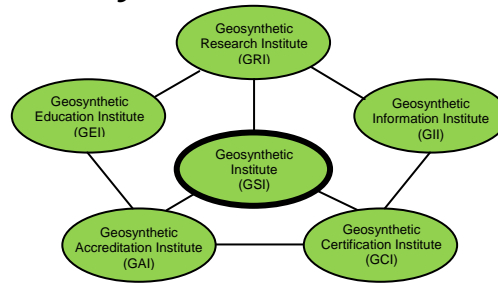


# The GSI Newsletter/Report

## Geosynthetic Institute



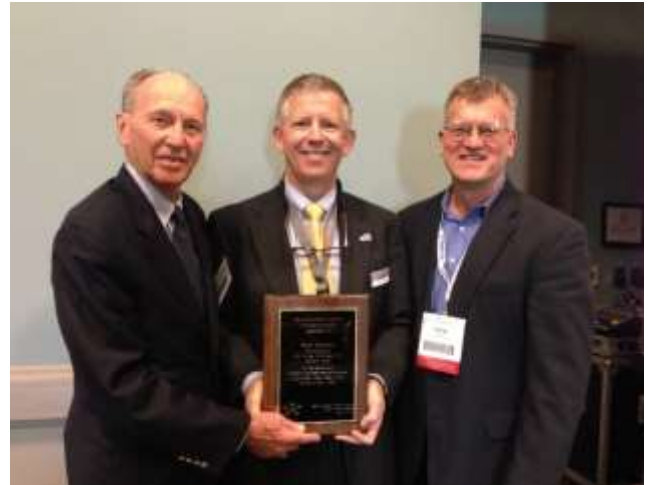
Vol. 27, No. 2

June, 2013

This quarterly newsletter, now in its 27<sup>th</sup> year, presents the activities of GSI and its related institutes to all who are interested. It is available on the institute's home page at [www.geosynthetic-institute.org](http://www.geosynthetic-institute.org). It also serves as a quarterly report to its member organizations. Details are available by contacting George R. Koerner or Marilyn Ashley at phone (610) 522-8440; fax (610) 522-8441 or e-mail at [gkoerner@dca.net](mailto:gkoerner@dca.net) or [mvashley@verizon.net](mailto:mvashley@verizon.net).

## Activities of GSI's Directors and Officers

1. We had our 25<sup>th</sup> Board of Directors meeting in Long Beach, California on April 1, 2013. The agenda was as follows:
  - Board and membership status
  - GSI's financial status
  - Recap of internal programs
  - Recap of external programs
  - Open Discussion
2. The BoD decided to reballot the geomembrane/GCL voting group member in light of the vacancy of Tim Rafter which was subsequently done with Boyd Ramsey of GSE winning the election... congratulations. His term is through 2014.
3. Nonpayment of membership fees was discussed and several organizations were dropped from membership.
4. The value of affiliated organizations to GSI was discussed.
5. In-house GSI courses, webinars and possible distance learning was discussed with favorable future outlooks.
6. Future BoD and Annual meetings will be held in conjunction with other conferences.
7. The 45<sup>th</sup> meeting of GSI was held in Long Beach on April 1<sup>st</sup> immediately prior to the BoD meeting. The GSI website in its password protected section gives the power point slides.
  - Tony Eith of Waste Management Inc. and Boyd Ramsey of GSI Environmental were given awards of merit... the following photo shows Bob, Boyd and George.



8. Webinars, webinars and more webinars are being presented – see the commentary in the last Newsletter/Report for the schedule in the months ahead regard.
9. The present BoD is as follows, along with their respective term ending year's.

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- The GSI Affiliated Institutes
- Items of Interest
- "Reflections on Geosynthetic Technical Publication Outlets"
- Upcoming GSI Events
- GSI's Member Organizations

### Term Ends 2013

- David Jaros - Corps of Engineers (Government Agencies)  
e-mail: [dave.l.jaros@usace.army.mil](mailto:dave.l.jaros@usace.army.mil)
- Lili Cui – Chevron Phillips Co. (Resin/Additive)  
e-mail: [cuil@cpchem.com](mailto:cuil@cpchem.com)
- Kent von Maubeuge - NAUE GmbH & Co. KG (International-1)  
e-mail: [kvmaubeuge@naue.com](mailto:kvmaubeuge@naue.com)

### Term Ends 2014

- Mark Sieracke - Weaver Boos (Consultants and Testing Labs)  
e-mail: [msieracke@weaverboos.com](mailto:msieracke@weaverboos.com)
- Boyd Ramsey - GSE (Geomembranes and GCLs)  
email: [Timr@atlanticlining.com](mailto:Timr@atlanticlining.com)
- Wayne Hsieh - NPUST and GSI-Taiwan (International-2)  
e-mail: [cwh@mail.npust.edu.tw](mailto:cwh@mail.npust.edu.tw)

### Term Ends 2015

- John Workman - Waste Management Inc. (Owners and Operators)  
e-mail: [jworkman@wm.com](mailto:jworkman@wm.com)
- Mark Wayne – Tensar Earth Technology (Geotextiles and Geogrids)  
e-mail: [mwayne@tensarcorp.com](mailto:mwayne@tensarcorp.com)
- Sam Allen – TRI Environmental Inc. (At-Large)  
e-mail: [Sallen@tri-env.com](mailto:Sallen@tri-env.com)

## **Overview of GRI Projects (Research)**

Each issue of our Newsletter/Report provides a brief glimpse and update of current GRI research projects. It will be noted that most projects are of a very long duration; one being up to 50-years! (In this regard short projects are given to design firms or testing laboratories that are GSI Members). Details and full briefings are available to member organizations at their request. Dr. Grace Hsuan, Professor of Civil Engineering at Drexel University can be contacted for additional information as can the other project managers listed in the following write-ups. **Projects marked with an asterisk have been written up as either short “in-progress” papers or complete papers.** Grace can be reached by email <[grace.hsuan@coe.drexel.edu](mailto:grace.hsuan@coe.drexel.edu)> or phone at (610) 522-8440.

**Important Notice:** Use of GSI/GRI generated data and information is for member organization use assuming that the information is not taken out of the context of which it was developed. When used for formal publications such as proposals, regulatory permits, brochures and advertisements we would appreciate seeing a draft copy for possible comments. Thank you for your cooperation in this regard.

1. **In-Situ Temperature Monitoring of Liner and Cover Geomembranes in Dry and Wet Landfills\*** - George Koerner is measuring the in-situ temperature behavior of liner and cover geomembranes and has installed 60± thermocouples for long term measurements in both wet and dry municipal solid waste landfills in Pennsylvania. The project has been extended into its 16<sup>th</sup>-year and has resulted in an extremely authoritative set of real-life data.
2. **Bioreactor (aka, Wet) Landfill Behavior and Properties\*** - One of the landfill cells mentioned in Item #1 is at field capacity, hence it is a true anaerobic bioreactor. Dr. George Koerner is in charge of considerable monitoring at this cell which includes the following
  - waste moisture content
  - waste temperature
  - leachate chemical analysis
  - waste gas analysis
  - perched leachate within the wasteData is being collected on an annual basis. The project will be concluded shortly and a paper is being prepared.
3. **Flow Behavior of Fully Degraded Waste\*** - A field project is investigating the drainage of highly degraded MSW placed directly on leachate collection systems. The leachate collection materials consist of both natural soils and geosynthetic drains. The experimental setup has been dismantled and a presentation was given at the 2012 Global Waste Conference in Phoenix... a paper will follow.
4. **Field Exposed Lifetime of Geogrids Used at the Facing of Landfill Berms** - The facing of mechanically stabilized earth landfill berms (and other walls and slopes as well) is often using a wrap-around configuration leaving the geogrid exposed to the atmosphere. A new project being conducted by George Koerner is presently investigating two different geogrid's behavior over time. A 50-year time frame is envisioned. The long-term behavior will eventually be compared to UV laboratory exposed data as noted in Item #8 below.
5. **Field Behavior of fPP and fPP-R Geomembranes** - We continue to receive and evaluate field samples of flexible polypropylene geomembranes (mainly scrim reinforced). They are regularly added to our database in this regard. The most recent was for potable water storage and had a service lifetime of 10-years. Using our correlation factor of 1200 light hours in D7238 at 70°C being equivalent to one-year in a hot climate, this is equivalent to a laboratory exposure in the weathering device of 12,000 light hours. Our GRI-GM18 specification calls for 20,000 light hours for an acceptable formulation which is essentially a factor-of-safety of 1.7.

6. **Laboratory Exposed Lifetime of Geomembranes\*** - GSI is using three UV-fluorescent devices to estimate the projected exposed lifetime of many different types of geomembranes. Presently being incubated are HDPE, LLDPE, fPP, and EPDM. Exposure times of 50,000 light hours are now realized at 70°C and a replicate set of samples are being incubated at 60°C. Some will take at least 70,000 light hours ( $\approx$  ten years). The third sequence at 80°C was started on 1/1/2010. Ongoing data is being reported to manufacturers and resin producers. GRI Report #42 is available on the 70°C data using a correlation coefficient to estimate field lifetime of the various geomembranes.
7. **Laboratory Exposed Lifetime of PVC (European) Geomembranes** - Of late, we have been attempting to distinguish between PVC geomembranes manufactured in North America versus Europe. Of course, the difference is in the type of plasticizers and other additives used in the formulations. In this regard we have been evaluating various European formulations for four years using three dedicated UV-fluorescent devices and the results are very impressive. The study is being conducted for CARPI Tech, a GSI member organization. (Note that the exposure and lifetime prediction of North American produced PVC GMs has been concluded).
8. **Laboratory Exposed Lifetime of Geogrids** - The UV-fluorescent exposure of two different polypropylene biaxial geogrids which are used at the exposed faces of welded wire mesh MSE structures is ongoing. The various geogrids are now up to 40,000 light hours and data is being generated and sent to the respective manufacturers; Tensar and TenCate. Replicate samples are now being incubated at 60°C for eventual use in Arrhenius Modeling and lifetime prediction. The last set at 80°C has just begun incubation.
9. **Laboratory Exposed Lifetime of TRM Fibers** - We are also using UV-fluorescent exposure of four different turf reinforcement mat fibers to assess their lifetime capabilities. They are presently being incubated at 60°C, 70°C and 80°C. Communication between the manufacturer Propex is ongoing.
10. **Laboratory Exposed Lifetime of Geotextiles** - We have completed a UV study on a heat-bonded nonwoven PP geotextile used for three dimensional cell structures which are exposed to the atmosphere. The results for the particular geotextile and its specific formulation at 20°C (68°F) average field temperature are 4.9 years for halflife of breaking strength and 4.1 years for halflife of breaking elongation. This study of exposed geotextile lifetime has been extended to a lightweight needle-punched nonwoven and it will then be followed by a woven slit-film. Thus, all three types of geotextile will eventually be evaluated.
11. **Retaining Wall Failure Evaluations\*** - We presently have GRI Reports 38, 39, and 40 addressing mechanical stabilized earth (MSE) walls using geosynthetic reinforcement which document 82-failures. Our data base grew to 141, then 171, and now (thanks to Rick Valentine) 224. *Readers we have a very serious situation in this regard!* The failures are either excessive deformation or collapses. We have presented one-day courses on this topic along with inspector training and development insofar as a field inspectors certification program; see the certification section of this Newsletter/Report. We have just recently presented the findings at two geotechnical conferences; one in Williamsburg and the other in Hershey. A paper on the first 141 failures is available and one 171 failures has been accepted for publication.
12. **pH Between Masonry Block Wall Units\*** - George Koerner has been measuring the pH between three types of masonry blocks for over six years to monitor the values. Concern here is over PET geogrids which are known to be sensitive to high alkalinity environments. Indeed, the values started high, but over time are now down to eight and lower. George Koerner has a paper in this regard.
13. **Landfill Failure Analysis** - Since our originally reported paper on ten landfill failures in a 2000 publication, we have accumulated ten more. All 20-failures have been analyzed using the ReSSA Code and are now available to members and associate members as GRI Report #41. The latest failure in this regard is in Easton, Pennsylvania. It is under investigation presently.
14. **Slow Pressurization of HDPE Geomembranes in Axi-Symmetric Testing** - The ASTM D5716 method of testing geomembranes in a 3-D axi-symmetric mode uses a pressure rate of 6.9 kPa/min (1.0 psi/min). While such a rate is reasonable for most geomembrane types, it is questionable for HDPE which is semi-crystalline and cannot stress relax. To investigate slower rates Bob Koerner is performing a new project with rates as low as 6.9 kPa/month (1.0 psi/month)! A draft paper has just been submitted.
15. **CaCO<sub>3</sub> in Bentonites Contained Within GCL's** - It is possible that the amount of calcium carbonate contained within the bentonite of different GCL's is indicative of their hydraulic performance. George Koerner has evaluated 15-bentonites and has a paper in progress.
16. **Shrinkage of GCLs Under Wet/Dry Cycling** - George Koerner has been evaluating shrinkage of various GCLs in boxes on the overhead roof of GSI. The study is on behalf of one of our members.

17. **Temperature Behavior Under Different Geosynthetic Layers** - Since exposed lifetime of geosynthetics is influenced by sunlight the lifetime of layers directly beneath the uppermost one is of interest. George Koerner is setting up such a scenario on behalf of one of our members.

18. **Generic Specifications** - A major continuing effort is ongoing with respect to the development and maintenance of GRI's generic geosynthetic specifications. The current status of these specifications is as follows:

Completed, Available and Regularly Updated

GM13 – HDPE Geomembranes  
GM17 – LLDPE Geomembranes  
GM18 – fPP and fPP-R Geomembranes  
GM21 – EPDM and EPDM-R Geomembranes  
GM22 – Exposed Temporary Covers  
GM25 – LLDPE-R Geomembranes  
GM19 – Geomembrane Seams  
GT10 – Geotextile Tubes  
GT12 – Geotextile Cushions  
GT13 – Geotextile Separators  
GCL3 – Geosynthetic Clay Liners  
GS15 – Geocells

Working Within Focus Group

GTXX – Turf Reinforcement Mats (tabled)  
GMXX – Coated Slit Film Geotextiles

Delayed or Off in the Distance

GGXX – Bidirectional Geogrids  
GGXX – Unidirectional Geogrids  
GNXX – Geonet Drainage Composites  
GCXX – Other Drainage Geocomposites  
GSXX – High Strength Reinforcement Geotextiles

The complete set of specifications are available to everyone (members and nonmembers) on the open section of our Home Page. Please download and use them accordingly. Also note that this is where the latest modification will always be available. There is a brief tutorial accompanying each specification. They will be updated shortly. Copies of the above listed draft specification tables are also available to members and associate members.

19. **Other GRI Standards** - There are several GRI Standards in various forms of preparation. These include the following:

- A group of test methods being prepared for both ThermaGreen and Maccaferri Companies for their respective new products.
- Another group of test methods on polymer coated slit film geotextiles – these are being used in agriculture and heap leach mining.

## Progress within GII (Information)

Our GSI Home Page is accessed as follows:

<<<http://www.geosynthetic-institute.org>>>

It has been completely revised and is being maintained through the fine efforts of Marilyn Ashley. Everyone (members and nonmembers) can access the open part, which has the following menu:

- Introduction to GSI
- Prospectus
- Associate Membership (Agencies)
- Members by Focus Groups
- GSI Publications
- GRI Specs, Guides, White Papers
- Laboratory Accreditation
- Product Certification
- Newsletter/Reports
- Internet Courses
- GSI Members Links
- GSI Member Meetings
- Courses at GSI
- Insp. Cert. Programs

To go further one needs a members-only password. Your contact person (see the last section of this Newsletter/Report if you do not know who it is) must get a password from Marilyn Ashley. Marilyn can be reached by e-mail at [mvashley@verizon.net](mailto:mvashley@verizon.net). When you get into this section, the following information is available. This includes:

- GRI Test Methods
- GRI Reports
- GRI Technical Papers (Citations)
- Notes of GSI Meetings
- Links to the GSs World
- Keyword Search for Literature
- Example Problems
- Frequently Asked Questions (FAQs)

The Keywords Section contains about 30,000 citations which is the majority of the geosynthetics literature published in English. It's quite easy to use provided that you have a specific topic, or area, in mind. This is the section of the website that we (and others we are told) use the most in our daily activities.

In addition to the information provided in our home page as just mentioned, Jamie Koerner (Special Projects Coordinator) is performing various surveys of pertinent topics in geosynthetics.

Most of these have been turned into GRI White Papers; the following being the most recent.

- #22 - Selected GS Opportunities with Energy Production and Transmission
- #23 - EPA Agencies Regarding Landfill Berms
- #24 - Reduction Factor for Holes in GS Reinforcement
- #25 - The Separation-in-Plane (SIP) Mode of Failure When Testing GM Seams
- #26 - Need for Justification of Quality Management Systems for Successful GS Performance
- #27 - The Intimate Contact Issues of Field Placed Geomembranes With Respect to Wave (or Wrinkle) Management



## #28 - Cold Temperature and Freeze-Thaw Cycling of Geomembranes and Their Seams

Jamie's most recent survey is a retrospective review of the 136 faculty which participated in the Educate-the-Educators week-long courses at Auburn University from 1994-1998. Do ask for a copy if interested.

## Progress within GEI (Education)

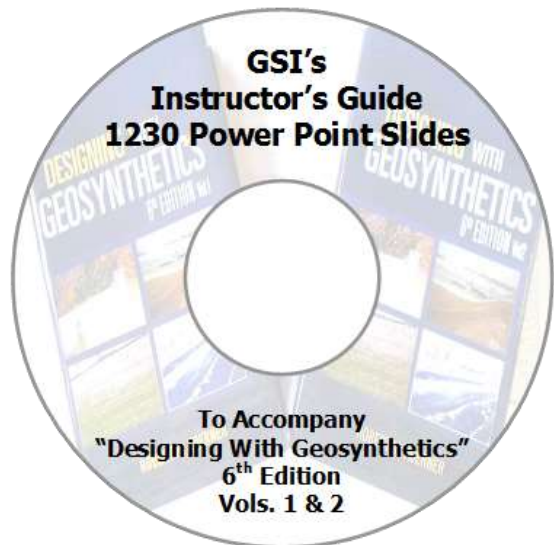
### Free CD

We sent a broadcast e-mail to everyone stating that many power point presentations were available and would be sent upon request. Many persons replied asking for all of them. Therefore, we put all 63 presentations on a CD which was sent to all GSI contact persons. That said, we have many copies still available so do ask and we will mail it to you immediately. Topic areas are all types of geosynthetics, plus walls/slopes, landfills, specifications, and miscellaneous.

### 6<sup>th</sup> Edition of Designing With Geosynthetics

The 6<sup>th</sup> Edition of Designing With Geosynthetics continues to sell well in all three of its formats; hardback, softback and e-book... the latter is really cheap; i.e., \$3.50 for each volume! The two volume set can be purchased through GSI, Xlibris, Amazon and Barnes and Noble. A special link is available on the cover page of our website.

Our most recent activity in this regard is to develop a power point presentation for the entire 914-page book. This is what it looks like and it does indeed contain 1230 nonencrypted ppt slides.



Call or e-mail if you want a copy. It is free to all, but we need your postal address.

### GRI Reports

To date, we have 42 GRI Reports available to members and associate members. These reports vary in length from 30 to 200 pages and beginning with Report #25 they are on the password protected section of our home page. Prior to that date only the abstract is available online. All of them, however, are available in hard copy. The most recent reports are as follows:

- #39 – Methods of Stabilizing Excessively Deformed MSE Walls
- #40 – On the Prevention of Failures of Geosynthetic Reinforced MSE Walls and Recommendations Going Forward
- #41 – Analysis and Critique of Twenty Large Solid Waste Landfill Failures
- #42 – Lifetime Prediction of Laboratory UV Exposed Geomembranes Based on a Correlation Factor (due January 2, 2012)

### Courses

We have scheduled the following two courses here at GSI. They are as follows with the agenda to be posted on our website.

- #1 December 4, 2013  
Construction Inspection of MSE Walls, Berms and Slopes  
(Optional Exam Follows)
- #2 December 5, 2013  
QA/QC of Geosynthetics in Waste Containment Systems  
(Optional Exam Follows)

Each course carries with it 8 PDH's. All are held at GSI so demonstrations by George enliven and illustrate the respective lectures. GSI is approximately 4.5 miles from Philadelphia International Airport.

Course Registration and Fee:

- \$350/person for each one-day course (up to one month prior to course)
- \$400/person thereafter
- \$250/person – GSI Members

Contact: Marilyn Ashley ([mvashley@verizon.net](mailto:mvashley@verizon.net))

### Webinars

(Second Wednesday of Every Month)  
11:30 AM – 1:00 PM (Eastern Time Zone)  
Registration at [www.geosynthetic-institute.org/webinar.htm](http://www.geosynthetic-institute.org/webinar.htm)

1.5 Professional Development Hours; Cost \$250

- GSI 1 – June 12, 2013 "MSE Wall Failures Data Base"
- 2 – July 10, 2013 "MSE Wall Back Drainage Design"
- 3 – August 14, 2013 "MSE Wall Remediation"
- 4 – September 11, 2013 "MSE Wall Inspection"

- 5 – October 9, 2013 “GSs in Hydraulic Applications”
- 6 – November 13, 2013 “GSs in Heap Leach Mining”
- 7 – December 11, 2013 “GSs in Agriculture”
- 8 – January 8, 2014 “GSs in Private Development”
- 9 – February 12, 2014 “Landfill Failures”
- 10 – March 12, 2014 “Landfill Bioreactors”
- 11 – April 9, 2014 “Lateral and Vertical Expansions”
- 12 – May 14, 2014 “Beneficial Uses of Closed Landfills”

**More Webinars**

**11:30 AM – 1:00 PM (Eastern Time Zone)  
Registration at [www.asce.org/webinars](http://www.asce.org/webinars)**

**1.5 Professional Development Hours; Cost \$400**

- ASCE 1 – July 25, 2013 “An Overview of Geosynthetics”
- 2 – August 13, 2013 “GSs in Surface Impoundments”
- 3 – August 29, 2013 “GSs in Coal Combustion Residuals”
- 4 – September 6, 2013 “GSs in Paved and Unpaved Roads”
- 5 – September 24, 2013 “MSE Walls Using Geosynthetics”

**GSI Fellowships**

As in the past, GSI has been awarding graduate fellowships for students performing geosynthetics research. There were nine new proposals this academic year. These proposals were then reviewed by the GSI Board of Directors along with Bob and George Koerner.

The presently established criteria are as follows:

- Students must be working on a geosynthetics topic which furthers the technology in a proactive manner.
- Students must have completed their candidacy requirements leading to a doctoral degree. (Comment, we hope that some of them will “go academic” and teach and/or research geosynthetics in their immediate future)
- Students must be recommended by their advisor or department head.

The fellowships can be renewed for a total of three-years depending upon acceptable annual reports. Funding for each student is \$10,000 the first year and \$5000 for the second and third years.

The following table identifies the successful recipients, their university, advisor and topic. We congratulate the students and wish them success in their endeavors. If any readers wish to add congratulations or to find greater detail as to specific projects and students

please contact us accordingly.

**GSI Fellowship Status for 2012-‘13 Academic Year**

**Class 4 (a) – 2<sup>nd</sup> Year Funding at \$5,000 per student**

No.	Name	University	Advisor	Topic
3-11	Felix Jacobs	RWTH-Aachen, Germany	Martin Ziegler	Geogrid Reinforced Soil in Biaxial Compression Tests
4-11	Mahmound Khachan	Syracuse University	Shobha Bhatia	Dewatering Performance of Geotextile Tubes

**Class 5 (a) – 1<sup>st</sup> Year Funding at \$10,000 per student**

No.	Name	University	Advisor	Topic
1-12	Chuangi Wang	University of Memphis	David Arellano	Properties of Recycled Expanded Polystyrene
2-12	Xunchang Fei	University of Michigan	Dimitrois Zekkos	Biodegradation of Geotextiles
3-12	Jitendra K. Thakur	University of Kansas	Jie Han	Recycled Asphalt Used in Geocells

Note that proposals for the new class (our sixth year of the program) for the A.Y. 2013-'14 are presently being reviewed by the GSI Board of Directors.

**Activities within GAI (Accreditation)**

The Geosynthetic Accreditation Institute’s (GAI) current mission is focused on a Laboratory Accreditation Program (LAP) for geosynthetic test methods. George Koerner is in charge of the program. The GAI-LAP was developed for accrediting geosynthetic testing laboratories on a test-by-test basis. GAI-LAP suggests that laboratories use ISO 17025 as their quality system model. In addition, the program uses the GSI lab as the reference test lab and operates as an ISO 17011 enterprise. In short, this means that the GSI lab does not conduct outside commercial testing.

It should also be made clear that GAI-LAP does not profess to offer ISO certification, nor does it “certify” laboratory results. GAI-LAP provides accreditation to laboratories showing compliance with equipment and documentation for specific standard ASTM, ISO or GRI test methods. In addition, GAI-LAP verifies that an effective quality system exists at accredited laboratories by way of proficiency testing.

There have been significant additions to the number of GAI-LAP tests. Presently, there are 230 GAI-LAP test

methods available for accreditation. Please consult our home page for a current listing.

As of June, 2013, the following laboratories are accredited by the GAI-LAP for the number of test methods listed in parenthesis. Contact personnel, telephone numbers and e-mails are also listed.

- 1<sup>A</sup> - TRI/Environmental Inc. (135 tests)  
Jarrett Nalson -- (512) 263-2101  
[Sallen@tri-env.com](mailto:Sallen@tri-env.com)
- 3<sup>A</sup> - Golder Associates (45 tests)  
David Alexander -- (770) 492-8280  
[dalexander@golder.com](mailto:dalexander@golder.com)
- 4<sup>C</sup> - Geosynthetic Institute (116 tests)  
George Koerner -- (610) 522-8440  
[gkoerner@dca.net](mailto:gkoerner@dca.net)
- 8<sup>B</sup> - Propex Operating Co., Ringgold (18 tests)  
Todd Nichols -- (800) 258-3121  
[todd.nichols@propexglobal.com](mailto:todd.nichols@propexglobal.com)
- 9<sup>B</sup> - Lumite (16 tests)  
Rebecca Kurek -- (770) 869-1700  
[rpage@lumiteco.com](mailto:rpage@lumiteco.com)
- 13<sup>A</sup> - TRI Env. Inc. (97 tests)  
Cora Queja -- (714) 520-9631  
[cqueja@tri-env.com](mailto:cqueja@tri-env.com)
- 14<sup>A</sup> - Geotechnics (49 tests)  
J. P. Kline -- (412) 823-7600  
[JPkline@geotechnics.net](mailto:JPkline@geotechnics.net)
- 20<sup>A</sup> - GeoTesting Express, MA (47 tests)  
Gary Torosian -- (978) 635-0424  
[gtt@geotesting.com](mailto:gtt@geotesting.com)
- 22<sup>B</sup> - CETCO Hoffman Estates (13 tests)  
Barbara Gebka -- (847) 851-1500  
[jim.olsta@cetco.com](mailto:jim.olsta@cetco.com)
- 23<sup>B</sup> - CETCO Cartersville (10 tests)  
Amanda Thomas -- (770) 387-7700  
[Amanda.Thomas@cetco.com](mailto:Amanda.Thomas@cetco.com)
- 24<sup>B</sup> - CETCO Lovell (10 tests)  
Roger Wilkerson -- (307) 548-6521  
[roger.wilkerson@cetco.com](mailto:roger.wilkerson@cetco.com)
- 25<sup>B</sup> - Ten Cate, Pendergrass (12 tests)  
Beth Wilbanks -- (706) 693-2226  
[b.wilbanks@tencate.com](mailto:b.wilbanks@tencate.com)
- 26<sup>B</sup> - Agru America Inc. (20 tests)  
Grant Palmer -- (843) 546-0600  
[gp@agruamerica.com](mailto:gp@agruamerica.com)
- 29<sup>E</sup> - FITI Testing and Research Institute (68 tests)  
Hong-Kwan Kim -- 82-2-3299-8071  
[hoganKim@fiti.re.kr](mailto:hoganKim@fiti.re.kr)
- 31<sup>D</sup> - NYS Dept. of Transportation (9 tests)  
Tom Burnett -- (518) 457-4704  
[tburnett@dot.state.ny.us](mailto:tburnett@dot.state.ny.us)
- 32<sup>A</sup> - Geo-Logic Inc. (6 tests)  
Ken Criley -- (530) 272-2448  
[criley@geologic.com](mailto:criley@geologic.com)
- 34<sup>B</sup> - GSE Environmental Richey Road (36 tests)  
Rich Schaefer -- (281) 230-6890  
[r.schaefer@gseworld.com](mailto:r.schaefer@gseworld.com)
- 37<sup>B</sup> - GSE Environmental Chile (19 tests)  
Mauricio Ossa -- 56-2 6010153  
[Mossa@gseworld.com](mailto:Mossa@gseworld.com)
- 38<sup>C</sup> - Sageos/CTT Group (103 tests)  
Eric Blond -- (450) 771-4608  
[eb blond@GCTTG.com](mailto:eb blond@GCTTG.com)
- 40<sup>B</sup> - GSE Environmental (14 tests)  
Bruce Pressley -- (843) 382-4603  
[bpressley@gseworld.com](mailto:bpressley@gseworld.com)
- 41<sup>A</sup> - SGI Testing Service, LLC (19 tests)  
Zehong Yuan -- (770) 931-8222  
[ZYuan@interactionspecialists.com](mailto:ZYuan@interactionspecialists.com)
- 42<sup>C</sup> - NPUST (GSI-Taiwan) (61 tests)  
Chiwan Wayne Hsieh -- 011-886-8-7740468  
[CWH@mail.npust.edu.tw](mailto:CWH@mail.npust.edu.tw)
- 43<sup>A</sup> - Ardaman & Associates (22 tests)  
George DeStafano -- (407) 855-3860  
[gdestafano@ardaman.com](mailto:gdestafano@ardaman.com)
- 44<sup>B</sup> - Fiber Web, Inc. (9 tests)  
Kim Thomas -- (615) 847-7155  
[Kim.Thomas@fiberweb.com](mailto:Kim.Thomas@fiberweb.com)
- 45<sup>B</sup> - Ten Cate Geosynthetics Malaysia SDN Bhd. (23 tests)  
Gan Wee Hunn -- (603) 519 28576  
[wh.gan@tencate.com](mailto:wh.gan@tencate.com)
- 46<sup>B</sup> - TAG Environmental Inc. (13 tests)  
Colin Murphy -- (705) 725-1938  
[colin\\_murphy@tagenv.com](mailto:colin_murphy@tagenv.com)
- 47<sup>B</sup> - Syntec LLC (10 tests)  
Andrew Barker -- (410) 327-1070  
[abarker@synteccorp.com](mailto:abarker@synteccorp.com)
- 49<sup>B</sup> - Engepol Geosinteticos (14 tests)  
Carolina Polomino -- (55) 51 3303-3916  
[carolina@engepol.com](mailto:carolina@engepol.com)
- 50<sup>B</sup> - ADS, Inc. Hamilton (7 tests)  
Terry McElfresh -- (513) 896-2065  
[terry.mcelfresh@ads-pipe.com](mailto:terry.mcelfresh@ads-pipe.com)
- 51<sup>B</sup> - Solmax International Inc. (22 tests)  
Simon Gilbert St. Pierre -- (450) 929-1234  
[simonGSP@solmax.com](mailto:simonGSP@solmax.com)
- 53<sup>B</sup> - Polytex Inquique (19 tests)  
Christian Valdebenito -- 011 56 57 42 90 00  
[cvaldebenito@polytex.cl](mailto:cvaldebenito@polytex.cl)
- 54<sup>B</sup> - ADS, Inc. Finley (10 tests)  
David Gonso -- (419) 424-8377  
[davegonso@ads-pipe.com](mailto:davegonso@ads-pipe.com)
- 55<sup>B</sup> - Atarfil Geomembranes (19 tests)  
Gabriel Martin Sevilla -- 34 958 439 200  
[gmartin@atarfil.com](mailto:gmartin@atarfil.com)
- 56<sup>B</sup> - Polytex Santiago (13 tests)  
Christian Valdebenito -- 56-2-627-2054  
[cvaldebenito@polytex.cl](mailto:cvaldebenito@polytex.cl)
- 57<sup>B</sup> - Ten Cate Cornelia (13 tests)  
Melissa Medlin -- (706) 778-9794  
[m.medlin@tencate.com](mailto:m.medlin@tencate.com)
- 58<sup>B</sup> - Propex Operating Co. Nashville (16 tests)  
Tim Smith -- (229) 686-5511  
[Tim.Smith@propexglobal.com](mailto:Tim.Smith@propexglobal.com)
- 59<sup>B</sup> - Firestone (9 Tests)  
Janie Simpson -- (864) 439-5641  
[SimpsonJanie@firestone.com](mailto:SimpsonJanie@firestone.com)
- 60<sup>B</sup> - Polytex Lima (12 tests)  
Elias Jurufe -- 51 16169393  
[Ejarufe@polytex.cl](mailto:Ejarufe@polytex.cl)
- 61<sup>B</sup> - Raven Industries (17 tests)  
Justin Norberg -- (605) 335-0288  
[Justin.Norberg@ravenind.com](mailto:Justin.Norberg@ravenind.com)
- 62<sup>B</sup> - Solmax International Asia (14 tests)  
Teoh Pei Ching -- (450) 929-1234  
[pcteoh@solmax.com](mailto:pcteoh@solmax.com)
- 63<sup>A</sup> - TRI Environmental, Inc.; DDRF (5 tests)  
Joel Sprague -- (864) 242-2220  
[JSprague@tri-env.com](mailto:JSprague@tri-env.com)
- 64<sup>B</sup> - Agru America (NV) (14 tests)  
Chris Adams -- (775) 835-8282  
[ca@agruamerica.com](mailto:ca@agruamerica.com)
- 65<sup>C</sup> - Bombay Textile Rsearch Assoc. (BTRA) (24 tests)  
Riyaz Shaikh  
(0) 022-25003551  
[btra@vsnl.com](mailto:btra@vsnl.com)
- 66<sup>B</sup> - Rowad International Geosynthetics Co. Ltd (14 tests)  
Asad Ullah Khan -- +966-3-812-1360  
[asad@rowadplastic.com](mailto:asad@rowadplastic.com)
- 67<sup>A</sup> - MicroBac Hauser Division (10 tests)  
Heather Smalley -- (720) 406-4806  
[heather.smalley@microbac.com](mailto:heather.smalley@microbac.com)
- 68<sup>B</sup> - Glen Raven Technical Fabrics LLC (4 tests)  
Richard Greeson -- (336) 229-5576  
[rgreeson@glenraven.com](mailto:rgreeson@glenraven.com)
- 69<sup>B</sup> - GSE Environmental (12 tests)  
Siriporn Chayaporenler -- 6638-636638  
[Siripornc@gseworld.com](mailto:Siripornc@gseworld.com)

- 70<sup>A</sup> - RSA Geo Lab LLC (48 tests)  
Raza Ahmed – (908) 964-0786  
[geolab13@yahoo.com](mailto:geolab13@yahoo.com)
- 71<sup>B</sup> - Plasticos Agricolas y Geomembranas S.A.C. (15 tests)  
Jhoana Carolina Diaz Martinez – 073-511814-511829  
[calidad@pqa.peru.com](mailto:calidad@pqa.peru.com)
- 72 - Tensar Corp. GA (5 tests)  
Mignon Kittler (770) 968-3255  
[mkittler@tensarcorp.com](mailto:mkittler@tensarcorp.com)
- 73 - Gai Loi JSE (9 tests)  
Paul Wong 84-650-362-5825  
[paul905677@gmail.com](mailto:paul905677@gmail.com)

<sup>A</sup>Third Party Independent    <sup>C</sup>Institute  
<sup>B</sup>Manufacturers QC            <sup>D</sup>Government

If you desire more information on the GAI-LAP, its test methods, and the associated laboratories, a directory is published annually in December of each year. It is available on GSI's home page at <http://www.geosynthetic-institute.org> (Accreditation).

The 2013 GAI-LAP customer survey form appears below. Even if you are not a GAI-LAP laboratory please take a few minutes to fill out the survey and return by FAX to (610) 522-8441 or e-mail ([gkoerner@dca.net](mailto:gkoerner@dca.net)). Information gathered from this survey will be presented at the GAI-LAP annual meeting on June 12, 2013 (Wednesday) from 6:00 to 7:00 PM in conjunction with the ASTM D-35 meeting. We will meet at the JW Indy Marriott in Downtown Indianapolis, Indiana Room White River Ballroom H.

1. GAI-LAP information exchange (5-excellent to 1-poor)  
**5 4 3 2 1**  
Comment, \_\_\_\_\_
2. Conflict Resolution Service (5-excellent to 1-poor)  
**5 4 3 2 1**  
Comment, \_\_\_\_\_
3. Proficiency Test Program (5-excellent to 1-poor)  
**5 4 3 2 1**  
Comment, \_\_\_\_\_
4. GAI-LAP Directory and Internet (5-excellent to 1-poor)  
**5 4 3 2 1**  
Comment, \_\_\_\_\_
5. GAI-LAP overall (5-excellent to 1-poor)  
**5 4 3 2 1**  
Comment, \_\_\_\_\_

We would like to get a return of over 70% of the participating labs and 20 outside opinions to validate it. We thrive on constructive criticism and appreciate your comments. As of now with only a 20% return rate we have the following tally:

- Information exchange = 4.0
- Conflict resolution = 4.2
- Proficiency Testing = 4.7
- Directory and Internet = 3.6
- Overall = 4.2

Past surveys have results as follows:

2012 (4.1), 2011 (4.1), 2010 (4.3), 2009 (4.4), 2008 (4.2), 2007 (3.9), 2006 (4.0), 2005 (4.0), 2004 (4.1), 2003 (4.1), 2002 (4.2)

Thanks for helping us continually improve.

*George R. Koerner*

## Activities within GCI (Certification)

GSI presently has two separate inspector certification programs. One (begun in 2006) is focused on QA/QC of field inspection of waste containment geosynthetics and compacted clay liners. The other (begun on Dec. 1, 2011) is focused on MSE Wall, Berm and Slope field inspection. See our website at [www.geosynthetic-institute.org](http://www.geosynthetic-institute.org) under "certification" for a description and information on both of them. They are both similar in that a perspective candidate must...

- Be recommended by a professional engineer who knows, and can attest to, at least six months of acceptable experience performing CQA activities with either geosynthetic liner or cover systems or MSE walls, berms, or slopes using geosynthetic reinforcement.
- Submit a completed application and be approved by the Geosynthetic Certification Institute to take the exam.
- Must successfully pass a written examination (70% of the questions is the passing grade) proctored by GCI or a GCI designated organization and graded by the Geosynthetic Certification Institute to become a certified inspector.
- Must pay a one-time fee which covers a five-year period upon completion of the above items. The fee is \$500 for five-years of certification.

### Program #1 - Inspection of Liner Systems for Waste Containment Facilities

This program now in its sixth year has been recommended, and in some cases required, by solid waste owners, state regulators, and design consultants for proper QCA in field installation of both geosynthetic materials and compacted clay liners. The statistics to date are as follows.



**Inspector Certification Test Results  
2006 – 2012**

Year	Geosynthetic Materials		Compacted Clay Liners		Commentary
	No. of people taking exam	No. of people failing exam	No. of people taking exam	No. of people failing exam	
2006	141	5 (3%)	128	12 (9%)	2 (1.5%)
2007	82	11 (13%)	73	12 (16%)	7 (8.5%)
2008	95	25 (26%)	89	20 (22%)	13 (14%)
2009	36	7 (19%)	36	2 (5%)	2 (6%)
2010	59	12 (20%)	54	7 (13%)	5 (8%)
2011	54	6 (11%)	53	3 (6%)	1 (2%)
2012	34	5 (15%)	28	3 (11%)	3 (9%)
2013	22	3 (13%)	20	1 (5%)	
<b>TOTAL (to date)</b>	<b>523</b>	<b>74 (14%)</b>	<b>481</b>	<b>60 (13%)</b>	<b>34 (5%)</b>

The 5-year renewal period for those having taken the exam in 2006 is at present and about 60% have renewed accordingly. This is felt to be encouraging from our perspective.

Note that a GSI course on this topic will be offered on December 5, 2013 with the exam following directly.

**Program #2 - Inspection of MSE Walls, Berms and Slopes**

The official launch of the program was on December 1, 2011 with a course and the examination afterward. More recently a somewhat revised course on November 29, 2012 was presented. There are now sixteen persons certified by GCI for the inspection of MSE Walls, Berms and Slopes.

This one-day course and subsequent examination were developed by GSI and reviewed by a steering committee consisting of the following individuals:

- Kent von Maubeuge – NAUE Group
- Mohammed Karim – Virginia DEQ
- Bob Sabanas – NTH Consultants
- John Conturo and Maria Tanase – AECOM, Inc.
- John Lostumbo – TenCate Geosynthetics
- Mike Yako – GEI Consultants
- Steve Poirier – Geosyntec Consultants
- Willie Liew – Tensar International
- Doug Clark – CEC Consultants
- Dick Stulgis – Geocomp, Inc.
- Frank Adams, Paul Whitty, Rafael Ospina – Golder Associates
- Daniel Alzamora - FHWA
- Sam Allen – TRI Environmental Inc.
- Greg Cekander – Waste Management Inc.
- Greg Fedak – CETCO Contracting Services

Our thanks go to them in this regard.

While a field inspector cannot require proper design or instruct a contractor how to build the wall, flaws can be identified for possible design modification or mitigation action. Furthermore, and at minimum, construction practices can be observed and corrected if inadequate or improper. Please contact George Koerner at [gkoerner@dca.net](mailto:gkoerner@dca.net) or Jamie Koerner at [jrkoerner@verizon.net](mailto:jrkoerner@verizon.net) for questions or additional information.

Note that a GSI course on this topic will be offered on December 4, 2013 with the exam following directly.

**The GSI Affiliated Institutes**

It has long been realized that the information generated within the GSI group should have a timely outlet to all countries, and in all languages. To this end, GSI has created affiliated institutes in two countries (Korea and Taiwan), and potentially others in the future. These affiliated institutes are full members of GSI and are empowered to translate and use all available information so as to create similar institutes and activities in their respective countries.

**GSI-Korea** was formed on February 9, 1998 as a collaborative effort between FITI Testing and Research Institute (a quasi-government organization) and INHA University (through its Geosynthetics Research Laboratory). It is presently in the transition of being held entirely within INHA University.

INHA University is located in Incheon and the geosynthetics laboratory is led by Professor Han-Yong Jeon. Dr. Jeon has 10-students working on geosynthetic-related projects and is extremely active both nationally and internationally. His active participation at conferences worldwide is very admirable. He has provided research and development in many geosynthetic subjects including geotextiles, geomembranes, geocells, additives for GCLs, recycled plastics for formulations, etc.

**GSI-Taiwan** was formed on August 18, 2000 and is wholly contained within the National Pingtung University of Science and Technology in Nei Pu, Pingtung (southern Taiwan). It completely parallels GSI in that it has specific units for research, education, information, accreditation and certification. The Director is Dr. Chiwan Wayne Hsieh who is a Professor in the Department of Civil Engineering and Dean of the R & D Office. GSI-Taiwan has an Taiwanese consortium of geogrid/geotextile manufacturers who work toward producing quality products according to the draft GRI geogrid specifications and the associated test methods. As such, GSI-Taiwan is a GAI-LAP accredited laboratory for 59 geosynthetic test methods. Dr. Hsieh has 10-students working on geosynthetic-related projects and

is extremely active nationally and internationally. GSI Taiwan has hosted three very successful internal conferences to date and has also held a much broader one, namely, GSI-Asia in Taichung, Taiwan.

## Items of Interest

### 1. Cities, Dams and Extreme Weather

(from *Civil Engineering Magazine*, December, 2012)

“Dams have long played a critical role in fostering urban growth, a trend that is expected to continue throughout the developing world. As the interplay between large dams and local weather patterns becomes better understood, civil engineers must lead the way in ensuring that large dams and the urban areas that rely on them remain as resilient as possible, even in the face of changing patterns of extreme weather.”

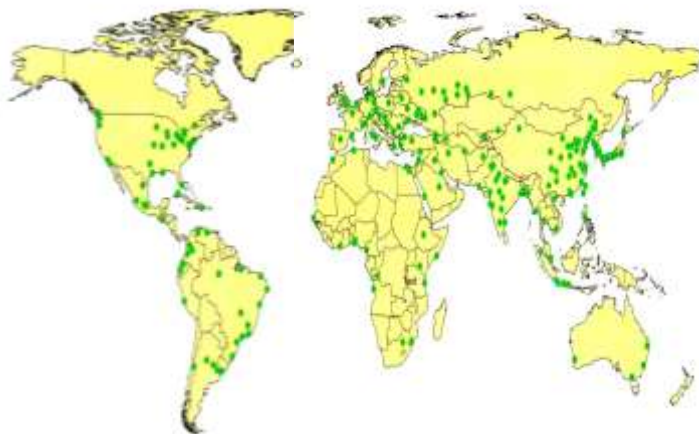


Figure 1 - Locations of large dam-reliant cities with populations exceeding 1 million within 100 km of a large dam.

### 2. Financing Out Future

(from *Civil Engineering Magazine*, April 2013)

“As America’s infrastructure—built large in the post-World War II years of the 20<sup>th</sup> century—ages and deteriorates and the burgeoning U.S. population places ever-increasing demands on it, the United States is confronting an infrastructure crisis that threatens both public safety and economic growth and competitiveness. On March 19 ASCE released its 2013 Report Card for America’s Infrastructure. Conducted by an advisory panel of the nation’s leading civil engineers, whose areas of expertise cover a broad spectrum, the fifth such assessment undertaken by ASCE confers an overall grade of D+ and estimates the investment needed to raise the grade to a B by 2020 at \$3.6 trillion. However, the means are in fact available to us to address this crisis in the immediate future.”

2013 REPORT CARD FOR AMERICA'S INFRASTRUCTURE		
Aviation	D	<b>A</b> Exceptional <b>B</b> Good <b>C</b> Mediocre <b>D</b> Poor <b>F</b> Failing  <i>Each category was evaluated on the basis of capacity, condition, funding, future need, operation and maintenance, public safety, and resilience</i>
Bridges	C-	
Dams	D	
Drinking Water	D	
Energy	D+	
Hazardous Waste	D	
Inland Waterways	D-	
Levees	D-	
Ports	C	
Public Parks and Recreation	C-	
Rail	C+	
Roads	D	
Schools	D	
Solid Waste	B-	
Transit	D	
Wastewater	D	
America's Cumulative G.P.A.	D+	

## Reflections on Geosynthetic Technical Publication Outlets by Bob Koerner

As a graduate student back in the 1960’s we were informed by our Duke University advisor (the world renown Professor Alexander S. Vesić) that the hierarchy of research and development (R & D) technical publications was as follows:

- (i) Journal papers for archival studies that have been brought to a degree of finality and had been rigorously peer reviewed by others *thus representing the state-of-the-art (SOTA)*.
- (ii) Conference proceedings papers for ongoing studies or incremental parts of a larger project that also have been peer reviewed but generally less rigorously than with journal papers.
- (iii) Magazine papers and technical reports for focused and/or proprietary audiences which are often nonreviewed at least externally.
- (iv) Technical books for the assembly and systematic organization of the body-of-knowledge as presented in the journals, proceedings, magazines and reports mentioned previously *thus representing the state-of-the-practice (SOTP)*.

In this regard, journal papers and technical books form the two extremes between the SOTA and the SOTP in most technical topic areas such as geosynthetics. To clarify this terminology, everyone in the specific technical area should know the SOTP, but only a small percentage venture into the uncertainty of research and development ultimately leading toward the SOTA. For example, in a court case lawyers expect a defendant to know the SOTP but not necessarily the SOTA, the latter being the purview of expert witnesses. Over time, I think that the above ordering of publication outlets somewhat remains the same, but the impact of costs and profits have been engendering change. Whether such changes are for the better or worse is left to the reader but some personal opinions follow.

Regarding journals, there are many that currently exist and the current “buzz” suggests that more are on the horizon. The impetus seems to be sales by the publishers to university libraries since journal papers are the academic drivers for faculty tenure and promotion. Of course, there is also the prestige of the publication itself to the author(s) and his/her university, organization, or company.

Regarding proceedings, the cost of hard copy in a printed version for most conferences appears to be prohibitive. At best, one leaves a conference with a CD of the papers most of which do not have a rigorous keyword section or search engine for future retrieval purposes. Even more troublesome is the tendency for many conferences to not have written papers at all and the CD only contains the power point slides of the presenters.

Regarding reports by governmental agencies, professional associations and larger consultancies, the cost of preparation, printing, and distribution seems to be insurmountable. At best, a website might be available but the consistency in maintaining a publication activity seems to be overwhelming at least in a sustainable format.

Regarding books covering a comprehensive overview of a specific area from “a-to-z”, most often we have a compilation by multiple authors where an editor(s) makes an attempt to have consistency and uniformity throughout. Having done this often, it’s really like “pulling teeth”! In the end, such efforts are of value to professionals but academically are difficult particularly for a faculty member (and his/her students) if a multi-edited book is used in a classroom setting as the textbook; they are also extremely expensive.

So... change is not only coming, it is with us for all four above categories of technical publication outlets, geosynthetics included. My fears in this regard are the following:

- Peer review is becoming more sparse and casual in its approach which might be

heightened with new geosynthetic journals on the horizon.

- Rejected articles are being “shopped” around until eventually accepted and published.
- Repeat articles by the same author or group, albeit modified slightly, are regularly appearing.
- Topics which have been researched in the past are being revisited with little or no regard to relevant existing publications.
- Literature searches of past work in the topic area are becoming more cavalier and often appropriate references are simply not cited.
- Attribution with regard to republication of figures, tables and photographs is being omitted.

In summary, this column will likely have no effect on the present or future status of technical publications but at least it will provide a recognition of perceived and ongoing changes which might be revealing to some of you.

P.S., Of course I’m guilty of some of the above dicey items but thought I’d get it off my chest anyway!

## Upcoming GSI Events

### GSI Webinars

(2<sup>nd</sup> Wednesday of Every Month – see pgs. 5&6 of this Newsletter/Report)

Contact: [www.geosynthetic-institute.org/webinar.htm](http://www.geosynthetic-institute.org/webinar.htm)

### ASCE Webinars

(see pg. 6 of this Newsletter/Report)

Contact: [www.asce.org/webinars](http://www.asce.org/webinars)

June 21, 2013

QA/QC of GSs in Waste Containment

CEC, Rayham, MA

Contact: [mvashley@verizon.net](mailto:mvashley@verizon.net)

### GSI Courses in Folsom, PA

#1 December 4, 2013

Construction Inspection of MSE

Walls, Berms and Slopes

(Optional Exam Follows)

#2 December 5, 2013

QA/QC of Geosynthetics in Waste Containment

Systems

(Optional Exam Follows)

Contact: [mvashley@verizon.net](mailto:mvashley@verizon.net)

- April 23-25, 2014

Central PA-ASCE

Hershey, PA

Contact: [robert.koerner@coe.drexel.edu](mailto:robert.koerner@coe.drexel.edu)

- July 2014  
ASCE Shale Conference  
Pittsburgh, PA  
Contact: [www.asce.org/conferences](http://www.asce.org/conferences)

## GSI's Member Organizations

We sincerely thank all of our sponsoring organizations. Without them, GSI simply could neither happen nor exist. The current GSI member organizations and their contact members are listed below. **Our newest members are ThermaGreen with Tim Walter/Blu Alexander/Ken vander Velden, Maccaferri with Massimo Ciarla and Pietro Rimoldi, and Jones and Wagener (Pty) Ltd. with Anton Bain, and Tecnologia de Materiales (TDM) with José Ferreyros as contact persons. Thanks to all and welcome to GSI.**

**GSE Environmental**  
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**AECOM**  
*Kevin McKeon/Ken Bergschultz/John Trast*  
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*David A. Carson*  
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*John L. Guglielmetti/David W. Timmons*  
**Federal Highway Administration**  
*Silas Nichols/Daniel Alzamora*  
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*Mark E. Case/Tim Bauters*  
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**CETCO**  
*Chris Athanassopoulos/James T. Olsta*  
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*Steven Lothspeich/Dimiter Alexiew*  
**NAUE GmbH & Co. KG**  
*Kent von Maubeuge [BoD]*  
**Propex**  
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*Robert Denis/Guy Elie*

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**CARPI, Inc.**  
*Alberto M. Scuero/John A. Wilkes*  
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**Agru America, Inc.**  
*Paul W. Barker/Markus Haager/Dee Strong*  
**Firestone Specialty Products**  
*Jeff Pankonie/Bill Tippins/Christa K. Petzke*  
**FITI (GSI-Korea)**  
*Jeonhyo Kim/H.-Y. Jeon*  
**Waste Management Inc.**  
*Greg Cekander/John Workman [BoD]*  
**NPUST (GSI-Taiwan)**  
*Chiwan Wayne Hsieh [BoD]*  
**GeoComp/GeoTesting Express**  
*W. Allen Marr/Richard P. Stulgis*  
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**EPI, The Liner Co.**  
*Daniel S. Rohe/Mark Wolschon*  
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**Weaver Boos Consultants, Inc.**  
*Mark Sieracke [BoD]*  
**Aquatan (Pty) Ltd.**  
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*A. N. Desai*  
**BASF Corporation**  
*Joseph J. Fay/Ralph Maier*  
**Watershed Geosynthetics LLC**  
*Michael Ayers*



**ThermaGreen**  
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*Massimo Ciarla/Pietro Rimoldi*  
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*Anton Bain*  
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*José Ferreyros*

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**U.S. Bureau of Reclamation**  
*Jay Swihart/Peter Irey*  
**Michigan Dept. of Environmental Quality**  
*Margie Ring/Xuede (Dan) Qian*  
**Environment Agency of U. K.**  
*Rob Marshall*  
**Florida Dept. of Transportation**  
*Ben Watson*  
**National Design, Construction & Soil Mechanics Center**  
*Stephen D. Reinsch*  
**Virginia Dept. of Environmental Quality**  
*Donald Brunson*  
**Massachusetts Dept. of Environmental Protection**  
*Paul Emond*  
**Philadelphia Water Department**  
*Vahe Hovsepian*  
**Oak Ridge National Laboratory**  
**(c/o Savannah River Remediation LLC)**  
*Amit Shyam*

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- Overview of GRI (Research) Projects
- Activities within GII (Information)
- Progress within GEI (Education)
- Activities within GAI (Accreditation)
- Activities within GCI (Certification)
- The GSI Affiliate Institutes
- The GSI Centers-of-Excellence
- Items of Interest
- "Geosynthetics and Coal Combustion Residuals"
- GSI's Member Organizations