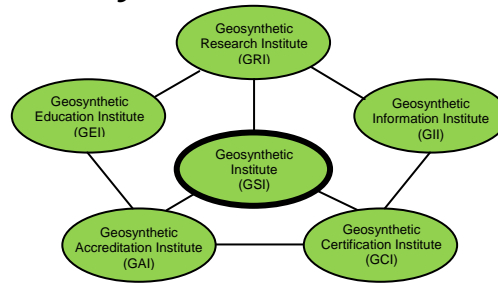


The GSI Newsletter/Report

Geosynthetic Institute



Vol. 29, No. 1

March, 2015

This quarterly newsletter, now in its 29th 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. 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 or mvashley@verizon.net.

Activities of GSI's Directors and Officers

1. The GSI Annual Meeting was held in Portland, Oregon in conjunction with Geosynthetics '15 Conference on February 17, 2015. There were 45 members in attendance and it was conducted by GSI's Director George Koerner. It was a resounding success and thanks to all in attendance.
2. The GSI Board of Directors meeting was held immediately after the annual meeting. Seven of the nine person board was in attendance. Thank you to all in this regard. George Koerner convened the meeting where a number of important details were addressed... some follow.
3. The GSI Fellowship program was reconfigured. Going forward fellowship for graduate students as follows...
 - fellowships are now for one year only (formerly it was for possibly three years)
 - the amount is now for \$5000 (formerly it was for \$10,000 + \$5,000 + \$5,000)
 - it is open for both masters and doctoral students (formerly it was doctoral students only)
 - more relevant topics than in the past will be favored (a list of 40-topics is available upon request)
 - proposals for the A.Y. 2015-'16 are due on June 12, 2015
 - review of proposals is by the BoD and officers (this remains as in the past)
4. Regularly scheduled webinars are being presented on a scheduled basis on behalf of both GSI and ASCE. See our website. If a special topic is needed on short notice contact Marilyn Ashley and we can accommodate you accordingly. In this regard we have "tag-teamed" on several occasions whereby we do our regular webinar followed by a member company doing further site-specific explanations.
5. The Geosynthetics 2015 conference was held Feb. 15-18, 2015 in Portland, OR, co-located with the International Erosion Control Association's (IECA) annual environmental connection show. This biennial geosynthetics conference was great and had about 3,000 people attending. The conference was full of educational components—featuring informative technical sessions and thought-provoking keynote lectures. Industry experts from around the world gathered to network, attend the educational sessions, participate in short courses, and walk the showroom floor. As you can see even Bob Denis of Solmax was there as were many other personnel from member organizations.

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6. GSI (i.e., George Koerner) was involved with four papers presented at the conference along with three panel discussions. The conference organizers were generous to allow the institute space for both the Annual (attended by 45 as pictured above) and BOD (all but 2 of the BOD attended) meetings.
7. Another event that George Koerner was involved with during the quarter was Geos Peru. It was the third national congress on geosynthetics held at the Hotel Los Delfines from March 4-6 in Lima Peru. IGS Peru President Ing. Augusto Alza Vilela (of TDM inc.) opened the congress with a discussion of advances in the uses and applications of geosynthetics in Peru. The scope and scale of some of his mining projects are remarkable. Geosynthetics continue to confirm their technical and economic value in civil works in South America. Peru invests heavily in infrastructure as a path to growth and development. For geosynthetics, there is a promising future throughout the Americas.

The congress was attended by 300 delegates and 50 exhibitors. Keynote speakers included Dr. Braja M. Das, Dr. Jorge Zornberg, Dr. George Koerner, M. Sc. Torrealva and M. Sc. Alfredo Mansen. It was a great show with plenty of sunshine and great food; see following photos.



8. Another event was the ISO TC 221 geosynthetic meeting in West Conshohocken, PA at ASTM headquarters. This meeting involved six working groups and was attended by sixty delegates from around the world committed to standardization of test methods, guides, practices and specifications. In addition to this three day meeting there was a party at George and Jamie Koerner's house Tuesday night March 10th. It was a casual BBQ attended by 53 people. Jamie Koerner outdid herself as a hostess and made everyone feel at home with good food and better conversation. A few pictures from the festivities appear below.



9. The last and most fun event that George Koerner was involved with during this quarter was the Containment Workshop put on by Naue Geosynthetics on March 16th at the Centre Birchwood Park, Warrington, U.K. Christopher Quirk put together a great day with lectures from Koerner, Fowmes, Pries, Stoyale and Flood. Topics covered were the changes to GRI-GM13 and GM17 geomembrane specifications and reasoning why the specifications are so important to the waste containment industry. There was also quite

a bit of discussion on landfill waste instability using shear box testing. The event was attended by 60 people from industry including the U.K. Department of the Environment; photos follows.



10. The nine-person GSI Board of Directors is presently as follows:

Term Ends 2015

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

Term Ends 2016

- A. N. Desai – BTRA & GSI-India (Agencies)
e-mail: btra@vsnl.com
- Edgard Chow – Kuraray (Resin Producers)
e-mail: edgard.chow@kuraray.com
- Kent von Maubeuge - NAUE GmbH & Co. KG (International-1)
e-mail: kvmaubeuge@naue.com

Term Ends 2017

- Tony Eith - CEC Consultants , Inc. (Consultants and Testing Labs)
e-mail: teith@cecinc.com
- Nathan Ivy - AGRU America Inc. (Geomembranes and GCL's)
e-mail: nivy@agruamerica.com
- Moreno Scotto - Maccaferri (International - 2)
e-mail: moreno.scotto@gmail.com

Overview of GRI Projects (Research)

The following projects are all funded by GSI membership dues unless specifically noted. Most are long-term projects for which we are well positioned to accomplish. Those projects marked with an asterisk have written papers available; please ask and we will send them accordingly. Contact George Koerner (gkoerner@dca.net), Grace Hsuan (g.hsuan@coe.drexel.edu) or Bob Koerner (robert.koerner@coe.drexel.edu) for details and/or discussions.

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 multiple thermocouples for long term measurements in both wet and dry municipal solid waste landfills in Pennsylvania. The project has been extended into its 17th-year and has resulted in an extremely authoritative set of real-life data which is being used by many researchers in their geomembrane lifetime predictions. George has presented an updated paper in Berlin at the 10th IGS Conference.
2. **Flow Behavior of Innovative Leachate Collection and Removal Systems (LCRS's)** – Several new geocomposite drainage systems are being compared to traditional geonet composites. The project is in its second year and will be a multi-year effort. It is likely that a Standard Guide will be developed on this topic.
3. **Flow Behavior of Fully Degraded Waste*** - This is a field project on 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 second paper was presented by George Koerner in Berlin at the 10th IGS Conference. A very recent draft White Paper was sent to members and “shot down” immediately. That said, we do indeed listen to the membership!
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 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. **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, PVC (N.A.), PVC (Euro.) and EPDM. Some of the products have exposure times of 70,000 light hours at 70°C and a replicate set of samples are being incubated at 60°C. Some will take at least 90,000 light hours (≈ 12.3 years). The third sequence at 80°C was started on 1/1/2010. They, of course, degrade much faster and are complete. Ongoing data is being reported to manufacturers and resin producers. GRI Report #44 is available on results to date. Our GSI-8 Webinar gives

preliminary data using the elevated temperature incubation and extrapolation modeling for lifetime prediction in the lab and in the field.

6. **HDPE Geomembrane Lifetime as a Function of Thickness** - This often encountered question is being evaluated by exposure at 80°C in a QUV weathering device per ASTM D7238. Formulations are exactly the same and only the sample thicknesses vary. These thicknesses are 2.76, 2.44, 1.58, 1.08, 0.77 and 0.48 mm. Parameters being evaluated in this decade long study are change in thickness and presence of crazing or cracking. Time will tell!
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 differences are in the type of plasticizers used in the formulations as well as thickness. In this regard we have been evaluating five different 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.
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 were incubated at 80, 70 and 60°C until half-life was achieved for strength and elongation. Laboratory lifetime predictions at 20°C as well as field predictions for Phoenix, Arizona are provided in GRI Report #44.
9. **Laboratory Exposed Lifetime of TRM Filaments** - We are also using UV-fluorescent exposure of four different turf reinforcement mat filaments to assess their lifetime capabilities. They have been incubated at 60°C, 70°C and 80°C. A final report to the manufacturer (Propex) has just been submitted.
10. **Laboratory Exposed Lifetime of Geotextiles** - A similar UV study as with geomembranes (Items 5 and 7), geogrids (Item 8) and TRM filaments (Item 9) has been conducted on various geotextiles. Woven monofilaments, woven slit films, nonwoven heat bonded and needle punched types are included. In the latter are four different weights of needle punched nonwovens. All data and laboratory and field lifetime predictions are included in GRI Report #44.
11. **Laboratory Exposed Geotextile Yarns** - A new effort on behalf of a member organization (TenCate) is evaluating polypropylene yarns with and without long-term antioxidants. It will be interesting to observe differences in behavior insofar as long-term strength and elongation. As with all of our long-term exposure research the incubation is the UV-fluorescent device per ASTM D7238.
12. **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 has now grown to 141, then 171, and now 254! *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 was published by the Journal of Geotextiles and Geomembranes in October, 2013 and the publisher (Elsevier) reports that 700 requests have been made to date. It was voted as being the best paper of 2013 by the journal.
13. **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 very 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.
14. **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.
15. **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 very fast for HDPE which is semi-crystalline and cannot readily stress relax. To investigate slower rates we have initiated a project with rates as low as 6.9 kPa/month (1.0 psi/month)! The last test, just now begun, is at a rate of 6.9 kPa/six months (1.0 psi/six months) and it will take about five years to conclude. A paper was presented at Geosynthetics '15 in Portland.
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 CETCO and may be extended for other manufacturers.

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 (heat only, but no sunlight) is of interest. George Koerner has set up such a scenario on behalf of Watershed Inc., a GSI member.

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

Completed and Available on our Website

- 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
- GM28 – CSPE-R Geomembranes
- GT10 – Geotextile Tubes
- GT12 – Geotextile Cushions
- GT13 – Geotextile Separators
- GCL3 – Geosynthetic Clay Liners
- GS15 – Geocells

Working; Available Upon Request

- GTXX – Turf Reinforcement Mats (tabled)
- GSXX – Polymeric Marine Mattresses

Delayed; Available Upon Request

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

The complete set of completed specifications are available to everyone (members and nonmembers) on the open section of our Home Page. Please download and use them accordingly. There is a brief tutorial accompanying each specification. Also note that this is where the latest modification will always be available. Of note is that GRI-GM13 for HDPE geomembranes has been upgraded for stress crack resistance and asperity height.

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

- A practice on field seaming inspection emphasizing the electrical leak location system (ELLS).
- Three standards on GCL joining so as to prevent/monitor panel separation.
- A guide as to recommended testing of drainage geocomposites.
- A practice explaining the use of MARV for geotextiles

- A transverse rib bending test for homogeneous geogrids

Progress within GII (Information)

Our GSI Home Page is accessed as follows:

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

It has been 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 | • Product Certification |
| • Prospectus | • Newsletter/Reports |
| • Associate Membership (Agencies) | • Internet Courses |
| • Members by Focus Groups | • GSI Members Links |
| • GSI Publications | • GSI Member Meetings |
| • GRI Specs, Guides, White Papers | • Courses at GSI |
| • Laboratory Accreditation | • 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. When you get into this section, the following information is available. This includes:

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

The Keywords Section contains about 35,000 citations which is the majority of the geosynthetics literature published in English. The proceedings of the 10th IGS conference in Berlin has just been added. 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. If you have topics in need of the current status please advise accordingly. The following are the most recent.

- #30 - In-Situ Repairs of Geomembrane Bubbles, Whales and Hippos
- #31 - On the Need for a Better Test Method Than Wet or Dry Sieving to Obtain the Characteristic Opening Size for Geotextile Filter Design Purposes

Progress within GEI (Education)

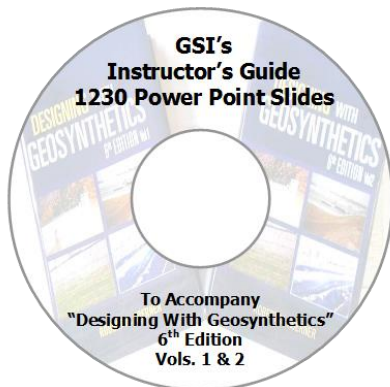
Free CD

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 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.

6th Edition of Designing With Geosynthetics

The 6th 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. All proceeds go to GSI.

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. Even further this might (?) morph into a full academic year "Distance Education Course" hosted by Drexel University.



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 43 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)
- #43 – An Analysis of the Most Difficult Q & A's of the First 2500 Submittals to the GMA Techline (just published)

Announcement of our most recent report!

- #44 - Exposed Lifetime Predictions of 19-Different Geosynthetics in the Laboratory and in Phoenix, Arizona

Courses

Due to lack of attendance for day-long courses at GSI we have not scheduled further dates. That said, all of our courses are available on-line via a series of six, ninety-minute, webinars. Contact Bob Koerner at robert.koerner@coe.drexel.edu if you want information and details.

GSI Webinars (90 minutes long)

(Second Wednesday of Every Month)
11:30 AM – 1:00 PM (Eastern Time Zone)

Registration at

www.geosynthetic-institute.org/webinar.htm

1.5 Professional Development Hours; Cost \$250

- W11 – April 8, 2015 "Lateral and Vertical Expansions"
- W12 – May 13, 2015 "Beneficial Uses of Closed Landfills"
- W1 – June 10, 2015 "MSE Wall Failures Data Base"
- W2 – July 8, 2015 "MSE Wall Back Drainage Design"
- W3 – August 12, 2015 "MSE Wall Remediation"
- W4 – September 9, 2015 "MSE Wall Inspection"

Note: These webinars are also recorded and are therefore available "on-demand", anytime and anyplace

ASCE Webinars

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

1.5 Professional Development Hours; Cost \$400

- ASCE 1 – April 7, 2015 "Geotextile Tubes"
- ASCE 2 – May 11, 2015 "Basal Reinforcement Using Geosynthetics"
- ASCE 3 – July 31, 2015 "Geotextile Filter Failures"
- ASCE 4 – August 24, 2015 "Geosynthetics in Unpaved and Paved Roads"

ASCE 5 – September 24, 2015 “Geosynthetics in MSE Walls and Slopes”

GSI Fellowships

The following table identifies the successful recipients, their university, advisor and topic for our year of activity. 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 2014-'15 Academic Year

Class 7(a) – 1st Year Funding at \$10,000 per student

No.	Name	University	Advisor	Topic
1-14	Asli Yalcin Dayioglu	University of Maryland	Ahmet Aydilek	Clogging Behavior of Recycled Concrete Aggregate in Geotextile Systems
2-14	Michelle (Mingyan) Deng	Missouri Univ. of Science and Technology	Ronaldo Luna	Reliability Based Optimization Design of Geosynthetics Reinforced Embankment Slopes
3-14	Yonggui Xie	Oregon State University	Ben Leshchinsky	MSE Wall Abutments: an Analytical Solution for Evaluating Service State Deformations with Geosynthetic Reinforcement

Class 5 (c) – 3rd Year Funding at \$5,000 per student

No.	Name	University	Advisor	Topic
3-11	Felix Jacobs	RWTH Aachen University	Martin Ziegler	Laboratory and Numerical investigation of Geogrid Reinforced Soil in Biaxial Compression Tests

Note that proposals for the new class for the A.Y. 2015-'16 are due on June 12, 2015. Also, please note Item #3 on “Activities of GSI’s Directors and Officers” in this Newsletter/Report for changes in the program.

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. *It should be emphasized 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 245 GAI-LAP test methods available for accreditation. Please consult our home page for a current listing.

As of March, 2015, 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^A - TRI/Environmental Inc. (135 tests)
Jarrett Nalson -- (512) 263-2101
Sallen@tri-env.com
- 3^A - Golder Associates (45 tests)
Henry Mock -- (770) 492-8280
dalexander@golder.com
- 4^C - Geosynthetic Institute (116 tests)
George Koerner -- (610) 522-8440
gkoerner@dca.net
- 8^B - Propex Operating Co., Ringgold (18 tests)
Todd Nichols -- (800) 258-3121
todd.nichols@propexglobal.com
- 9^B - Lumite (16 tests)
Rebecca Kurek -- (770) 869-1700
rpage@lumiteco.com
- 13^A - TRI Env. Inc. (Precision Labs) (97 tests)
Cora Queja -- (714) 520-9631
cqueja@tri-env.com
- 14^A - Geotechnics (49 tests)
J. P. Kline -- (412) 823-7600
JPkline@geotechnics.net
- 20^A - GeoTesting Express, MA (47 tests)
Gary Torosian -- (978) 635-0424
gtt@geotesting.com
- 22^B - CETCO Hoffman Estates (13 tests)
Barbara Gebka -- (847) 851-1500
jim.olsta@cetco.com
- 24^B - CETCO Lovell (10 tests)
Roger Wilkerson -- (307) 548-6521
roger.wilkerson@cetco.com
- 25^B - Ten Cate, Pendergrass (12 tests)
Beth Wilbanks -- (706) 693-2226
b.wilbanks@tencate.com
- 26^B - Agru America Inc. (20 tests)
Grant Palmer -- (843) 546-0600
gp@agruamerica.com
- 29^E - FITI Testing and Research Institute (68 tests)
Hong-Kwan Kim -- 82-2-3299-8071
hoganKim@fiti.re.kr
- 31^D - NYS Dept. of Transportation (9 tests)
Tom Burnett -- (518) 457-4704
tburnett@dot.state.ny.us
- 32^A - Geo-Logic Inc. (6 tests)
Ken Criley -- (530) 272-2448
criley@geologic.com

- 34^B - GSE Environmental Richey Road (36 tests)
Rich Schaefer -- (281) 230-6890
r.schaefer@gseworld.com
- 37^B - GSE Environmental Chile (19 tests)
Mauricio Ossa -- 56-2 6010153
Mossa@gseworld.com
- 38^C - Sageos/CTT Group (103 tests)
Eric Blond -- (450) 771-4608
eblond@GCTTG.com
- 40^B - GSE Environmental (14 tests)
Bruce Pressley -- (843) 382-4603
bpressley@gseworld.com
- 41^A - SGI Testing Service, LLC (19 tests)
Zehong Yuan -- (770) 931-8222
ZYuan@interactionspecialists.com
- 42^C - NPUST (GSI-Taiwan) (61 tests)
Chiwan Wayne Hsieh -- 011-886-8-7740468
CWH@mail.npust.edu.tw
- 43^A - Ardaman & Associates (22 tests)
George DeStafano -- (407) 855-3860
gdestafano@ardaman.com
- 44^B - PGI and Fiber Web, Inc. (9 tests)
Kim Thomas -- (615) 847-7155
Kim.Thomas@fiberweb.com
- 45^B - Ten Cate Geosynthetics Malaysia SDN Bhd. (23 tests)
Gan Wee Hunn -- (603) 519 28576
wh.gan@tencate.com
- 46^B - TAG Environmental Inc. (13 tests)
Colin Murphy -- (705) 725-1938
colin_murphy@tagenv.com
- 47^B - GSE Syntec (10 tests)
Andrew Barker -- (410) 327-1070
abarker@synteccorp.com
- 49^B - Engopol Geossinteticos (14 tests)
Carolina Polomino -- (55) 51 3303-3916
carolina@engopol.com
- 50^B - ADS, Inc. Hamilton (7 tests)
Terry McElfresh -- (513) 896-2065
terry.mcelfresh@ads-pipe.com
- 51^B - Solmax International Inc. (22 tests)
Simon Gilbert St. Pierre -- (450) 929-1234
simonGSP@solmax.com
- 53^B - Polytex Autofagasta (19 tests)
Ximena Parra Pizarro -- 011 56 57 42 90 00
XPanna@polytex.cl
- 55^B - Atarfil Geomembranes (19 tests)
Gabriel Martin Sevilla -- 34 958 439 200
gmartin@atarfil.com
- 56^B - Polytex Santiago (13 tests)
Marta Tenorio F. Jeff -- 011 56-2-627-2054
MTenorio@polytex.cl
- 57^B - Ten Cate Cornelia (13 tests)
Melissa Medlin -- (706) 778-9794
m.medlin@tencate.com
- 58^B - Propex Operating Co. Hazelhurst (16 tests)
Ron (Jeff) Bercher -- (229) 686-5511
Ronald.Bercher@propexglobal.com
- 59^B - Firestone (9 Tests)
Janie Simpson -- (864) 439-5641
SimpsonJanie@firestonebp.com
- 60^B - Polytex Lima (12 tests)
Elias Jurufe -- 51 16169393
Ejarufe@polytex.cl
- 61^B - Raven Industries (17 tests)
Clint Boerhave -- (605) 335-0288
Clint.Boerhave@ravenind.com
- 62^B - Solmax International Asia (14 tests)
Teoh Pei Ching -- (450) 929-1234
pcteoh@solmax.com
- 63^A - TRI Environmental, Inc.; DDRF (5 tests)
Joel Sprague -- (864) 242-2220
JSprague@tri-env.com
- 64^B - Agru America (NV) (14 tests)
Chris Adams -- (775) 835-8282
ca@agruamerica.com
- 65^C - Bombay Textile Rsearch Assoc. (BTRA) (24 tests)
Riyaz Shaikh
(0) 022-25003551
bra@vsnl.com
- 66^B - Rowad International Geosynthetics Co. Ltd (14 tests)
Asad Ullah Khan -- +966-3-812-1360
asad@rowadplastic.com
- 67^A - MicroBac Hauser Division (10 tests)
Heather Smalley -- (720) 406-4806
heather.smalley@microbac.com
- 68^B - Glen Raven Technical Fabrics LLC (4 tests)
Richard Greeson -- (336) 229-5576
rgreeson@glenraven.com
- 69^B - GSE Environmental (12 tests)
Siriporn Chayaporenler -- 6638-636638
Siripornc@gseworld.com
- 70^A - RSA Geo Lab LLC (48 tests)
Raza Ahmed -- (908) 964-0786
geolab13@yahoo.com
- 71^B - Plasticos Agricolas y Geomembranas S.A.C. (15 tests)
Jhoana Carolina Diaz Martinez -- 073-511814-511829
calidad@pga.peru.com
- 72^B - Tensar Corp. GA (5 tests)
Mignon Kittler (770) 968-3255
mkittler@tensarcorp.com
- 73^B - Gai Loi JSE (9 tests)
Paul Wong 84-650-362-5825
paul905677@gmail.com
- 74^B - Agru America Inc.
Mark Locklear (843) 221-4412
ml@agruamerica.com
- 75^B - GeoMatrix S.A.S.
Javier Diaz Cipagauta (571) 424-9999
jdiaz@geomatrix.com.co
- 76^B - Tehmco (Chile)
Patricia Rojas Perez (562) 589-2800
projas@tehmco.cl
- 78^B - PQA Mexico
Cesar Augusto Arcila (669) 954-8202
calidadmexico@pga.com.co
- 79 - TRI Suzhou China (21 tests)
Cora Queja (291) 230-8695
cqueja@tri-env.com
- 80 - Texel (Canada) (8 tests)
André Parent (418) 387-4801
andre.parent@texel.ca
- 81 - GSE Germany (18 tests)
____ Kroeger
ekroeger@gseworld.com
- 82 - CARNO ATC (1 test)
Mary Lynn Smith (770-427-9456)
marylynn.smith@cardno.com
- 83 - GSE Egypt (12 tests)
Ahmed Abdel Tawab +2 02 38288820
atawab@gseworld.com

^AThird Party Independent ^CInstitute
^BManufacturers QC ^DGovernment

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

Commentary on Specimen Retention

Different and sometimes conflicting advice is given on the subject of spent test specimens and records retention. Some people recommend getting rid of everything as soon as you can, while others suggest keeping everything forever. With such varying advice, it is tempting to manage specimens and records solely from a legal perspective, in other words, in terms of how long after a project is complete the firm remains vulnerable to potential lawsuits.

The length of time you should keep materials and their records also depends on the action or event. Generally, you must keep your records that support an item until the period of limitations for that item runs out. An example of this is seven (7) years for federal tax purposes. The period of limitations is the period of time in which you can amend or assess additional action. Recognize that spent test specimens require much more space than the supporting of the test results, the latter eventually be capable of being stored electronically.

A number of states have a statute of repose that limits the time in which an action may be brought to a period that begins with a specific documented event, such as substantial completion of a project. These times may range from four to fifteen years.

However, I am not familiar with each states laws in regard to retention of materials and records. Please also note that legal issues should not be the only consideration in deciding which materials or records to retain. Some of this material may need to be retained from a historical perspective. Typically one evaluates how a firm currently handles records once a project is no longer active. Take the opportunity to determine which records are important to preserve and then write a materials records retention policy. Remember, though, that a key factor for the success of such a policy is whether the procedures it mandates are practical for firm employees to implement and maintain in the office environment.

When evaluating current practices, a good first step in designing an office materials and records retention policy is to evaluate the firm's current day-to-day project filing and record-keeping practices. In a best-case scenario, minor modifications of existing office procedures can be made to vastly improve future archiving requirements. A vital cog in records retention policies are the people who do the actual work of project material and records keeping. Hopefully the transformation from paper to electronic records makes the task easier but it leaves materials such as spent test samples and specimens to be decided on a limited time basis.

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 in 2011) is focused on MSE Wall, Berm and Slope field inspection. See our website at 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 eighth 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 – 2015

Year	Geosynthetic Materials		Compacted Clay Liners		Commentary No. of people failing both exams
	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
2007	82	11 (13%)	73	12 (16%)	7
2008	95	25 (26%)	89	20 (22%)	13
2009	36	7 (19%)	36	2 (5%)	2
2010	59	12 (20%)	54	7 (13%)	5
2011	54	6 (11%)	53	3 (6%)	1
2012	34	5 (15%)	28	3 (11%)	3
2013	32	4 (12%)	30	1 (3%)	1
2014	45	1 (3%)	42	3 (7%)	0
2015	3	0	3	0	0
TOTAL (to date)	581	76 (13%)	536	63 (12%)	34

The 5-year renewal period for those having taken the exam in 2009 is ongoing and about 60% have renewed accordingly. This is felt to be encouraging from our perspective.

The corresponding course for this certification program is available in a series of six-90 minute webinars. Contact Jamie Koerner at jrkoerner@verizon.net for details and arrangements.

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. The corresponding course for this certification program is available in a series of six-90 minute webinars. Contact Bob Koerner at robert.koerner@coe.drexel.edu for details and arrangements.

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 or Jamie Koerner at jrkoerner@verizon.net for questions or additional information.

The status of the program is shown in the following table.

Inspector Certification Test Results
MSE Walls and Berms
(2011-2015)

Year	Course Location	MSE Wall And Berms	
		No. of People Taking the Exam	No. of People Failing the Exam
2011	GSI Course	7	0
2012	GSI Course	6	0
2013	GSI Course	2	0
2014	GSI Course	3	0
2015	GSI Course	4	0
TOTAL		22	0

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.

GSI-India under the direction of Dr. A. N. Desai has just been formed. The hosting organization is the Bombay Textile Research Association (BTRA) which is world known for its excellence in textile R & D and is currently branching out into all forms of geosynthetics. We are delighted in this regard and, as a side-note, Dr. Desai has just been elected to GSI's Board of Directors. (See associated writeup on the "Global Geosynthetics Summit" in the December, 2014 Newsletter/ Report).

Items of Interest

Please note that this section will no longer be carried in these quarterly GSI Newsletter/Reports. This is due primarily to limit the length of the reports which have grown considerably over time.

Nonreinforced Working Platforms

Back in the early 1960's Bob Koerner was the very young resident engineer on a sand drain/surcharge project requiring the use of a very large pile driving "rig" which was made even more massive than usual with leads hanging over the front and a compressor on the back for counterweight. The first part of the project consisted of spreading a 3 ft. thick (~ 1.0 m) layer of sand called a "working blanket" over the 500 ft. (150 m) by 200 ft. (60 m) site. It was underlain by a 65 ft. (20 m) thick layer of soft saturated silty clay foundation soil. The purpose of all of this was to rapidly consolidate the soft foundation soil via expelled water from the sand drains for the construction of two large steel molasses storage tanks. (Today we would use prefabricated vertical drains, aka wick drains.) While the consolidation part made sense to me, the working blanket (which I thought was just to release the expelled water) was not obvious until the large crane crawled out from its assembly location to begin driving the sand drains. For each impact everything around it simply shook. In particular, incremental movements of the crane shook the localized area like one was standing on a water bed! The project itself was so formative for me that I wrote a paper on the project (ref. Koerner, R. M., "A Young Engineers, Molasses and Failed Sand Drains", Geosynthetics, Vol. 7, No. 5, 2009, pp. 24-31). Ask for a copy if interested.

These thoughts came back when reading the short article in Foundation Drilling Magazine (Nov./Dec., 2014) by James Finbow of Bauer Foundations in Canada. His title "Working Platforms, of course I have one. By the way what is it?" reminded me of those days long gone. Jim shows three awesome photos of inadequate/improper working platforms as shown below.



Photo demonstrates the catastrophic consequences of an unsuitable working platform



CFA rig collapsed across main London to Paris railway line. Collapse due to improper working platform.

Above photos compliments of ADSC and Foundation Drilling Magazine

To geosynthetics oriented people the solution for an adequate and proper working platform (working platform is a much better description of the function than working blanket) is obvious... geotextiles, geogrids, geocomposites, geomattresses, etc., all have a key role to fulfill in reinforcing such soft and unstable soils against the site-specific loading system. The above said, I see very little by way of geosynthetic design solutions specifically for working platforms in the technical literature (or even on the websites of geosynthetic manufacturers and design engineers) suggesting to all involved (particularly contractors) that we have the "key" toward safe and economical working platforms.

Some special focus seems to be in order (and even desired) in this regard.



Photo showing failure of working platform and the importance of a safe site

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 Altakamol Alhadith Cont. Co. of Saudi Arabia with Carlos Lasserre; INOVA Geosynthetics/AERO Aggregates with Archie Filshill; Sotrafa Agrualura y Geosinteticos of Spain with Jose Miguel Munoz Gomez; and Kaytech Fabrics Co. of South Africa with Garth James. Thanks to all and welcome to GSI!!!**

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Watershed Geosynthetics LLC
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INOVA Geosynthetics/AERO Aggregates
Archie Filshill
Sotrafa S. A.
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Kaytech Fabrics
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- Delaware Solid Waste Authority**
Thomas A. Heck
- Nebraska Department of Environmental Quality**
Michael Behrens
- New York State Dept. of Environmental Conservation**
Robert J. Phaneuf
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- U.S. Bureau of Reclamation**
Jay Swihart/Peter Irely
- Michigan Dept. of Environmental Quality**
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- Virginia Dept. of Environmental Quality**
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- Dept. of Water Affairs of South Africa**
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IN THE NEXT ISSUE

- Activities of the GSI Directors and Board
- 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
- Perceived Status of Erosion Control Products
- GSI's Member Organizations