Fig.7 and Fig.8.



Fig.7 Soft ground before consolidation



Fig.8 Soft ground after consolidation

As a comparison, the same consolidation effect achieved by using the preloading method was analyzed. The soil had a coefficient of consolidation $C_v=0.0029\text{cm}^2/\text{s}$ and a compression index $C_c=0.3611$. In order to achieve the same effect of consolidation (to reduce water content from 62% to 36%), there should be 132 kPa of preloading (around 6~7 m high soil surcharge); and it would take 1139 days, which is more than 3 years, to achieve 90% of consolidation (Zhuang et al. 2014). However, electro-osmotic consolidation took only 36 days, including 16 days of intermittence.

For vacuum consolidation, theoretic limit of bearing capacity is 1 atm (~100kPa) and practical limit is around 80kPa considering the vacuum loss. Therefore, practically vacuum consolidation can achieve bearing capacity of 50~60kPa for maxima and it would take 3~6 months or even longer for the vacuum consolidation to complete.

Comparisons above shows that electro-osmotic consolidation is much quicker and can achieve better consolidation effect.

Potential market of EKG and challenge of large scale application

The innovation of EKG and development of electro-osmosis theory are inspiring enthusiasms now in China for research on electro-osmotic consolidation. Land reclamation often produces tens of thousands square meters of soft ground to be consolidated. Therefore, potential opportunity for EKG is huge.

Challenges for large scale application lie in the following aspects (Zhuang 2015).

1) Electric conductive filter and carbon migration from EKG

In order to provide a channel for dewatering, a filter is necessary for EKG. Ordinary geotextile filter will affect the conductivity of EKG board, so electric conductive geotextile was developed as a filter for EKG. It is a woven geotextile and made from the same conductive polymer as EKG board. The deficiency of this filter is that it is too thick

that under high lateral earth pressure the hydraulic conductivity is poor.

Another potential problem is the migration and loss of carbon from EKG electrode during electro-osmosis. This phenomenon has been reported by several researchers and it may affect long term effect of electro-osmotic consolidation. However, the author's latest in-situ experiment shew that EKG electrode lasts at least 2 months, which is much longer than other researchers' report. And 2 months is pretty acceptable for electro-osmotic consolidation.

2) Voltage loss along depth

Resistivity of EKG electrode is not negligible, so there is voltage loss along depth. Experiments show that consolidation effect is very good in 1 meter depth; effect is fair within 5 meters depth. For sludge deeper than 5 meters, electro-osmotic consolidation is still a challenge. For this challenge, new catalog of EKG, which is E-tube, is under developing.

3) Power source

Energy consumption of electro-osmotic consolidation is within 10kwh/m^3 , which is similar to that of vacuum consolidation. However, electro-osmotic consolidation is much quicker than vacuum consolidation and this indicates that energy input should be much quicker. Therefore, we can expect that electric power required for electro-osmotic consolidation is much higher. As a comparison, for hydraulic-filled sludge of 5m deep, electric power required for vacuum consolidation is around 10 watt/m^2 only, while 100 watt/m^2 is required for electro-osmotic consolidation.

This situation presents a challenge for design of electric power source. A DC power source of 80V/2000A for large scale application is big, heavy and expensive. The weight of power source topped up 1 ton (See Fig. 9). One possible solution is to use many small power sources, but number of power source is huge for large scale application and configuration and management of these power sources are still a problem.



Fig.9 DC power source for large scale application

4) Bearing capacity and cost

The cost of electro-osmotic consolidation is much higher than the cost of consolidation using PVD. The high cost is mainly due to the price of EKG. The price of EKG is 20RMB/m (~3USD/m), while the price of PVD is 1RMB/m (0.2USD/m) only. On this price, EKG is difficult to compete with PVD and electro-osmotic consolidation is suitable for urgent project under this situation.

There are two potential ways that EKG can compete with PVD. The first way is to lower the price of EKG and the second way is to further improve the effect of electro-osmotic consolidation. For deep hydraulic-filled sludge, secondary treatment after vacuum or surcharging consolidation is usually required. Using piles is the most popular way for the secondary treatment and piles are very expensive.

If bearing capacity after electro-osmotic consolidation can be improved to over 80kPa, so that the secondary treatment can be omitted then EKG would be very competitive.

Conclusions

The author's main contributions in research field of electro-osmosis are

- 1) Advance of electro-osmosis theory from both micro and macro perspectives (electric charge accumulation theory and energy analysis model), which provides a basis for design of electro-osmotic consolidation.
- 2) A patented novel EKG product that solved the problems of electrode corrosion and high electric energy consumption at the same time.
- 3) A specially designed automatic DC power source according to the new electro-osmosis theory that can help to achieve better electro-osmotic consolidation effect.

Acknowledgements

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Conference Reports

Report on the 1st National Symposium of VCI GS on Geosynthetics Technology and Applications Ha Noi, Vietnam, 5 December 2014

The 1st National Symposium on “*Geosynthetics Technology and Applications*” was successfully organized by Vietnam Chapter of International Geosynthetics Society (VCI GS) at National University of Civil Engineering (NUCE) on 5 December 2014. Remarkable results and photos were recorded at this Seminar.

There were more than one hundred participants from VCI GS’s members, Ministry of Transport (MOT), Ministry of Construction (MOC), Institute of Transport Science and Technology (ITST), professional associations and construction companies, lecturers and students from universities attending the seminar. Especially, four Ambassadors of International Geosynthetics Society (IGS) from Japan, India, Korea and Thailand delivered their papers at the seminar.

Speaking at the opening session, Dr. Nguyen Hoang Giang – Chairman of Vietnam Chapter of International Geosynthetics Society said that geosynthetics are now being increasingly used in the world for every conceivable application in civil engineering, namely construction of dams, embankments, canals, approach roads, runways, railway embankments, retaining walls, slope protection works, drainage works, river training works, seepage control, etc. due to their inherent qualities. This is due to limited awareness of this material utilities and development taking place in its use, especially in Viet Nam.

According to Prof. Dr. Chungsik Yoo - Vice President of IGS, the core purpose of the IGS is to provide the understanding and promote the appropriate use of geosynthetics technology throughout the world. Besides, IGS brings together individual and corporate members from all parts of the world in this field. At present, there are 41 national or regional chapters of IGS.



Dr. Nguyen Hoang Giang, Chairman of VCI GS



Prof. Dr. Chungsik Yoo, Vice President of IGS

The following topics were presented and discussed during the one-day seminar including:

- Geosynthetics Reinforced Soil Wall;
- Case Study of the Construction of Very High Reinforced Soil Retaining Walls in India;
- Confined-reinforced Subgrade to Reduce Differential Settlement of Road Pavement;
- Enhancement the Efficiency of Prefabricated Vertical Drain Using Vacuum and Heat Preloading;
- Introduction of Monitoring Equipment for Early Warning Landslide Risks in Hai Van;
- Failure Gravity Wall and Suggestions;
- Applying Neoweb Cellular Con-

finement System for Infrastructure Constructions in the Mekong Delta;

- Overview of Landslide of Western Section of Ho Chi Minh Route in Dac Rong-Thach My, Reasons and Solutions.

All eight papers above presented at the seminar and two more papers on “The Current State of the Ground Anchor Technology in Japan” and “Shear Strength of Concrete-Clay Interface with Reference to Concrete Surface Roughness” are published in the proceedings with ISBN No. 978-604-82-1399-2.



Discussions

During the day of the seminar, there were always questions and answers between presenters and the participants after each presentation creating the active atmosphere and interesting discussion. So, this is a good opportunity for experts and students of Vietnam to approach and develop the Geosynthetics technologies in Vietnam. On the other hand, the international experts have better understanding the current situation of geosynthetics technology and learn specific cases and incidents of risky projects in Viet Nam. The experts shared their valuable experiences for

Vietnamese audience.

The IGS's Ambassadors also held lectures at Hochiminh University of Technology on 4th December 2014. This is also an activity of Vietnam Chapter of International Geosynthetic Society in this first National Symposium.

In summary, the 1st National Symposium of VCIGS on "Geosynthetic Technology and Applications" has been successfully organized and created a global network for professional experts in the field of Geosynthetic technology. Viet Nam is facing natural disaster frequently with storms and landslide. However, it can be reduced and mitigated by taking advantages of geosynthetic technology and its applications.

Reported by

Dr. Nguyen Hoang GIANG, Chairman of VCIGS



Participants of seminar

Geosynthetics 2015

Portland, Oregon, USA, 15 – 18 February 2015

Geosynthetics 2015, under the auspices of the International Geosynthetic Society, was held February 15 - 18, 2015 in Portland, Oregon (USA). This biennial event explored advances and innovations shaping civil, geotechnical, and geo-environmental communities.

The conference was organized by the Industrial Fabrics Association International and was co-located with the International Erosion Control Association's **Environmental Connection Conference**. The combined conference was attended by more than 2,700 attendees and more than 240 exhibitors, becoming the largest event of its kind in North America.

In addition to a two day exhibition, the conference included in-depth educational components including technical sessions and six full-day short courses offering participants professional development hours. The conference also featured the launch of the Introduction Series for new users to learn about the basics of geosynthetics.

Plenary Sessions included:

- Oso Landslide Causes, Implications and Prevention Options by Dr. Scott Burns of the University of Oregon
 - Reconstruction of State Route 530 after the 2014 Oso Landslide by Shaun Stauffer of GeoEngineers, Inc.
 - Geosynthetics Installation Panel Discussion hosted by Boyd Ramsey of GSE
 - Geosynthetics Growth Panel Discussion hosted by Dr. Stan Boyle of Shannon & Wilson
- Complete proceedings are available at www.ifai.com/store.

Key participating members in the conference included the North American Geosynthetic Society, American Society of Civil Engineers, American Society for Testing and Materials, Federal Highway Administration, Geosynthetic Institute, International Association of Geosynthetic Installers, and the Transportation Research Board.

As part of the conference, the annual meeting for the North American Geosynthetic Society was held. This meeting saw the appointment of a new Board of Directors. Members of the 2015-2017 BOD are:

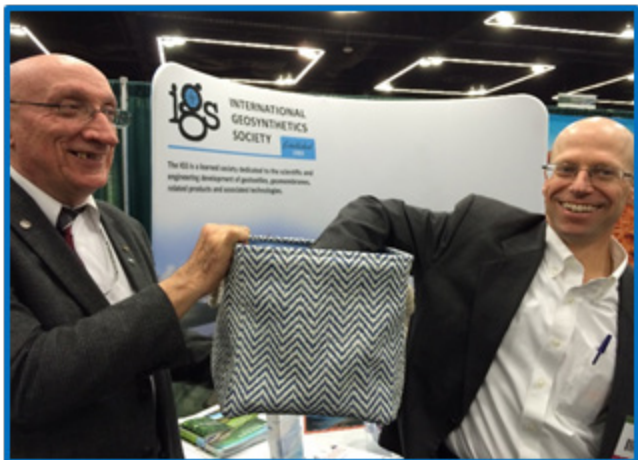
John Henderson P.E., President
Dr. Richard Brachman, President Elect
Corey Bobba, P.E., Treasurer
Robert Mackey, P.E., Past President

Dr. Stan Boyle, P.E, Vice-President
Michael Bernardi, Vice-President
Gabriela Mariscal, Vice-President
Dr. John S. McCartney, Vice-President
Dr. Dhani B. Narejo, P.E., Vice-President

Also discussed in detail at the annual meeting was the upcoming GeoAmericas 2016, hosted by the North American Geosynthetic Society, which will be held 10-13 April 2016 in Miami Beach, Florida (USA). The conference is now accepting abstracts at www.geoamericas2016.org.

GeoAmericas 2016 is just around the corner!

At the Geosynthetics Conference in Portland, USA the GeoAmericas 2016 Conference held a raffle for **TWO full complimentary registrations**. The basket of entries was held by David Suits, Co-Secretary General of the Conference while Stan Boyle of the IGS North America BOD pulled the winning names. We were pleasantly surprised to see that two ladies were the winning recipients!



David Suits and Stan Boyle drawing the winners

The winners are:



Shannon D. Hudson, P.E. Maxwell
Supply Company



Carissa R. Agnese, CEP, ENV SP
SKW Contractors

Reported by

John Henderson, President of the North American Geosynthetics Society (NAGS)

Announcements of Regional Conferences of IGS

GeoAmericas 2016 3rd Pan-American Congress on Geosynthetics Miami Beach, USA, 11 – 14 April 2016



The 3rd Pan-American conference will continue the GeoAmericas tradition of excellence, providing a forum for engineers, practitioners and academe from the Americas to explore current and future potential applications for geosynthetics. It also offers an active marketplace for the promotion of geosynthetic products and technologies to users throughout the Americas.

GeoAmericas 2016, the 3rd Pan-American Conference on Geosynthetics, will be held at the Lowes Hotel on South Beach in Miami, Florida. The 3rd Pan-American conference will continue the GeoAmericas tradition of excellence,

providing a forum for engineers, practitioners and academe from the Americas to explore current and future potential applications for geosynthetics. It also offers an active marketplace for the promotion of geosynthetic products and technologies to users throughout the Americas.

GeoAmericas 2016 is developing a program to advance the knowledge and understanding of geosynthetics at every level, from novice to expert. All will be provided with an opportunity to gain and share knowledge. Considering the diverse range of interests and applications, the conference has chosen not to isolate a theme; rather, the event will facilitate learning and dialogue on the key issues faced by geosynthetic communities throughout the Pan-American region.

Geoamericas 2016 will be hosted by NAGS managed by Minerva-Technology and held under the auspices of IGS.

Call for Abstracts now open! Submit today

Abstract due date EXTENDED to: 10 APRIL 2015

Abstracts in English of up to 400 words are invited on all applications utilizing geosynthetics. Topics include, but are not limited to:

- Mining
- Water and Wastewater
- Roads, Ports, and Railways

- Slope Stability & Reinforced Structures
- Sustainability
- Tunnels
- Durability of Geosynthetics
- Waste Management
- Testing
- Quality Control & Quality Assurance(Construction and Manufacturing)

Special Session Topics

- GeoAmericas 2016 will host some special sessions. Abstracts are welcomed for special sessions consideration. They include: Geosynthetic Stabilized Earth Walls with Clay as Reinforced Soil: Opportunities, Challenges and Experience
- Finite Element Seepage Analysis Involving Geosynthetics
- Limited Life Basal Reinforcement for an Embankment Built on Saturated Soft Clay
- Installation Aspects of Soil Reinforcement Applications
- Mechanically Stabilized Earth Walls and Embankments Adjacent to Existing Structures - Design and Construction
- Atypical Obstacles in Reinforced Earth Design
- Lessons Learned From Failures
- Geomembrane Stress Cracking Resistance Using Various Polymers
- Geosynthetics in Energy Applications
- Geomembrane Welding: What Have We Learned Over the Years
- Geosynthetic Assets: Maximizing Your Return-on Investment
- To Use or Not: Geosynthetics in Permanent Mining Structures, as Waste Dumps and Tailings Dams

Important Dates

- **10 APRIL 2015: Abstract Due Date EXTENDED!**
- **01 Aug 2015:** First draft of papers due
- **15 Sep 2015:** Reviews complete
- **30 Nov 2015:** Final papers due
- **15 Jan 2016:** Authors must be registered, papers to proceedings

For more information please contact

GeoAmericas 2016, Phone: +1.561.768.9487

Email: BSlaybaugh@MinervaTRI.com

Website: GeoAmericas2016.org

EuroGeo6 6th European Regional Conference on Geosynthetics Istanbul, Turkey, 25 – 28 September 2016



The Turkish Chapter of IGS joyfully announces that the 6th EuroGeo Conference will be held on 25 - 28 September 2016, under the auspices of the IGS, in the unique city of Istanbul. After Maastricht (1996), Bologna (2000), Munich (2004), Edinburgh (2008) and Valencia (2012), the profession will convene in Istanbul.

Congress Venue will be the Istanbul Convention Center, located in a central region, which is called by the name of Congress Valley in Harbiye. Istanbul is situated in a location that international airlines may easily reach - Atatürk Airport (recommended) on the European Side and Sabiha Gökçen Airport on the Anatolian Side. Local transport to ICC is easy with mass transportation vehicles such as metro, tram, bus and metrobus.

Naturally, the main excitement of the Conference will be in its technical contributions. Undoubtedly, the time period between now and 2016 will bring new materials and reforms to the geosynthetics industry; all of these developments will be well reflected in the scientific program of the EuroGeo6 Conference.

We are looking forward to seeing academicians, manufacturers, practitioners and designers in the geosynthetics field at EuroGeo6. We want to extend a special invitation to engineers in general contracting firms, who will widely benefit from the Conference by learning more about the extraordinary financial and technical advantages geosynthetics provide. In an environment where the number of "Design-Build" and "Build-Operate-Transfer" types of contracts all around the world is multiplying, passing on such information to general contractors becomes of great importance

As the months leading up to the Conference unfold, you will be provided with more information. We can guarantee that the EuroGeo6 Conference in 2016 will be an opportunity for all who attend to experience a valuable technical

program, a magnificent city, and warm Turkish hospitality.

Important dates

- 30 May 2015:** Abstract submission begins
- 30 Oct. 2015:** Deadline for submission of abstracts
- 01 Nov. 2015:** Early Bird registration opens
- 15 Dec. 2015:** Notification of provisional acceptance, based on abstract
- 31 March 2016:** Deadline for paper submission
- 15 June 2016:** Notification of paper acceptance, review comments provided
- 15 July 2016:** Early registration closes
 - Deadline for revised paper submission
 - Deadline for registration of at least one of the authors for paper to be published
- 25 Sep. 2016:** Conference opens

Proposed Sessions

Geosynthetics in

- Roads, Railroads and Other Transportation Applications
- Hydraulic Applications
- Mining
- Landfills
- Reinforced Walls and Slopes
- Direct and Life-cycle Cost Savings
- Environmental Benefits
- Sustainability
- Durability
- Innovations and New Developments
- Drainage and Filtration
- Polymeric and Clay Geosynthetic Barriers
- Properties and Testing
- Physical and Numerical Models
- Monitoring
- Quality Control and Quality Assurance
- Wastewater and Fresh Water Storage
- Embankments on Soft Soils
- Seismic Applications
- Coastal Protection
- Pavements
- Unpaved Roads
- Light-Weight Construction
- Agricultural Applications
- Geosynthetics as Formwork

For more information

Please consult the conference website, <http://www.eurogeo6.org/en/> for the latest announcements.

Contact info@eurogeo6.org with questions.

GeoAsia6 6th Asian Regional Conference on Geosynthetics New Delhi, India, 8 – 11 November 2016



India is a fast developing economy requiring large scale infrastructures. Liberalization of the economy has further facilitated planning and execution of many large scale infrastructures, including roads, railways, power and water resources, which will further promote applications of Geosynthetics for infrastructural works. Spending in XII Plan (2012 - 17) in infrastructure is estimated to be USD 01 Trillion, which is expected to grow for infrastructure

activities for the XIII Plan (2017 - 2022).

6th Asian Regional Conference would be a step towards providing opportunity for exchange of experiences, practices and collaborations to facilitate flow of appropriate technology to enable successful implementation of infrastructure projects. It will be organized by the Indian IGS Chapter under the auspices of the IGS.

Main Theme of the Conference

Geosynthetics for Infrastructure Development

Sub-Themes

- Roads and Railways
- Hydraulic Applications

- Ground Improvement and Slope Stability
- Erosion Control
- Environmental Applications
- Natural Fibre Geotextiles
- Geosynthetic Testing

Call for papers

All concerned wishing to present paper(s) on sub-themes/allied sub-themes of the Conference are requested to send the synopsis(es) of their proposed paper(s) in English to the Conference Secretariat.

Only original contributions that have not been published, or presented at other events, need to be submitted.

Important Dates

Submission of abstracts	31 July 2015
Acceptance of abstracts	15 September 2015
Submission of full-length papers	15 February 2016
Submission of revised papers after review	15 July 2016

Workshops/Short Courses

IGS Training Courses and Workshops on the relevant issues of interest are planned for the days of the meetings of IGS Council and IGS Committees Meetings, preceding the conference.

Keynote and Theme Lectures

Internationally renowned experts will be invited to deliver keynote and theme lectures.

Exhibition

It is proposed to organize an Exhibition, concurrent to the Technical Sessions. Corporate Members of IGS will be given preference and allowed discount of 25% on the normal tariff.

Technical Visits

They will be planned to major Geosynthetics/Geotechnical Projects

For more information see

www.seags.ait.asia/news-announcements/11704/

Announcements of Conferences under the Auspices of IGS

15th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering (15ARC)

Fukuoka, Japan, 9 - 13 November 2015



Call for abstracts for Special Session on Geosynthetics Engineering at 15ARC, Fukuoka, Japan

The 15th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering (15ARC) will be held at Fukuoka, Japan, 9 -13 November 2015 under the auspices of the JGS (Japanese Geotechnical Society).

A special session on Geosynthetics Engineering will be organized in collaboration with IGS. The call for abstracts for this special session is now open. The IGS members are invited to submit paper abstracts by 30 September 2014 to 15tharc@kumamoto-u.ac.jp.

Please check the conference official website (<http://www.15arc.org/index.html>) for more details about the format of the paper abstracts.

News from the IGS Chapters and the Membership

4th IGS UK Chapter Symposium – Geosynthetics in Pavement Engineering: Working towards 2015

Loughborough University, Leicestershire, UK, 22 April 2015



The IGS UK Chapter is pleased to announce its Fourth National Geosynthetics Symposium, with the theme Pavement Engineering. It will be held on 22nd April 2015 at Holywell Park, Loughborough University.

The aim of the symposium is to share knowledge of the sustainability of Geosystems in civil engineering. The keynote lecture on behalf of the Government will be undertaken by the Government Chief Construction Advisor, Peter Hansford who will introduce the philosophy of “Construction 2025” with a particular emphasis on sustainability.

There will then follow a series of presentations to provide the views and experiences of a main contractor, main consultant, academia, and finally professionals from the geosynthetic and road surfacing industry highlighting the sustainable geosynthetic solutions offered in pavement engineering.

The overall aim of the symposium is to show the delegates that in 2015 and moving towards 2025 that geosynthetic construction can provide proven sustainable solutions in terms of whole life costs and carbon emissions compared to what are often considered more ‘traditional’ construction methods.

Confirmed speakers and programme

Key Note Speech:

- Peter Hansford (Government Chief Construction Advisor): Government overview of Construction 2025 with an emphasis on sustainability

Further Speeches:

- Dr Bachar Hakim (URS): Consultants view of the role of sustainability in pavement engineering
- Thomas Faulkner (Skanska Plc): Contractors view of the role of sustainability in pavement engineering
- Prof. Jorge Zornberg (University of Texas): Overview of geosynthetics in pavements
- Peter Assinder (HUESKER Synthetic GmbH): Current specification for geosynthetics in pavement engineering
- Ian Fraser (TCS Geotechnics): Sustainability of geosynthetic solutions in unbound pavement layers and drainage
- Dr Howard Robinson (Road Surface Treatments Association): Sustainability of geosynthetic asphalt solutions
- Dr Gary Fowmes (Loughborough University): Summary and close

For more details please contact:

Katarzyna.Zamara@fccenvironment.co.uk

RemTech 2014

8th Remediation Technology Exhibition and Conferences

Ferrara, Italy, 17 - 19 September 2014

From Wednesday 17 to Friday 19 September 2014, the 8th edition of **RemTech Expo** – Remediation Technologies Exhibition and Conferences, took place in Ferrara, Italy, with the auspices of various leading societies, including the IGS Italian Chapter (AGI-IGS).

RemTech Expo is an unique event entirely dedicated to remediation techniques and to territory requalification, the ideal place for meetings between operators, manufacturers, contractors, institutions and academics, in order to build together workable solutions for the environment. Other qualifying elements of this 8th edition was the special section **Coast Expo Esonda 2014**, 5th edition, dedicated to soil stabilisation, coastal protection and in particular to dredging issues, and also the special section **Inertia 2014**, 3rd edition, dedicated to construction and demolition waste recycling issues.

Four thousand visitors and one hundred and eighty exhibitors from all over Italy, but also from a lot of foreign countries, that show a **10% increase** compared to the previous edition; **foreign official delegations** from China, Brazil, Russia and South Africa; **four hundred among the world's leading experts** in sediment management and sustainable remediation; **over one hundred conference sessions** on remediation, innovation, hydrogeological instability and hydraulic risk, excavation materials, quarries, redevelopment of the building stock.



Registration at RemTech 2014

It's definitely active the balance sheet of the eighth edition of **RemTech Expo**, the more specialized event in Italy on reclamation of contaminated sites and requalification of the territory.

Renewed exhibition area was in fact characterized by almost 180 booths, coming from the sectors of characterization, analysis, remediation, monitoring, demolitions, general contractors, dredging, geosynthetics, asbestos, requalification, insurances, services, design companies and environmental communication firms.

At least 12 booths were related to geosynthetics manufacturers, distributors and applicators.



RemTech 2014 Awards Presentation

At the end of the Opening Conference chaired by Daniele Cazzuffi, coordinator of the RemTech Scientific Committee and IGS Past President, the ceremony of the sixth

RemTech Degree Awards took place. The Awards were assigned to the six best theses discussed in Italian Universities from 1 January 2013 to 15 July 2014 and related to reclamation technologies items: in particular, two were related to PhD thesis, while four were referred to Master thesis.

The focus of RemTech was not only represented by the exhibition, but also by 12 Official Conferences, coordinated by the Scientific Committee and by the Advisory Committee.

The **Proceedings of the Official Conferences** (editors: Daniele Cazzuffi and Ilaria Pietrini) are available on a CD-Rom (with ISBN number) containing 64 papers for a total of 468 pages published by DEA Edizioni: the proceedings are available at a cost by contacting info@deaedizioni.it

Four foreign official delegations were represented at RemTech 2014, with official delegations coming from China, Brazil, Russia and South Africa: these official delegations were organized by the Emilia-Romagna region and by the Italian Trade Promotion Agency (ICE).

Following a tradition started in 2011, a



Gala Dinner at RemTech 2014

Gala Dinner was organized on Thursday 18 September in one of the most beautiful old and historical buildings in Ferrara: the atmosphere was quite unique and resulted in a great success of the evening.

RemTech has confirmed his own place vocation where institutions, specialized companies, associations of category, university world (teachers, but also students and researchers), contractors and operators can dialogue, compare and collaborate at most high levels, creating a true community in the broad and interdisciplinary field of remediation technologies.

Next edition of **RemTech** (www.remtechexpo.com) will be in **Ferrara from 23 to 25 September 2015**.

See you at RemTech 2015 in Ferrara!

Reported by

Daniele Cazzuffi, IGS Past President, and Coordinator of RemTech Scientific & Advisory Committees

News from the Peruvian IGS-Chapter

Last year the Peruvian IGS-Chapter organized several Technical Lectures, which were held at the College of Civil Engineers from Perú. The lectures were attended by a number of 70 to 90 participants, each.

Title of the events and the dates were:

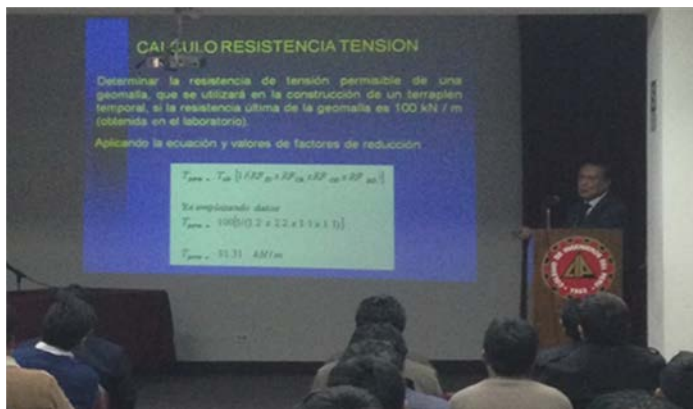
Pavement Design: past, present and future	08 September 2014
Geosynthetics design in mining	21 October 2014
Geosynthetics design for dams in mining	22 October 2014
Geosynthetics solutions for soil stabilization in roads	07 November 2014
Design through specification with geotextile, application and correlation of the AASHTO M288 and MTC EG-2013	09 December 2014

The technical lectures were given by:

- Eng. Bryan C. Gee (Product Manager at TENSAR - USA)
- Eng. Civil Boris Castillo Benavente (Project Manager at GEOSERVICE Engineering – Perú / Past President for Peruvian Chapter- International Geosynthetic Society)
- Eng. Civil Miguel De La Torre Sobrevilla (General Manager at GEOSERVICE Engineering – Perú / Past President for Peruvian Chapter- International Geosynthetic Society)
- MSc. Marco Antonio Montalvo Farfán (Project Manager at CESEL S.A. - Perú/ 1st Vicepresident for Peruvian Chapter- International Geosynthetic Society)
- Eng. Civil Néstor Alex Sifuentes Boggio. (General Manager for Geotextile fabric at Geosistemas Pavco / Secretary for Peruvian Chapter- International Geosynthetic Society)



Eng. Bryan C. Gee in pavement design lecture

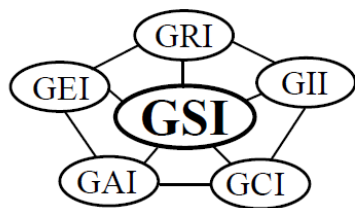


Eng. Miguel De La Torre Sobrevilla giving the lecture about Geosynthetics for dams in mining.

Reported by

Augusto Alza, Peruvian IGS Chapter President

GSI Fellowship for Graduate Students



Request for Proposals

The Geosynthetic Institute (GSI) is delighted to announce a worldwide call for requests-for-proposals (RFPs) focusing on innovative geosynthetics research and development projects. There will be numerous awards given, each for \$5,000. (**Note that this is a change from previous years of the program in that the terms are different and that the students can be pursuing either masters or doctoral degrees**) Emphasis will be placed on relevant topics of interest and/or concern to the geosynthetics community. A list of possible topics (there are obviously many others) is available upon request. The proposals must be submitted in the following four page format (with no exceptions).

- Page 1 – Letter of recommendation from student's department head or advisor
- Page 2 – Title and detailed abstract of proposed project
- Page 3 – Student's resume
- Page 4 – Relevancy of topic to the geosynthetics community

The RFPs for the 2015-2016 academic year must be submitted to the undersigned by e-mail by June 12, 2015. Awards will be announced on, or before, July 30, 2015. Review of the proposals is by the nine-person Board of Directors of GSI. For information on the Geosynthetic Institute and past recipients, visit us at the following website: www.geosynthetic-institute.org/gisfellows.htm

Reported by

Jamie R. Koerner, Special Projects Coordinator, jrkoerner@verizon.net

Educate the Educators on Geosynthetics in Portugal Lisbon, 29 - 30 June 2015

The second course in Europe of "Educate the Educators" on Geosynthetics will take place in Lisbon from Monday June 29th to Tuesday June 30th. The workshop is being organized by the Portuguese Chapter of the IGS under the auspice of the International Geosynthetics Society and in cooperation with the Portuguese Geotechnical Society (SPG).

The event is being prepared for 35 attendees representing the Portuguese Universities and Polytechnic Schools of Engineering. Apart from IGS financial support, six sponsors (Atarfil, Bianchini, Huesker, Quinimar, Naue and Renolit) are already confirmed. The financial support of other companies is welcomed.

The organizing committee expects that the support given by IGS and the economic support of the sponsors will make the participation possible without costs for the attendees.

The course will be composed of several lectures given by three experts in geosynthetics engineering:

- Prof. Jorge Zornberg
- Prof. Erol Guler
- Dr.-Ing. Michael Heibaum

The lectures will cover different applications of geosynthetics in geotechnical, transportation, hydraulic and environmental problems.

Reported by

Castorina Silva Vieira, Secretary of IGS-Portugal

1st Algerian Congress on Geosynthetics Algiers, Algeria, 28 - 29 January 2015

The first Algerian Congress on Geosynthetics was held in Algiers, Algeria, on 28 - 29 January 2015 under the auspices of the Ministry of Higher Education and Scientific Research. 120 delegates from various parts of the country attended the congress in addition to delegates from France.

The conference program featured an opening ceremony in which Mr Zahir Djidjeli (President, Algerian Geosynthetics Association), Professor Mahmoud Bensaïbi (Director of the National School of Public Works, congress host representative) and Professor Malek Bouazza, Monash University, Australia (IGS representative) addressed the audience.

Five technical sessions took place over the duration of the congress and included presentations on the state of the practice on geosynthetics in Algeria, use of geosynthetics in coastal protection, reinforcement of airfields and pavements, slope reinforcement and stability, waste containment facilities, reinforced embankments, and filtration and drainage in infrastructure projects. The technical exhibition featured a strong presence of geosynthetics manufacturers, suppliers and consultants (11 exhibitors) coupled with a visit to a nonwoven geotextile manufacturing plant where delegates had the opportunity to observe the different steps taken to make nonwoven geotextiles.

Parallel to the technical activities, the Algerian Geosynthetics Association AGM took place on 28 January 2015.

The congress successfully brought together people working in industry, academia and the public sector to discuss the latest ideas and developments in geosynthetics and related fields.

Reported by

Prof. Malek Bouazza, IGS representative



Algerian Geosynthetic Association (ASAG) officers presiding over the AGM held on 28 January 2015

GIGSA becomes the first IGS Chapter to select a majority of IGS Young Members onto 2015 - 2016 Council Committee

Since the creation of the Young IGS Members (YIGS) committee which was launched at Eurogeo 5 in Valencia, Spain in September 2013, the YIGS members have strived to make their presence known within the IGS community, and becoming involved at all levels possible, from local chapter involvement, assisting in regional conferences organisation as well as interaction and reporting back with the IGS council members at council meetings.

GIGSA (the IGS chapter of South Africa) is the first IGS chapter to have incorporated a majority of YIGS members in its recent November 2014 elections for council members for 2015 – 2016 term. The election allows for 10 council members to be selected onto the chapter committee for a two year term. The GIGSA community voted for 7 YIGS members onto its council committee, who has occupied the following portfolios;

- Edoardo Zannoni – President
- Irene Nyirenda – Vice President
- Johann le Roux – Secretary
- Charl Cilliers – 2nd person responsible for technical portfolio
- Claire Flicker – Newsletter and Website portfolio
- Walter Meyer – Events portfolio
- Mel Briers – Regional representative for Western Cape

The other 3 members who were voted onto the committee are; Paul Pratt, Florian Hoertkorn and Colin de Bruyn as well as two co-opted members; Peter Legg and Falk Hedrich, and past president; Riva Nortjè, are well knowledgeable and experienced members who have been involved in the geosynthetics industry for over 15 years each and are eager to guide and mentor the YIGS members on the committee.

This has shown that GIGSA are determined to get more young members involved in geosynthetics and have by far set an exceptional example to the rest of the IGS industry on bringing YIGS members on board onto their council committee.

The criteria used to be recognized as a YIGS member is, that a member must be under 35 years of age and have an interest in geosynthetics through either as being a member through their regional chapter or a student member.

The aim of setting up this portfolio was to involve young members at an early stage of their studies or careers in activities and/or tasks of the IGS through their respective regional sub-committees.



GIGSA Council Committee 2015 - 2016 including the elected Young IGS Members

*Reported by
Irene Nyirenda, Vice President and IGS News Correspondent for GIGSA*

A New Approach to Conference Sponsorship at GeoAmericas 2016: Making a Difference in Haiti

One of the first things you usually receive when arriving at check-in for professional conferences is the organizational “give-aways” that accompany the conference introduction packages. Many times these items find their way to a dusty corner of the respective attendees’ desks or shelves after returning home from the conference. In an effort to continue with the focus of recent GeoAmericas conferences on sustainability, and to depart a bit from material “give-aways,” GeoAmericas 2016 (Miami) will utilize sponsorship in support of an internationally-backed, social development project in nearby Haiti.

This work will give the geosynthetics and larger geotechnical community a major development project to hang its hat upon and yield valuable promotion and goodwill long after GeoAmericas 2016.

Redesigning Charlier with Geosynthetics

Together with the nonprofit group Help for the Children Haiti (HFTC), GeoAmericas 2016 (www.GeoAmericas2016.org) plans to raise awareness and support construction of a school and orphanage in the town of Charlier. The project is located in an isolated locale approximately 3 hours’ drive west of Port au Prince.



Charlier is a seaside fishing community with a population of approximately 5,000 people. Only a central paved east-west road runs through the township with no access other than the nearby ocean. Unemployment is nearly 100% with no access to local businesses. Though the town has a public school, the institution only provides education for 1st through 5th grade and there is no opportunity to advance beyond this education level since only the Creole language is taught. National exams for continuing education beyond 5th grade are in French and Charlier children have no possibility of passing or receiving funding for further advancement.

On a larger scale, the 2010 earthquake that struck Haiti left a large population of orphans with limited family or means throughout the area.

Currently, HFTC is requesting support for the Kindergarten/1st grade school building. The larger Charlier will include a total of 4 phases to develop tary to Grade 12 and an orphanage to house 100 tion and job sustaining program will be implement-phases. There are also current efforts to establish township. Thus, in addition to the children who will of the school and orphanage, the master plan is to lic health, business, and agricultural development.

GeoAmericas 2016's organizers, the North Ameri-(NAGS) and Minerva – Technology, Resources & already taken the first steps in supporting the

Notably, NAGS has prepared drainage, erosion control, and sanitary development plans that have been integrated with the master development plans prepared by HFTC. The drainage and sanitary development plans of course make full use of geosynthetic products from erosion control to leach field related materials.

It is anticipated that geosynthetics for additional site stabilization will be needed as the project development commences since the location has a moderately sloping gradient. These design steps are being followed with construction material acquisition, volunteer and local labor, and monetary support.

GeoAmericas 2016 & HFTC involment

As GeoAmericas 2016 approaches, the conference will structure its sponsorship packages to include support for this project. Sponsorship packages will support the project by contributing funds, geosynthetic materials and labor. Corporate members of the IGS and those exhibiting at GeoAmericas 2016 are ideally suited to put their products into practice as a measure of social and environmental sustainability for a part of the Caribbean where access to such materials is limited.

Conference organizers will create a short video during construction to capture the geosynthetics in action. This video will be used by the conference, the event host IGS chapter, and the sponsors to demonstrate the sustainability and durability of geosynthetics in the ground and in the community.

The model for volunteer support developed by HFTC has week-long volunteer trips. Volunteers (or their organizations) pay for airfare to and from Port au Prince plus \$1,000 each to cover food, lodging, car transport, and material costs on site. At present 10 volunteer teams are being arranged to address the construction needs of Phase I.

Volunteers will team up with local labor from Charlier to provide adequate means to complete the needed parts of the construction while enabling cultural interaction.

Take action

This is an exciting chance to see a nearby part of the world that many people have never had the opportunity to see, and to provide support for sustainable growth in a community instead of limited sponsorship to even handouts.

The charm of the people of Charlier and the simple beauty of this beach community are an additional benefit, if you take the opportunity to be a construction member volunteer.

Additional announcements regarding these support opportunities are forthcoming. please contact Elizabeth Peggs (elizabeth@geosynthetica.net) of Minerva for more information. Also, sign up for the GeoAmericas 2016 newsletter at www.GeoAmericas2016.org for event updates, including on the international project in Haiti.

Per the IGS Conference Guidelines, all IGS Corporate Members will have first opportunity to access Exhibits and Sponsorships for the conference. The Exhibits and Sponsorship package will be released on or before 1 April 2015. Information on individual volunteer opportunities may contact Robin Fillmore (robin.fillmore@gmail.com) or John Sankey (jsankey@reinforcedearth.com) of HFTC.

Reported by
By John Sankey



Phase I construction of a master plan for the site in a school campus for elemen-children. A parallel job created as part of each of the a local health clinic in the benefit from the construction create opportunities for pub-

can Geosynthetics Society Information Minerva), have Charlier project.



List of IGS Chapters

Country	Name of IGS Chapter Year of Foundation	IGS Chapter President	webpage further email address
Argentina	Argentinean Chapter 2009	Dr. Marcos Montoro marcos_montoro@yahoo.com.ar	www.igsargentina.com.ar/
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Greece	HGS, Greek Chapter 2005	Prof. Dimitrios K. Atmatzidis dka@upatras.gr	under complete reconstruction!
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Malaysia	Malaysian Chapter – Per tubuhan IGS Malaysia (MyIGS) 2013	Dr. Fauziah Ahmad cefahmad@yahoo.com	dtan@solmax.com

Country	Name of IGS Chapter Year of Foundation	IGS Chapter President	webpage further email address
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United King- dom	U.K. Chapter 1987	Dr, Gary J. Fowmes g.j.fowmes@lboro.ac.uk	www.igs-uk.org
Vietnam	Vietnamese Chapter – International Geosynthet- ics Society – Vietnam Chapter (VCIGS) 2013	Dr. Nguyen Hoang Giang giangnh@nuce.edu.vn	trantrunghieu@utt.edu.vn

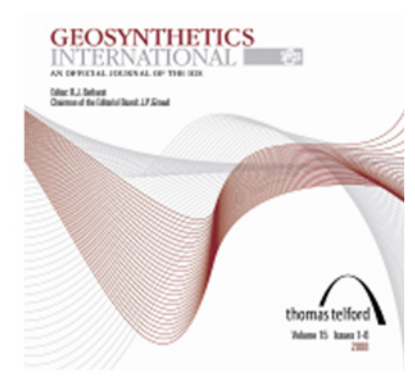
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Geosynthetics International is an official journal of the IGS and has established itself as a premier peer-reviewed journal on geosynthetics. The Journal publishes technical papers, technical notes, discussions, and book reviews on all topics relating to geosynthetic materials (including natural fiber products), research, behaviour, performance analysis, testing, design, construction methods, case histories, and field experience.

Geosynthetics International is only published electronically starting Volume 10 (2003) by ICE Publishing (Thomas Telford) and is free to IGS Members. All others, e.g., corporations, companies, and university libraries, can subscribe at a rate of £590 / US\$ 960.

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Introduction to special issue on geosynthetic clay liners II

Volume 22, No. 1, of *Geosynthetics International* is a special issue devoted to geosynthetic clay liners (GCLs). GCLs are manufactured products consisting of bentonite clay bonded to a layer, or between layers, of geosynthetic material. In the 33 years since the GCL was invented, acceptance of these products has grown to the point where they are now commonly specified in the design of waste disposal facilities and other facilities requiring hydraulic barriers. Acceptance has been rapid because GCLs offer many advantages over compacted soil liners, not the least of which is a lower cost for many applications. Equally rapid developments in manufacturing, testing, design, construction, and the regulatory environment have sparked research on various issues related to GCL performance. This special issue contains some of the latest research on the engineering behavior and performance of these unique barrier materials.

The *Special Issue on Geosynthetic Clay Liners II* represents a 10 year update to the original *Special Issue on Geosynthetic Clay Liners* organized by Dr Fox as guest editor in 2004. For this current effort, we decided to team as guest editors and then jointly invited submission of papers from leading international experts. These invitations produced 10 submitted manuscripts from which eight technical papers were ultimately accepted for publication. Each paper received rigorous peer review by two or more anonymous reviewers. This special issue provides our readers with coverage of a wide range of topics including: shear strength, hydraulic performance, chemico-osmotic behavior, internal erosion, bentonite migration, and thermal exposure conditions. The scope and content of some papers go beyond that typical for a journal article as the intent was to provide contributing authors with the flexibility to submit comprehensive papers if desired. The electronic format allows this impressive collection of papers to be published together as a single issue of *Geosynthetics International*.

This special issue of *Geosynthetics International* would not be possible without the high-level contributions of the contributing authors. We would also like to gratefully acknowledge the assistance of the Editor, R. J. Bathurst, and the Chair of the Editorial Board, J. P. Giroud, and the many reviewers who ensured that each paper met the high technical standards of *Geosynthetics International*.

Reported by

P.J. Fox; University of California-San Diego, USA

T.D. Stark University of Illinois at Urbana-Champaign, USA

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[State-of-the-art report: GCL shear strength and its measurement – ten-year update](#), P.J. Fox; T.D. Stark

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[Polymer-treated bentonite clay for chemical-resistant geosynthetic clay liners](#), G. Di Emidio; F. Mazzieri; R.-D. Verastegui-Flores; W. Van Impe; A. Bezuijen

[Hydraulic conductivity of a dense prehydrated geosynthetic clay liner](#), F. Mazzieri; G. Di Emidio

Please find the download of the articles at:

<http://www.icevirtuallibrary.com/content/issue/gein/22/1>

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Geotextiles & Geomembranes



Geotextiles and Geomembranes is dedicated to the mission of the IGS, which is to promote the scientific and engineering development of geotextiles, geomembranes, related products, and associated technologies.

The Journal publishes technical papers, technical notes, discussions, and book reviews on all topics relating to geosynthetics, research, behaviour, performance analysis, testing, design, construction methods, case histories, and field experience.

Papers should be submitted electronically as a Microsoft Word or pdf file to: kerry@civil.queensu.ca

Please ensure the text is double spaced, there is an abstract with keywords included, and tables and figures are at the end following the text. Please check the Journal's instructions for authors for additional information regarding submissions. The Journal strives to provide the authors with quick, constructive reviews, and we appreciate the author's hard work in addressing these comments and quick return of revised papers.

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IGSSec@geosyntheticssociety.org

For instructions on how to activate access and create your personal account, go the web site provided below.

A hardcopy of *Geotextiles and Geomembranes* is available at a reduced subscription rate to individual and Corporate Members of the IGS. Individual IGS Members may subscribe at an 84% discount: US\$170 for six issues. IGS Corporate Members may subscribe at a 64% discount: US\$396 for six issues. Please indicate that you are an IGS Member when requesting the special price.

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For direct connection to the home page of the journal with the possibility to download PDF-files of the full papers (IGS members and abonents only) please follow the link at the end of the following content listing.

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[Large-scale tests of pile-supported earth platform with and without geogrid](#), Haofeng Xing, Zhen Zhang, Huabei Liu, Hua Wei

[Behavior of strip footing on fiber-reinforced cemented sand adjacent to sheet pile wall](#), Ahmed M. Nasr

[Cyclic behaviour of dry silty sand reinforced with a geotextile](#), S.A. Naeini, N. Gholampoor

[Long-term settlement analysis of partially improved thick clay deposit](#), W.Y. Jang, S.G. Chung

[Effect of stress on water retention of needlepunched geosynthetic clay liners](#), H. Bannour, G. Stoltz, P. Delage, N. Touze-Foltz

[Interaction of antioxidants with carbon black in polyethylene using oxidative induction time methods](#), Wai-Kuen Wong, Y. Grace Hsuan

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[Influence of discrete fibre reinforcement on the uniaxial compression response and seismic wave velocity of a cement-stabilised sandy-clay](#), Nuno Cristelo, Vítor M.C.F. Cunha, Mónica Dias, António Topa Gomes, Tiago Miranda, Nuno Araújo

[Hydraulic performance of geosynthetic clay liners to sulfuric acid solutions](#), Y. Liu, A. Bouazza, W.P. Gates, R.K. Rowe

[In situ test and analysis method of air bulging under geomembranes in a shallow-lined reservoir](#), Cao Xue-shan, Yuan Jun-ping, He Gui-lin, Liu Ying-hao, Yin Zong-ze

[Experimental study on seismic response of geogrid reinforced rigid retaining walls with saturated backfill sand](#), Liyan Wang, Guoxing Chen, Su Chen

[Behaviour of geotextile filters in armoured slopes subjected to the action of waves](#), Ennio M. Palmeira, Janaina Tatto

[Validation of analytical models for the design of basal reinforced piled embankments](#), S.J.M. van Eekelen, A. Bezuijen, A.F. van Tol

[Modeling of the compaction-induced stress on reinforced soil walls](#), S.H. Mirmoradi, M. Ehrlich

[Experimental study on the inclusion of soilbags in retaining walls constructed in expansive soils](#), Liu-Jiang Wang, Si-Hong Liu, Bin Zhou

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Effect of polypropylene fibres on the compressive and tensile strength of a soft soil, artificially stabilised with binders, António A.S. Correia, Paulo J. Venda Oliveira, Dione G. Custódio

Effect of fine content on the pullout resistance mechanism of bearing reinforcement embedded in cohesive-frictional soils, Kampanart Sukmak, Patimapon Sukmak, Suksun Horpibulsuk, Jie Han, Shui-Long Shen, Arul Arulrajah

An analytical solution for contaminant extraction using well injection depth extraction technology, Xiao-wu Tang, Heng-yu Wang, Yan Wang, Qiang Tang, Peng-lu Gan

MSE walls as bridge abutments: Optimal reinforcement density, Yonggui Xie, Ben Leshchinsky

Behaviour of geotextiles designed for pervious pavements as a support for biofilm development, Joseba R. Bayon, Daniel Jato-Espino, Elena Blanco-Fernandez, Daniel Castro-Fresno

Shaking table tests on soil retaining walls reinforced by polymeric strips, A. Komak Panah, M. Yazdi, A. Ghalandarzadeh

Laboratory evaluation of flexible pavement structures containing geocomposite drainage layers using light weight deflectometer, Jean-Pascal Bilodeau, Guy Doré, Catherine Savoie

3-Dimensional numerical modelling of geocell reinforced sand beds, A. Hegde, T.G. Sitharam

Nonlinear consolidation of vertical drains with coupled radial-vertical flow considering well resistance, Mengmeng Lu, Shanyong Wang, Scott W. Sloan, Daichao Sheng, Kanghe Xie

Numerical study on ground improvement for liquefaction mitigation using stone columns encased with geosynthetics, Liang Tang, Shengyi Cong, Xianzhang Ling, Jinchi Lu, Ahmed Elgamal

Breakthrough time-based design of landfill composite liners, Yunmin Chen, Yuze Wang, Haijian Xie

Please find the download of the articles at:

<http://www.sciencedirect.com/science/journal/02661144>

For IGS members to have FREE access to the G&G journal articles they MUST log in through the IGS website.

Corporate Membership

Case studies – use the chance!

All corporate members are invited to announce a case study at any time. For each issue 3 to 4 case studies are planned to be placed in (up to 1 page with pictures). If there are more announcements we will place them on a list and will use them on a “first come, first serve” basis. A corporate member may have a second case study published if the list is finished with corporate members not been considered yet. As we know that some of our corporate members are very hard-working on such a type of publication, please be aware that the only possibility to prevent a publication series by one company is to send in your own case study!

With a distribution of more than 3000 samples/downloads of IGS News this is a good promotion of the geosynthetics technique and your company. We would be happy if this chance is used frequently.

Reported by

Gerhard Bräu, IGS News Editor

Base reinforcement for an arterial roadway for Eagle Mountain City



The Challenge

In Eagle Mountain City, UT, new middle and high schools were planned to be built adjacent to a new roadway. The engineer on the project wanted to stabilize the fine-grained subgrade soils which showed some potential to collapse (based on laboratory testing) and also to minimize the base aggregate requirements for the roadway. This road was expected to carry heavy traffic loads and high volume due to the new middle school and high school being constructed and also as an arterial roadway for Eagle Mountain City.

The Design

Using TenCate's MiraSpec Design Solutions Software, the engineer designed the roadway cross section and reduced the amount of granular borrow (engineered granular sub-base material) that would be required by five inches and allowed a cost effective alternative that would eliminate the granular borrow completely.

The Construction

This was a new roadway! The contractor cleared and grubbed the roadway area to subgrade level, reworked the upper 12 inches of fine grained subgrade soils by scarifying and recompacting to a minimum dry density of 95 percent of ASTM D-1557 (modified proctor) near optimum moisture. Then, TenCate Mirafi® RS580i* was laid and the new pavement section was built. The installation went smoothly and exceeded expectations during construction. The contractor pointed out that the installation of the single layer of material was much easier and quicker than the double layer system which had been used previously in similar applications and under similar conditions.



Base material being spread on Mirafi® RS580i



Mirafi® RS580i rolled out and overlapped appropriately



Mirafi® RS580i with base material

The Performance

The roadway is performing better than expected. The contractor and the city are very happy with the installation and performance of the material and roadway section. The engineer is also very pleased with the ease of design that the webbased software offers.



Phased construction - West lanes paved and open to construction traffic



Final lift of asphalt will be placed before open to final service.

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Geomembranes for Water Reservoir "Gsteng" - HDPE Liner for Geosynthetic project



Project date: Fall 2014

Location: St. Johann-Alpendorf (Austria)

Products: 22,400 m² HDPE Liner structured (MST HighGrip/MSB+), 2.5 mm - 7,000 m² HDPE Liner smooth, 2.5 mm - 659 m drainage pipes DA 160 (SDR 17) - 1,468 m PE pipes DA 160 (SDR 17)

Up to now small upstream water dispensers with a dimension of 50,000 m² were used for the 100 hectare snow area in Alpendorf. They consist of three small water reservoirs. In poor early winters a start to the season was only partly possible due to a very limited supply of passable ski routes. Therefore an economic hedging for the operator of the ski region and the tourist destination St. Johann-Alpendorf itself was not granted. An investment in the technology for the supply of artificial snow was essential.

The construction of the water reservoir "Gsteng", which was filled with 175,000 m³ water, was successfully completed in fall 2014. In future this reservoir provides the basement for a powerful artificial snow production St. Johann/Pongau and also to assure the amenity of this location as winter sports center. The execution of the work under difficult conditions in the alpine area was carried out by the installation company IAT (Kärnten).

The AGRU MICRO SPIKE HighGrip liner, is a further development of the MST+/ MSB liner that has proven reliability over the last decade. The position of the spikes were relocated and optimized on the one side and a total new form was developed on the other side. It is a promising product with more than 20,000 spikes per square meter on each side.

Product Catalogue Lining Systems: <http://www.agru.at/en/products/lining-systems/product-catalogue/>



Three Tanks in Talara Refinery, Perú



Project: Manufacturing, Assembly and Inter-connection three tanks of 120 MB in Talara Refinery (PETROPERU – Talara – Perú -2013)

Product: Geoweb® Geocellular Confinement System applied to reinforcement of foundations

The poor conditions of foundation due to the presence of loamy sandy materials of low bearing capacity and the high groundwater level in the area, restricted the foundation system used in storage tanks PETROPERU, reflecting in technical, constructive and economic difficulties.

It was considered to use large volumes of draining nature replacement material (more than 5.0m) to increase the bearing capacity of the soil and control high groundwater level founded in the area, it also had to control the settlement projected levels so that they were less than 5.0 cm, which were initially estimated without geosynthetic reinforcement in values of 10 cm including replacement material “over”.

A number of alternative solutions were suggested using geosynthetic system combining conventional materials.

The alternatives proposes using independently geogrids or geocells in combination with granular materials (affirmed) as reinforcement systems for the foundations of the project; discarding the alternative with geogrid due to high earthmoving needed (stuffed greater than 0.80 m) and the level of initial deformation needed to start working conscientiously (more than 10%). Finally we opted for the solution with Geoweb System, which showed better performance and functionality in the project; This was verified on having achieved low levels of earthmoving (less than 0.45m fillings), minimum deformation work (exchange liabilities and instantaneous tangential stresses applied to charges - three dimensional structure of confinement) and achieve settlements less than 5.0cm.

Conclusions:

Using the Geoweb System, allows to distribute the soil pressures and the external loads in an efficient way due to the confinement and the lower deformation capacity given to the soil.

The Geoweb System avoid the volumetric changes of the landfill material, confining it and providing a major area of contact and redistributing the efforts, dissipating thereby the loads.

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Engineering Brisbane's New Parallel Runway on Soft Subsoils



The Brisbane Airport Commission expects to handle 50 million passengers by 2035, a 138% increase over today. To safely accommodate the increase in passengers and the larger, more advanced, more frequent arrival of jets, the Brisbane Airport Commission (BAC) invested in the construction of a new parallel runway (NPR) system.

The airport lands are set upon 2700 hectares of former river delta. The soils are weak and often saturated. Traditional replacement and strengthening strategies, such as the time-intensive use of lime or cement stabilization, were deemed too expensive, especially since sand needed to be pumped in from 4.5 km away to cover 360 hectares to firm up the land on which the runway would be built. This represented one of the largest dredging operations ever proposed in Australia. The 5:1 sand/water mix required a large-scale pipeline, one which had to cross very soft soils, a water treatment site, and the active Brisbane Airport.

More than 100,000 m² of NAUE Combigrig® and Secugrid® welded biaxial geogrid were used to stabilize and reinforce the pipeline operation.

Large-scale testing by Perkins and Cuelho (2010 – 2014) has added to the field literature by Giroud and Han (2004) and been further supported by Shahkolahi (2014). These studies and designs demonstrate the importance of geogrid performance in pavement systems,



tems, with respect to durability against installation damage, achieving ultimate tensile strength, junction strength, etc. The required stiffness requires strength at low elongations (0.5 – 2%). At these low strains, suitable engineering values for stability/rigidity of the geosynthetic reinforcement are found, particularly for weak subgrades.

The stability and dependability of the dredging pipeline is essential to the future runway's construction, which will require 13 million m³ of sand and an estimated 8,000km of wick drains for soil consolidation.

The engineering required to transform these lands is impressive, especially for the infrastructure role to be

served, but the solution is not far from reach. Geosynthetics make the design achievable and more economical.

Article courtesy of GLOBAL SYNTHETICS, NAUE's partner in Australia!

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The International Geosynthetics Society was formed with the following objectives:

- to collect, evaluate, and disseminate knowledge on all matters relevant to geotextiles, geomembranes, related products, and associated technologies;
- to improve communication and understanding regarding geotextiles, geomembranes, related products, and associated technologies, as well as their applications;
- to promote advancement of the state of the art of geotextiles, geomembranes, related products, and associated technologies; and
- to encourage, through its Members, the harmonization of test methods, and equipment and criteria for geotextiles, geomembranes, related products, and associated technologies.

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First, to contribute to the development of our profession.

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- the online IGS Membership Directory, updated in real time;
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- 19 IGS Mini Lecture Series are available online;
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- preferential treatment at conferences organized by or under the auspices of the IGS; and
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Calendar of Events

Event	Location	Date	E-Mail, Website
4th IGS UK Chapter Symposium – Geosynthetics in Pavement Engineering: Working towards 2025	Loughborough, UK	22 April 2015	Katarzyna.Zamara@fccenvironment.co.uk
XVI African Regional Conference on Soil Mechanics and Geotechnical Engineering- Innovative Geotechnics for Africa	Hammamet, Tunisia	27 - 30 April 2015	organisation@cramsg2015.org www.16cramsg.org
ISP7 - PRESSIO 2015	Hammamet, Tunisia	01 - 02 May 2015	isp7_organisation@cramsg2015.org www.cramsg2015.org/isp7-pressio2015/?lang=en
International Conference CIGOS-PARIS 2015	Cachan, Ile de France, France	11 - 12 May 2015	secretariat@cigos.org www.cigos.org/
ISFOG 2015	Oslo, Norway	10 - 12 Jun 2015	isfog2015@ngi.no www.isfog2015.no
3 rd International Conference on the Flat Dilatometer DMT'15	Rome, Italy	14 - 16 Jun 2015	simona@marchetti-dmt.it www.dmt15.com
International Symposium on Geohazards and Geomechanics	Warwick, Coventry, United Kingdom	10 - 11 Sep 2015	C.Voulgari@warwick.ac.uk www2.warwick.ac.uk/fac/sci/eng/research/civil/geo/conference/
XVI European Conference on Soil Mechanics and Geotechnical Engineering	Edinburgh, Scotland, United Kingdom	13 - 17 Sep 2015	derek_smith@coffey.com www.xvi-ecsmge-2015.org.uk
Workshop on Volcanic Rocks & Soils	Isle of Ischia, Italy	24 - 25 Sep 2015	agi@associazionegeotecnica.it http://www.wvrs-ischia2015.it/
Geosintec 2 2nd Spanish Conference on Geosynthetics	Madrid, Spain	07 - 08 Oct 2015	Pedro.abad@igs-espana.com Beatriz.Mateo@igs-espana.com
Sardinia 2015-Fifteenth International Waste Management and Landfill Symposium	Cagliari, Italy	05 - 09 Oct 2015	info@sardiniasymposium.it www.sardiniasymposium.it
26 th European Regional Conference	Montpellier, France	11 - 16 Oct 2015	www.icid.org/26th_erc2015_info.pdf
Three Decades of Geosynthetics in India	New Delhi, India	14 - 16 Oct 2015	uday@cbip.org www.cbip.org
6 th International Conference on Earthquake Geotechnical Engineering	Christchurch, New Zealand	02 - 04 Nov 2015	6icege@tcc.co.nz www.6ICEGE.com
The 15th Asian Regional Conference on Soil Mechanics and Geotechnical Engineering - New Innovations and Sustainability	Fukuoka, Kyushu, Japan	09 - 13 Nov 2015	15tharc@kumamoto-u.a.c.jp www.igskyushu.net/uploads/15ARC/
Sixth International Symposium on Deformation - Characteristics of Geomaterials	Buenos Aires, Argentina	15 - 18 Nov 2015	http://saig.org.ar/ISDCG2015
15 th Pan-American Conference on Soil Mechanics and Geotechnical Engineering	Buenos Aires, Argentina	15 - 18 Nov 2015	presidente@saig.org.ar www.panam2015.com.ar
Geo-Environment and Construction European Conference	Tirana, Albania	26 -28 Nov. 2015	erion.bukaci@gmail.com erdi.myftaraga@hotmail.com lulibozo@gmail.com
International Conference on Soft Ground Engineering ICSGE2015	Singapore, Singapore	03 - 04 Dec 2015	ICSGE2015@nus.edu.sg www.geoss.sg/icsge2015
GIFT - Geotechnics for Infrastructure and Foundation Techniques	Pune, Maharashtra, India	17 - 19 Dec 2015	igc2015pune@gmail.com www.igc2015pune.in/GUI/index.aspx
The 1 st International Conference on Geo-Energy and Geo-Environment (GeGe2015)	Hong Kong	04 - 05 Dec 2015	gege2015@ust.hk http://gege2015.ust.hk
3rd PanAmerican Regional Conference on Geosynthetics	Miami South Beach, USA	11 - 14 Apr 2016	NAGSDirector05@gmail.com epiggs@minervatri.com
NGM 2016, The Nordic Geotechnical Meeting	Reykjavik, Iceland	25 - 28 May 2016	has@vegagerdin.is www.ngm2016.com
SEAGC2016	Subang Jaya, Selangor, Malaysia	31 May - 03 June 2016	seagc2016@gmail.com / choy.iemtc@gmail.com www.mygeosociety.org/SEAGC2016

Event	Location	Date	E-Mail, Website
GeoChina 2016	Shandong, China	25 - 27 July 2016	geochina.sec@gmail.com http://geochina2016.geoconf.org/
3rd ICTG International Conference on Transportation Geotechnics	Guimaraes, Portugal	04 - 07 Sep 2016	agc@civil.uminho.pt www.webforum.com/tc3
13 Baltic States Geotechnical Conference	Vilnius, Lithuania	15 - 17 Sep 2016	danute.slizyte@vgtu.lt www.13bsgc.lt
EuroGeo 6 – European Regional Conference on Geosynthetics	Istanbul, Turkey	25 – 29 Sep 2016	eguler@boun.edu.tr
6th Asian Regional Conference on Geosynthetics	New Delhi, India	08 - 11 Nov 2016	uday@cbip.org www.cbip.org
11th International Conference on Geosynthetics (11ICG)	Seoul South Korea	16 - 20 Sep 2018	csyoo@skku.edu

Note:

The conference announcements are shown with different graphics due to their priority for IGS:

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