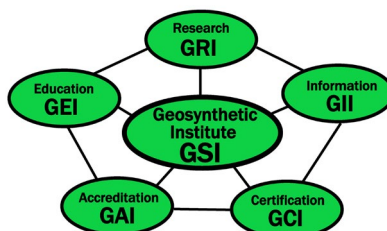


# The GSI Newsletter/Report



## Geosynthetic Institute

Vol. 37, No. 2

June, 2023

This quarterly newsletter, now in its 36<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 Jamie Koerner at phone (610) 522-8440; or e-mail at [gsigeokoerner@gmail.com](mailto:gsigeokoerner@gmail.com) or [Jamie@geosynthetic-institute.org](mailto:Jamie@geosynthetic-institute.org)

### Activities of GSI's Officers and Board of Advisors (BOA)

#### 2023-2025 Board of Advisors

The following are the names of the current BOA members and their contact information. We thank them for their time and advice on matters concerning the Geosynthetic Institute. Please reach out to them if you have any questions or comments.

#### Term Ends 2023

- Te-Yang Soong - CTI Co. (Consultants)  
email: [tsoong@cticompanies.com](mailto:tsoong@cticompanies.com)
- Brian Fraser - Layfield Group (Barrier Group)  
email: [brian.fraser@layfieldgroup.com](mailto:brian.fraser@layfieldgroup.com)
- Jacek Kawalec – Tensar (International - 2)  
e-mail: [Jacek.Kawalec@vp.pl](mailto:Jacek.Kawalec@vp.pl)

#### Term Ends 2024

- Burrill (Bo) McCoy - Waste Management Inc. (Owners and Operators)  
e-mail: [bmccoy2@wm.com](mailto:bmccoy2@wm.com)
- Rene Laprade - Tencate Geosynthetics (Geotextiles and Geogrids)  
e-mail: [r.laprade@tencategeo.com](mailto:r.laprade@tencategeo.com)
- Sam Allen – TRI Environmental Inc. (Test Laboratories)  
e-mail: [Sallen@tri-env.com](mailto:Sallen@tri-env.com)

#### Term Ends 2025

- Henning Ehrenberg – NAUE GmbH & Co. KG (International-1)  
email: [hehrenberg@naue.com](mailto:hehrenberg@naue.com)
- Miranda Rine – C.P. Chemical (Resin and Additives Group)  
email: [Miranda.rine@cpchem.com](mailto:Miranda.rine@cpchem.com)
- David Carson – U.S. EPA (Agencies)  
email: [carson.david@epa.gov](mailto:carson.david@epa.gov)

GSI continues to have virtual quarterly meetings with the Board of Advisors via Zoom. The 3Q BOA meeting is scheduled for September 29, 2023. Elections will be held in Q3 for the BOA positions held by Te-Yang Soong (Consultants), Brian Fraser (Geomembranes/GCLs) and Jacek Kawalec (International). We are now soliciting candidates for these perspective BOA positions. If you wish to be included on the ballot, please reach out to us ASAP.

#### IN THIS ISSUE

- Activities of GSI's Officers and BOA
- Overview of GRI (Research) Projects
- Progress within GII (Information)
- Progress within GEI (Education)
- Activities within GAI (Accreditation)
- Activities within GCI (Certification)
- The GSI Affiliate Institutes
- GSI's Member Organizations

## 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. In an attempt not to repeat information in the quarterly newsletters, we will merely list the ongoing projects that have been written about in previous newsletters and will only provide details of new research. For details and/or discussion of ongoing projects contact:

George Koerner ([gsigeokoerner@gmail.com](mailto:gsigeokoerner@gmail.com))

Grace Hsuan ([hsuanyg@drexel.edu](mailto:hsuanyg@drexel.edu))

### 1. Durability of Exposed Geosynthetics (GM, GT, GG, HPTRM, Turf, WD & GCCM)

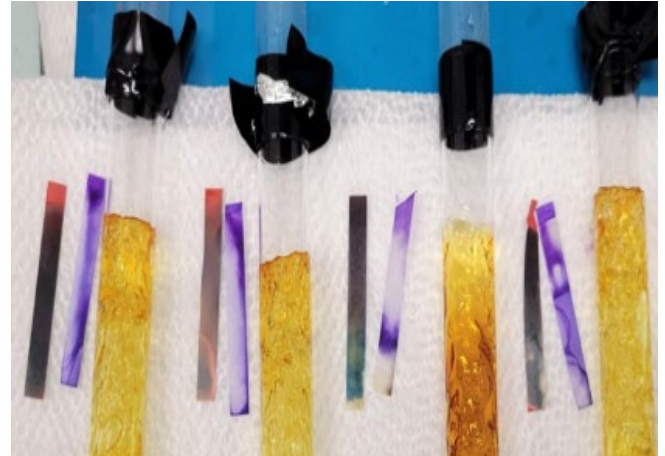
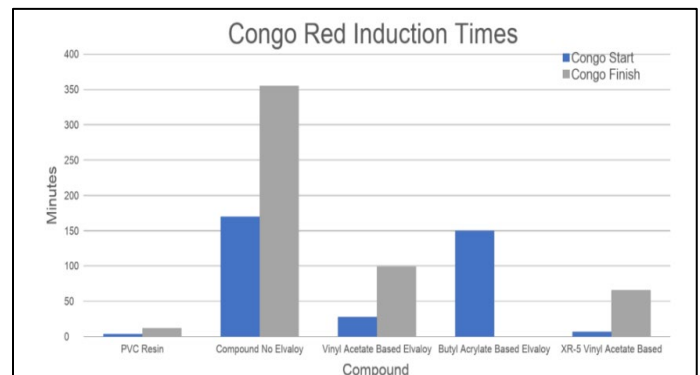
GSI is using two outdoor exposure racks and four UV fluorescent devices to estimate the projected exposed lifetime of a litany of different geosynthetics. The newest material added to the repertoire are GCCM which are tested before and after exposure via ASTM D8058 Flexural Strength. Durability of Geosynthetic at GSI (Outdoor versus laboratory exposure) Currently testing 8 GMs, 4 GCCMs, Wind defender, Closure Turf, Miramesh, Tensar BX and 2 HP-TRMs. The goal of the study is to quantitatively illustrate the durability of these materials and to correlate outdoor exposure to accelerated weathering. Study is in its ninth year.

### 2. GSI wall, pH and durability of PET GGs

We continue to measure the pH between three types of dry cast masonry retaining wall blocks for over fourteen years. Concern here is over PET geogrids which are known to be sensitive to very high alkalinity environments. Indeed, the PH values started high, but over time they are now down below eight. It is nice to know that Mother Nature likes to buffer things from a pH perspective and we are always trying to reach equilibrium. A paper on this topic will be presented at GeoAmericas 2024.

### 3. EIA = PVC + KEE Specification

GRI-GM34 EIA = PVC +KEE Specification last revision was in March 7, 2023. It will be revised again after compelling research presented by Seaman Corporation during a May visit to GSI. As you can see by the following results, the Congo Red Induction Times for commonly formulated EIA do not reconcile with the 60 minutes currently in the standard for thermal stability.



Therefore the proposed updates of the specification are as follows:

1. Strike flawed ISO 182-1 Congo red thermal stability test
2. Change testing frequency units from lbs. to square yards.
3. Reorganize the Table 1 into "system" (i.e., composite EIA and scrim) and "EIA alone" properties.
4. Replace ASTM D751 Trouser Tear with ASTM D5884 Tear.
5. Change Severe, Moderate and Typical conditions based on survivability concerns to Type 1, 2 and 3 based on application specific needs.
6. Strike any reference to encapsulation of scrim (i.e., section 6.2)

### 4. Beyond GRI GM13 and GM17

GM-13 and GM-17 have achieved acceptance and adaption in many markets and countries throughout the world. The documents have been modified over time with 16 and 14 modifications/revisions, respectively. However, the barrier market has significantly expanded

in scope, range and expected performance over the past decade. A “one size fits all” approach, while appropriate in the past, is no longer adequate to address the industry’s needs.

For this reason, GSI has contracted a group of talented engineers and scientist with a wealth of knowledge on formulating and manufacturing PE geomembranes to prepare new specifications for geomembrane barriers based on application requirements including, but not limited to durability, lifespan, barrier properties and other factors. This process would include investigation of existing databases from multiple sources and review and discussion of the proposed levels and values. This process will be somewhat lengthy and, of course, a proposed output will need review by a larger group.

The contract is for \$100K USD and will last a year. A contract was awarded to a group from TRI environmental. The project team consists Rick Thomas, Amber Douglas, Sam Allen and Boyd Ramsey. There will be monthly Zoom calls to discuss status, findings, and efforts within the group. There will also be quarterly meetings open to the GSI committee for the purpose of transparency. The project started on December 2022 and will end on December of 2023.

We had 29 portals + 17 Pdf requests for a Q2 update, which was presented by Boyd Ramsey and Sam Allen on June 29<sup>th</sup>, 2023 to the GSI Geomembrane focus group. The following are a few takeaways from the presentation.

- A midterm report is due for this project which will be distributed to all upon receipt.
- We were surprised the chlorine immersion was deemed unsuccessful by the project team as an accelerated aging practice of polyethylene geomembranes. It should be noted that this accelerated aging technique is still being championed in ASTM D 35.02.
- Concern that Carbonyl Index work is being conducted on thin film rather than geomembranes (30 mil plus material)
- Gas chromatography separates the components of a compound, and mass spectrometry characterizes each of the components individually. The combination of the two analytic techniques allows for both qualitative and quantitative evaluations of a sample containing a number of organic compounds. These techniques will be used on the off gas during a TGA test to evaluate polyolefin formulations. This approach using the chemical fingerprinting method looks promising to the research team.

## 5. 31 year old MSW exhumation Case history

A MSW landfill is being exhumed after 31 year of excellent service, (less than 2 GPAD leakage rate into the secondary). The pumps have been off for over a month and still there is nothing to pump in the secondary sump. The composite liner has done its job very well.

GSI will test Primary and Secondary Geomembranes, Fusion and Extrusion Seams, Geotextiles, Geonet, GCL against all of the requisite GRI specification and base line information. Liner system was installed in 1992 and exhumed in 2023 as part of a lateral expansion at the facility. This is an awesome opportunity to evaluate geosynthetic durability real-time in a real-world application. Much more to come in this once in a lifetime opportunity.



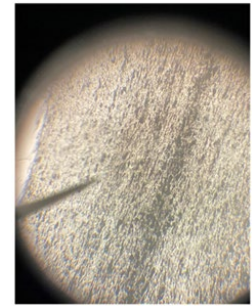
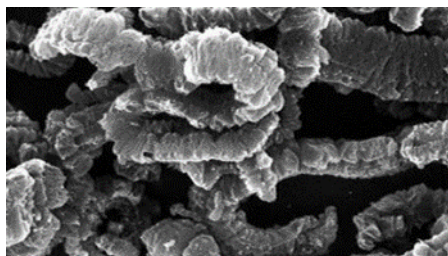
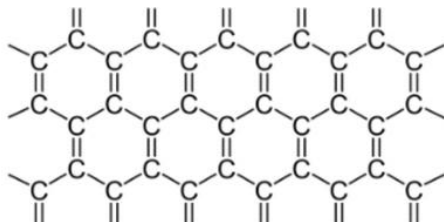




## 6. Comparing geomembrane stabilized with Graphene rather than carbon black.

According to the United States criteria in OSHA HCS for classifying hazardous substances, Carbon Black is not classified for any toxicological or eco-toxicological endpoint. However, as a combustible dust or a reaction by product it is designated by OSHA as a hazardous chemical particularly when it is airborne. For this reason, some forward-thinking individuals in the geosynthetic industries are looking for alternatives to carbon blacks to protect the polymer from UV degradation, act as a black pigment and improve the conductivity.

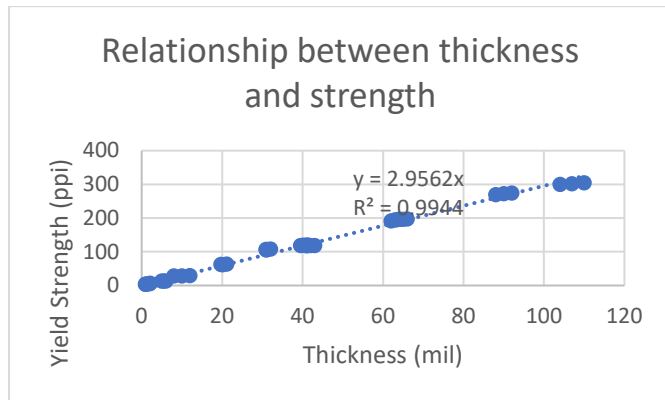
We are currently testing five samples with graphene content from 1 to 5%. We will counterpoint all GRI GM13 properties. As you can see by the pictures below, we will have to write new methods for graphene content and dispersion prior to creating new geomembrane specification.



## 7. Controlling the smooth edge thickness of textured polyolefin geomembranes.

- Over the past several years, we have seen a reduction in thickness of the weld edge (smooth edge) of textured geomembranes. This is presenting a challenge for installers when trying to achieve passing trial seams in the field prior to production welding. Seam tests are passing, but just barely (10% above GM19a or less).
- GRI GM13 and GM17 specifications allow for thickness measurements to be less than the nominal geomembrane thickness for smooth and textured geomembranes. Specifically, one (1) of ten (10) thickness measurements for a textured geomembrane can be 15% less than the nominal geomembrane requirement and this value could be recorded anywhere across the geomembrane material. GM19a seam strength specification values are based on the actual, rather than the nominal thickness of geomembranes. This can present a challenge for installers when trying to achieve passing trial seams in the field prior to production welding, based upon GM 19a values. GSI has been given the task to reconcile this quandary, or at least try to explain it.
- We consulted with five major GAI-LAP accredited test labs and found that none of them take thickness measurements of the weld edge. However, both ASTM D5199 and ASTM D5994 stipulate "that samples are to be taken within 6" of the edge of the roll." It is the Institute's opinion that thickness measurements should be taken at 6" from the edge of the roll on both sides. The smooth edges of textured sheets should be checked via ASTM D5199 test. The remainder of the textured portion of the geomembrane should be checked via ASTM D5994. Labs should stay away from measuring the immediate texture to smooth transition zone. However, the smooth edge absolutely needs to be checked and agree with the stated nominal thickness of the delivered geomembrane.

- As you can see in Figure 1 below, thickness is linearly related to strength. A reduction of thickness at the smooth edge will be a significant factor affecting geomembrane strength and the seam produced using the geomembrane.



**Figure 1- Relationship between thickness and tensile strength of smooth HDPE geomembranes**

- We believe that thickness control (and for that matter all GRI GM13 properties) of the geomembrane weld edge is vitally important. This weld edge portion of the geomembrane needs to be controlled through testing. The thickness and visive tensile strengths are critical to the overall success of the project. Arguably, the seam is the most critical part of the installation due to stress concentration and workmanship issues.
- It should be noted that peel and shear values per ASTM D6392 contained within GRI GM19a were determined from years of field data from thousands of case histories. The case studies are worldwide and include both public and private sector jobs. Promulgated in 2002, GRI GM19a seam specification for HDPE geomembrane was based on the “true” nominal thickness of geomembranes. Using Figure 1 as an example, if a geomembrane has a roll edge of 51 mils instead of 60 mils, the installer would be starting the project with a 27 ppi handicap.
- We see the following two options for reconciling the current situation.

**Option 1: revisions to GRI GM19a.**

Note 6: to be added to section 5.1 page 4 of 13 of specification, note 6: Test seam strength values in Tables 1a & b, 2a & b and 3a & b are based on “actual” thickness values rather than “nominal” thickness values of the seamed geomembrane.

**Option 2: revisions to GRI GM13 and GM17**

Note to be added, “When working with a textured geomembrane with a smooth edge, the smooth edge of the textured geomembrane must meet specification for the requested nominal thickness of the smooth geomembrane.”

**There will be a GM Task Group Meeting on July 19, 2023 to discuss the path going forward.**

## **Progress within GII (Information)**

We updated the Geosynthetic Institute bylaws in June of this year. The Bylaws were first adopted in December 11, 1994 and the last Revision (#9) was done on December 11, 2017. The Latest Revision is (#10) June 22, 2023 and contains the following updates.

- Added GSI address to cover page.
- Updated GSI Logo.
- Removed Robert and Paula Koerner from BOD listing.
- Deleted personal addresses of Board of Director members
- Separated Consultants and Test Laboratories Board of Advisor Positions.
- Eliminated “At Large” BOA position.
- Changed mail to email.

The bylaws are available to anyone upon request.

As you can see by the listing below, we are still disseminating a lot of new information at the institute.

- GRI Methods, Specifications, Guides & Practices
- GM34 EIA (PVC +KEE) specification
- GM36 fusion seam thickness
- GM24 Immersion chlorine star fold incubation
- GM13, 17 & 19 smooth edge thickness of textured GM
- Quarterly Newsletters
- White papers
- GSI Website (updated by Charles Merab)
- Bimonthly GMA Techline (contract Renewals for 2023-2024) and
- Bimonthly GSI News Column in Geosynthetics Magazine

## I-95 Highway Repair

Geosynthetics saved the day once again during the I-95 Philadelphia highway repair. This critical infrastructure carries 160,000 vehicles per day and is a major truck route. The entire roadway was closed in both directions because of a gas tanker explosion under one of its primary bridges. A temporary MSE wall was built in only twelve days to reinstate six lanes of traffic. Congratulations to Aeroaggregates, Solmax/Propex, Huesker and Tensar for providing the sustainable materials that keep the world moving!



Dr. Archie Filshill (CEO of Aero aggregates) being congratulated by President Biden, with the mayor, governor and two senators in attendance

## Geosynthetic Institute's upcoming Activities:

- 2023 GAI-LAP 22 audits (5 remain)
- 2023 July 8<sup>th</sup> Annual GSI BOD meeting in Philadelphia, PA
- 2023 July 19<sup>th</sup> GM task Group virtual meeting
- 2023 September 17<sup>th</sup> -22<sup>nd</sup> - 12<sup>th</sup> ICG, Roma Italy
- 2023 September 26<sup>th</sup> Naue Romania
- 2023 September 29<sup>th</sup> Q3 Zoom GSI BOA meeting
- 2023 October 11<sup>th</sup> GeoVirginia
- 2023 November 7<sup>th</sup> – 9<sup>th</sup> Geo “U” Two, Austin, TX USA

- 2023 December 12<sup>th</sup> CETCO GCL University, Irvine, CA USA
- 2023
- December 22<sup>nd</sup> Q4 Zoom GSI BOA meeting
- 2024 January 24-26<sup>th</sup> ASTM D35 Louisville, KY USA

## Members Only Section on Website

To go further one needs a members-only password. Your contact person/persons (names beneath member company) must obtain a password from Jamie Koerner to access the members-only section of the Geosynthetic Institute website. Jamie can be reached by e-mail at [Jamie@geosynthetic-institute.org](mailto:Jamie@geosynthetic-institute.org). When you get into this members-only section, the following information is then available.

- GRI Test Methods (all)
- GRI Reports
- GRI Technical Papers (419 Citations)
- Notes of GSI Meetings
- Links to the GSs World
- Keyword Search for Generic Papers
- Example Problems
- Frequently Asked Questions (FAQs)

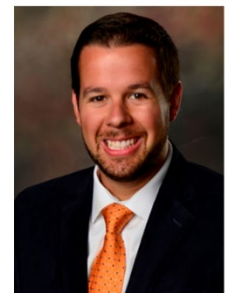
## GRI Reports

To date, we have 48 GRI Reports available to members and associate members. These reports vary in length from 30 to 200 pages. They are in the password protected section of our home page at [www.geosynthetic-institute.org/member/reports.html](http://www.geosynthetic-institute.org/member/reports.html).

White papers are available for free to everyone, however GRI reports are only free to members (located in the member's only section of the website). Non-members can purchase the reports from the online GSI bookstore.

## Progress within GEI (Education)

## Fellowships - 2023 Landreth Award Winner



We are proud to announce **Michael A. Perez, Ph.D., PE** as the 2023 Landreth Award Winner. Mike is an Assistant Professor at Auburn University in Alabama. The Robert and Mitchell Landreth “Steward of the



Environment” award was established in 2021. It is in honor of Robert Landreth (1939-2021) and his wife Mitchell. The award is bestowed by the Geosynthetic Institute (GSI) in recognition of “distinguished engineering achievement related to the environment” by a young faculty member, graduate student, or post doctorate working with Geosynthetics. Only one such \$10k USD award is given annually by GSI.

The Institute will again sponsor the Testing Innovation Fellowship Program with a \$10k USD donation shared by IGS North America and ASTM international. It is our great pleasure to do so for this very worthwhile cause. These students are our future!

## Brazil Virtual Lecture Durability of Polyethylene Geomembranes

On Tuesday, June 20, Dr. George Koerner presented a lecture on “Durability of Polyethylene Geomembranes to approximately 157 attendees. The lecture was sponsored by Nortene and Engapol, who is a member of the Geosynthetic Institute and a participant in the GAI-LAP program.

While Dr. Koerner was in Brazil the week prior (June 12 – June 16) for GAI-LAP audits, he gave a lecture sponsored by TDM Brazil. The seminar on geocells was well received. Pictured below are some of the attendees who attended the seminar.



## Free Webinar Wednesdays

From January 4, 2023 until March 15, 2023, the Geosynthetic Institute gave **FREE 15 minute webinars** every Wednesday. This was open to everyone (members and non-members). The purpose was to educate everyone, even those not familiar with geosynthetics. The links are still posted on the Geosynthetic Institute’s website and anyone who is interested in viewing the recorded webinars can do so at no cost. The following link provides access: <https://geosynthetic-institute.org/free.html>

## Webinar Wednesday Schedule 2023

The “live” webinar schedule will resume in April, with one webinar per month. These GSI webinars (1 ½ hours in duration) will be available for purchases on our website.

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

Date	GSI No.	Title
April 19	W-35	Geosynthetics used as Hydraulic Barriers - Description
May 31	W-31	Laboratory Testing of Geosynthetics- Description
June 21	W-32	Sustainability of Geosynthetics - Description
July 19	W-33	Ultraviolet Resistance of Geosynthetics- Description
August 16	W-23	Geosynthetic Filters: Concerns and Issues - Description
September 6	W-36	Geosynthetics used in Canal Linings - Description
October 11	W-26	Applications and Design of Geotextile Tubes- Description
November 15	W-34	Geosynthetics in Roadways- Description
December 13	W-6	Geosynthetics in Heap Leach Mining - Description

Each webinar provides 1.5 Professional Development Hours available upon completion of a short quiz

GSI Members Cost - \$200  
(unlimited number of attendees for GSI Members)  
Nonmembers Cost - \$250

## Courses

We have abandoned our in-house, one-day, courses (which have been given for the past 30-years) and are presently delivering two of them in six segments over three consecutive days, one each morning and then afternoon. They are the following:

1. Quality Assurance/Quality Control of Geosynthetic in Waste Containment Facilities  
(Recordings are available)
2. Construction Inspection of Mechanically Stabilized Earth (MSE) Walls, Berms and Slopes  
(Recordings are available)

The third and newest of GSI courses is an On-Line “Designing with Geosynthetics (DwG)” course. Please go to [www.geosynthetic-institute.org/courses.htm](http://www.geosynthetic-institute.org/courses.htm) and scroll down to Course #3. Here you will see the requisite details. The course itself is completely synchronized with the 6<sup>th</sup> Edition of the DwG textbook. It consists of 1540 slides with  $\approx$  18 hours of voice over; about one minute for each slide.

Contact Jamie Koerner at [jamie@geosynthetic-institute.org](mailto:jamie@geosynthetic-institute.org) if you want additional information.

## Activities within GAI (Accreditation)

This program is exceeding expectations with much interest internationally and with the proficiency test program (PTP)

- Began in 1995 w/ISO 17025 as model. GSI operates under 17011.
- 122 labs, 24 different countries, 265 possible tests

- GAI-LAP now has a cooperative agreement with A2LA. In addition, there are currently four newly minted A2LA Auditors (with geosynthetic expertise) that have passed the CQA exam post A2LA Training on May 15-19<sup>th</sup> 2023 in Fredrick MD U.S.A.



A2LA Training Session in Fredrick MD

- An ad-hoc committee in Denver CO has approved BTRA and FITI to conduct GAI-LAP audits in India and Asia, respectively. Auditors of each institute need to be vetted before auditing can commence.



125 Anniversary of ASTM International, Denver CO, USA

The following laboratories are accredited by the GAI-LAP for the number of test methods listed in parenthesis.

- |   |  |
|---|--|
| <p>1<sup>A</sup> - TRI/Environmental Inc. (155 tests)<br/>Jarrett Nelson -- (512) 263-2101<br/><a href="mailto:jnelson@tri-env.com">jnelson@tri-env.com</a></p> <p>3<sup>A</sup> - WSP (43 tests)<br/>Henry Mock -- (770) 492-1893<br/><a href="mailto:Henry.Mock@wsp.com">Henry.Mock@wsp.com</a></p> <p>4<sup>C</sup> - Geosynthetic Institute (108 tests)<br/>George Koerner -- (610) 522-8440<br/><a href="mailto:gsigeokoerner@gmail.com">gsigeokoerner@gmail.com</a></p> <p>8<sup>B</sup> - Solmax Geosynthetics (Propex) - Ringgold (18 tests)<br/>Todd Nichols -- 438-553-3757<br/><a href="mailto:tnichols@solmax.com">tnichols@solmax.com</a></p> <p>9<sup>B</sup> - Lumite (17 tests)<br/>Rebecca Kurek -- (770) 869-1787<br/><a href="mailto:rkurek@lumiteco.com">rkurek@lumiteco.com</a></p> <p>13<sup>A</sup> - Precision Geosynthetic Labs (TRI Env.) (75 tests)<br/>Chad Blackwell -- (714) 520-9631<br/><a href="mailto:cblackwell@tri-env.com">cblackwell@tri-env.com</a></p> <p>14<sup>A</sup> - Geotechnics (55 tests)<br/>J. P. Kline -- (412) 823-7600<br/><a href="mailto:JPkline@geotechnics.net">JPkline@geotechnics.net</a></p> <p>20<sup>A</sup> - GeoTesting Express, MA (63 tests)<br/>David Norton - (978) 635-0424<br/><a href="mailto:dnorton@geotesting.com">dnorton@geotesting.com</a></p> <p>22<sup>B</sup> - CETCO Hoffman Estates (11 tests)<br/>Minerals Technologies Inc.<br/>Dennis Wind -- (847) 851-1904<br/><a href="mailto:Dennis.wind@mineralstech.com">Dennis.wind@mineralstech.com</a></p> <p>24<sup>B</sup> - CETCO Lovell (12 tests)<br/>Minerals Technologies Inc.<br/>Stuart Yates -- (307) 548-6521<br/><a href="mailto:stuart.yates@mineralstech.com">stuart.yates@mineralstech.com</a></p> | <p>25<sup>B</sup> - Solmax (TenCate), Pendergrass (13 tests)<br/>Melissa Holbrook -- (706) 693-2226<br/><a href="mailto:m.medlin@solmax.com">m.medlin@solmax.com</a></p> <p>26<sup>B</sup> - Agru America Inc. (27 tests)<br/>Serena Evans-- (843) 546-0600<br/><a href="mailto:Sevans@AgruAmerica.com">Sevans@AgruAmerica.com</a></p> <p>29<sup>E</sup> - FITI Testing and Research Institute (80 tests)<br/>Hang Won-Cho -- 82-2-3299-8071<br/><a href="mailto:hwcho@fitiglobal.com">hwcho@fitiglobal.com</a></p> <p>31<sup>D</sup> - NYS Dept. of Transportation (8 tests)<br/>Jim Simonds -- (518) 485-5707<br/><a href="mailto:Jim.Simonds@dot.ny.gov">Jim.Simonds@dot.ny.gov</a></p> <p>34<sup>B</sup> - Solmax (GSE) - Houston, TX USA (21 tests)<br/>Daniel Vasquez<br/><a href="mailto:dvasquez@solmax.com">dvasquez@solmax.com</a></p> <p>38<sup>C</sup> - CTT Group SAGEOS (125 tests)<br/>Oliver Vermeersch -- (450) 771-4608<br/><a href="mailto:overmeersch@gcttq.com">overmeersch@gcttq.com</a></p> <p>40<sup>B</sup> - Solmax (GSE) - Kingstree, SC USA (13 tests)<br/>Bruce Pressley -- (843) 382-4603<br/><a href="mailto:bpressley@solmax.com">bpressley@solmax.com</a></p> <p>41<sup>A</sup> - SGI Testing Service, LLC (19 tests)<br/>Zehong Yuan -- (770) 931-8222<br/><a href="mailto:ZYuan@sgilab.com">ZYuan@sgilab.com</a></p> <p>43<sup>A</sup> - Ardaman &amp; Associates (22 tests)<br/>George DeStefano -- (407) 855-3860<br/><a href="mailto:gdestafano@ardaman.com">gdestafano@ardaman.com</a></p> <p>44<sup>B</sup> - Berry Global Inc. (9 tests)<br/>Julie Solarz -- (615) 847-7299<br/><a href="mailto:juliesolarz@berryglobal.com">juliesolarz@berryglobal.com</a></p> <p>45<sup>B</sup> - Solmax (TenCate) Malaysia SDN Bhd. (29 tests)<br/>Boon Kean Tan -- (603) 519 28576<br/><a href="mailto:bktan@solmax.com">bktan@solmax.com</a></p> <p>46<sup>B</sup> - TAG Environmental Inc. (13 tests)<br/>Manpreet Saini-- (705) 725-1938<br/><a href="mailto:manpreet.Saini@tagen.com">manpreet.Saini@tagen.com</a></p> <p>49<sup>B</sup> - Engopol Geossintéticos (16 tests)<br/>Patricia Natali -- (55) 51 3303-3901<br/><a href="mailto:patricia@engopol.com">patricia@engopol.com</a></p> <p>50<sup>B</sup> - ADS, Inc. Hamilton (8 tests)<br/>Justin Elder -- (513) 896-2065<br/><a href="mailto:justin.elder@ads-pipe.com">justin.elder@ads-pipe.com</a></p> <p>51<sup>B</sup> - SOLMAX - Canada (20 tests)<br/>Claude Cormier -- (450) 929-1234<br/><a href="mailto:ccormier@solmax.com">ccormier@solmax.com</a></p> <p>53<sup>B</sup> - Polytex Autofagasta (19 tests)<br/>Mario Contreras Cardenas -- 011 55-288-3308<br/><a href="mailto:mcontreras@polytex.cl">mcontreras@polytex.cl</a></p> <p>55<sup>B</sup> - Atarfil Geomembranes (21 tests)<br/>Gabriel Martin Sevilla -- 34 958 439 200<br/><a href="mailto:gmartin@atarfil.com">gmartin@atarfil.com</a></p> <p>56<sup>B</sup> - Polytex Santiago (15 tests)<br/>Sebastian Iturrita Monroe-- 011 56-2-677-1000<br/><a href="mailto:Siturrita@polytex.cl">Siturrita@polytex.cl</a></p> <p>57<sup>B</sup> - Solmax (TenCate) - Cornelia (26 tests)<br/>Randy Johnson -- (706) 778-9794<br/><a href="mailto:rjohnson@solmax.com">rjohnson@solmax.com</a></p> <p>58<sup>B</sup> - Propex Furnishing Solutions - Hazlehurst (10 tests)<br/>Lee Branch -- (912) 375-6180<br/><a href="mailto:Lee.Branch@propexglobal.com">Lee.Branch@propexglobal.com</a></p> <p>59<sup>B</sup> - Holcim Solutions &amp; Products (9 Tests)<br/>Janie Simpson -- (864) 439-5641<br/><a href="mailto:Janie.Simpson@holcim.com">Janie.Simpson@holcim.com</a></p> <p>60<sup>B</sup> - TDM Geosintéticos S.A. (19 tests)<br/>Henry De La Cruz -- 051-1-6300330<br/><a href="mailto:Hdelacruz@tdmgeosinteticos.com.pe">Hdelacruz@tdmgeosinteticos.com.pe</a></p> <p>61<sup>B</sup> - Viaflex (24 tests)<br/>Clint Boerhave -- (605) 335-0288<br/><a href="mailto:Clint.Boerhave@viaflex.com">Clint.Boerhave@viaflex.com</a></p> <p>62<sup>B</sup> - SOLMAX - Selangor - Malaysia (18 tests)<br/>Pei Ching Teoh -- (450) 929-1234<br/><a href="mailto:pcteoh@solmax.com">pcteoh@solmax.com</a></p> <p>63<sup>A</sup> - TRI-SC Labs (14 tests)<br/>Jay Sprague -- (864) 346-3107<br/><a href="mailto:Jesprague@tri-env.com">Jesprague@tri-env.com</a></p> |
|---|--|



- 64<sup>B</sup> - Agru America (NV) (14 tests)  
Ryan Steele -- (775) 835-8282  
[RSteele@AgruAmerica.com](mailto:RSteele@AgruAmerica.com)
- 65<sup>C</sup> - Bombay Textile Research Assoc. (BTRA) (25 tests)  
PK Panda (0) 022-25003651  
[geotech@btraindia.com](mailto:geotech@btraindia.com)
- 66<sup>B</sup> - Rowad International Geosynthetics Co. Ltd (15 tests)  
Mohammad Ishad Hussain-- +966-3-812-1360  
[irshad@rowadplastic.com](mailto:irshad@rowadplastic.com)
- 69<sup>B</sup> - Solmax - Rayong - Thailand (18 tests)  
Siriporn Chayaporenler - 66-386-36758  
[siripornc@solmax.com](mailto:siripornc@solmax.com)
- 70<sup>A</sup> - RSA Geo Lab LLC (48 tests)  
Rasheed Ahmed -- (908) 964-0786  
[geolab13@yahoo.com](mailto:geolab13@yahoo.com)
- 71<sup>B</sup> - Plasticos Agrícolas y Geomembranas S.A.C. (24 tests)  
Manuel Constantino Olivares Espinoza --  
073-511814-511829  
[calidad@pqapag.com](mailto:calidad@pqapag.com)
- 72<sup>B</sup> - Tensar Corp. GA (5 tests)  
Lynn Cassidy-Potts (770) 968-3255  
[lcassidy@tensarcorp.com](mailto:lcassidy@tensarcorp.com)
- 73<sup>B</sup> - Gai Loi JSE (10 tests)  
Paul Wong 84-650-362-5825  
[paul905677@gmail.com](mailto:paul905677@gmail.com)
- 74<sup>B</sup> - Agru America Inc. (9 tests)  
Mark Locklear - (843) 221-4121  
[mlocklear@agruamerica.com](mailto:mlocklear@agruamerica.com)
- 75<sup>B</sup> - GeoMatrix S.A.S. (45 tests)  
Javier Diaz Cipagauta (571) 424-9999  
[jdiaz@geomatrix.com.co](mailto:jdiaz@geomatrix.com.co)
- 76<sup>B</sup> - Tehmco (Chile) (18 tests)  
Rodrigo Campoy 56-22-580-2852  
[rcampoym41@gmail.com](mailto:rcampoym41@gmail.com)
- 78<sup>B</sup> - PAG Mexico (16 tests)  
Cesar Augusto Arcila (669) 954-8202  
[directorcalidad@payg.mx](mailto:directorcalidad@payg.mx)
- 79<sup>A</sup> - TRI Geosynthetic Testing and Services (32 tests)  
Mansukh Patel 86-512-6283-1396  
[Mpatel@tri-env.com](mailto:Mpatel@tri-env.com)
- 80<sup>B</sup> - Texel Technical Materials (Alkegen) (10 tests)  
Eric Trudel (418) 387-4801  
[Etrudel@alkegen.com](mailto:Etrudel@alkegen.com)
- 81<sup>B</sup> - Solmax (GSE) - Rechlin - Germany (18 tests)  
Evelyn Kroeger 49-40-767420  
[ekroeger@solmax.com](mailto:ekroeger@solmax.com)
- 83<sup>B</sup> - Solmax Geosynthetics S.A.E. (13 tests)  
Ahmed Abdel Tawab - 202-2-828-8888  
[atawab@solmax.com](mailto:atawab@solmax.com)
- 84<sup>B</sup> - Owens Corning (18 tests)  
Ashutosh Dixit - 1-778-945-2888  
[Ashutosh.dixit@owenscorning.com](mailto:Ashutosh.dixit@owenscorning.com)
- 85<sup>B</sup> - PAG Tacna (25 tests)  
Manuel Constantino Olivares Espinoza --  
073-511814-511829  
[calidad@pqapag.com](mailto:calidad@pqapag.com)
- 86<sup>B</sup> - BOSTD China (29 tests)  
Zheng Hong - 86-532-8780-6917  
[zhenghong@bostd.com](mailto:zhenghong@bostd.com)
- 87<sup>B</sup> - Willacoochee Industrial (19 tests)  
Miranda Adams - 912-534-5757  
[miranda@winfabusa.com](mailto:miranda@winfabusa.com)
- 88<sup>B</sup> - Geosynthetic Testing Services Pvt. Ltd. (16 tests)  
Ravi Kant - 02717-250019  
[rkant@gts-pl.com](mailto:rkant@gts-pl.com)
- 89<sup>B</sup> - Megaplast India Pvt. Ltd. (13 tests)  
Tatwadarsi Tripathy - 91-937404-4620  
[geo.sqc@megaplast.in](mailto:geo.sqc@megaplast.in)
- 90<sup>B</sup> - Techfab (India) Industries Ltd. - Daman (10 tests)  
Anant Kanoi - 91-22-2287-6224  
[anant@techfabindia.com](mailto:anant@techfabindia.com)
- 91<sup>B</sup> - Techfab (India) Industries Ltd. - Rakholi (3 tests)  
Rajendra Chavan - 91-982-593-9922  
[geogrid.qualitylab@techfabindia.com](mailto:geogrid.qualitylab@techfabindia.com)
- 92<sup>B</sup> - Techfab (India) Industries Ltd. - Khadoli (2 tests)  
Navir Kumar - 91-22-229-76224  
[woven.qualitylab@techfabindia.com](mailto:woven.qualitylab@techfabindia.com)
- 93<sup>B</sup> - Garware Technical Fibres (19 tests)  
Rajendra K. Ghadge - 0-932-601-8083  
[rghadge@garwarefibres.com](mailto:rghadge@garwarefibres.com)
- 95<sup>B</sup> - Mexichem Colombia (Pavco) (8 tests)  
Jenny Colmenares Chavez - 57-1-782-5100 (ext. 1534)  
[jjenny.colmenares@wavin.com](mailto:jjenny.colmenares@wavin.com)
- 96<sup>B</sup> - Tensar China (7 tests)  
Zhu Shaolian - 603-6148-3276  
[zsl@tensar.com.cn](mailto:zsl@tensar.com.cn)
- 97<sup>A</sup> - TUV SUD PSB Singapore (17 tests)  
CHA Ming Yang - 65-6885-1514  
[ming-yang.CHA@tuv-sud.psb.sg](mailto:ming-yang.CHA@tuv-sud.psb.sg)
- 99<sup>B</sup> - Atarfil Middle East (16 tests)  
Mohammad Hneine - 971-564-33-1271  
[mhneine@atarfil.com](mailto:mhneine@atarfil.com)
- 100<sup>B</sup> - Atarfil Geomembranes USA (12 tests)  
Alejandro Carreras - 757-263-4057  
[acarreras@atarfil.com](mailto:acarreras@atarfil.com)
- 101<sup>B</sup> - Solmax (GSE) - Spearfish, SD USA (7 tests)  
Chuck Taylor - 605-642-8531  
[ctaylor@solmax.com](mailto:ctaylor@solmax.com)
- 102<sup>B</sup> - SKAPS Industries (12 tests)  
Sadhvi Arora - 706-336-7000  
[sadhvi.Arora@skaps.com](mailto:sadhvi.Arora@skaps.com)
- 103<sup>B</sup> - STRATA Geosystems Pvt. Ltd. (17 tests)  
C. V. Kanade - 91-22-4063-5100  
[cv.kanade@strataindia.com](mailto:cv.kanade@strataindia.com)
- 104<sup>A</sup> - Advanced Terra Testing (32 tests)  
Kerry Repola - 303-232-8308  
[krepola@terratesting.com](mailto:krepola@terratesting.com)
- 105<sup>B</sup> - Pavco Wavin - Peru (8 tests)  
Nestor Sifuentes Boggio - 51 990 277 136  
[nestor.sifuentes@wavin.com](mailto:nestor.sifuentes@wavin.com)
- 106<sup>C</sup> - Auburn University-Erosion & Sediment Control Testing Facility (1 test)  
Michael Perez - 334-844-6267  
[Mike.perez@auburn.edu](mailto:Mike.perez@auburn.edu)
- 107<sup>A</sup> - TRI Australasia PTY LTD (38 tests)  
Warren Hornsey - +617-5535 7227  
[Whornsey@tri-env.com.au](mailto:Whornsey@tri-env.com.au)
- 108<sup>B</sup> - Solmax Geosynthetic Co. Ltd. Suzhou (13 tests)  
Pei Ching Teoh - 86512-66667-6100  
[pcteoh@solmax.com](mailto:pcteoh@solmax.com)
- 109<sup>B</sup> - Hock Technology Co. Ltd. (17 tests)  
Song Binghong - 186-7873-9722  
[Binghong.Song@sdhock.com](mailto:Binghong.Song@sdhock.com)
- 110<sup>C</sup> - Geofabrics Australia Pty. Ltd. - GRID (53 tests)  
Ryan Hackney - 61-42-781-0392  
[r.hackney@geofabrics.com.au](mailto:r.hackney@geofabrics.com.au)
- 111<sup>B</sup> - Huesker Inc. - Shelby (9 tests)  
Callie Kesterson - 704-406-8308  
[ckesterson@huesker.com](mailto:ckesterson@huesker.com)
- 112<sup>C</sup> - Instituto Mauá Tecnologia Brazil (14 tests)  
Henrique Nelson Satkunas  
[Henrique.satkunas@maua.br](mailto:Henrique.satkunas@maua.br)
- 113<sup>B</sup> - Azul Pack Filmes - Embalagens (7 tests)  
Camila Nicoletti Brito  
[Camila.brito@azulpack.com.br](mailto:Camila.brito@azulpack.com.br)
- 114<sup>B</sup> - Lonax Industria Brasileira DeLonas Ltda. (13 tests)  
Felipe Diniz  
[qualidade@lonax.com.br](mailto:qualidade@lonax.com.br)
- 115<sup>B</sup> - Doha Waterproof Factory (21 tests)  
Ahmed Al-Masre  
[infor@dohawaterproof.com](mailto:infor@dohawaterproof.com)
- 116<sup>B</sup> - Soleno Textile Techniques Inc. (6 tests)  
Kathie Fleury  
[kfleury@soleno.com](mailto:kfleury@soleno.com)
- 117<sup>B</sup> - Reinforced Earth India Pvt Ltd. (4 tests)  
Robert Lozano  
[Rlozano@reinforcedearth.com](mailto:Rlozano@reinforcedearth.com)
- 118<sup>B</sup> - Layfield Canada (7 tests)  
Richard Langford

- 119<sup>B</sup> [Richard.Langford@layfieldgroup.com](mailto:Richard.Langford@layfieldgroup.com)  
Mexichem Brasil (10 tests)  
Nathalia Miyahara  
[Nathalia.Miyahara@wavin.com](mailto:Nathalia.Miyahara@wavin.com)
- 120<sup>B</sup> Gold-Joint Testing Technology. (21 tests)  
ACE Geosynthetics  
Amy Tang  
[amy.tang@geoace.com](mailto:amy.tang@geoace.com)
- 121<sup>B</sup> Techfab (India) Karajgam (18 tests)  
Prabhu Tripathy  
[p.Tripathy@techfabindia.com](mailto:p.Tripathy@techfabindia.com)
- 122<sup>B</sup> TDM Geosintéticos Brasil (6 tests)  
Wladimir Caressato  
[Wcaressato@TDMbrasil.com.br](mailto:Wcaressato@TDMbrasil.com.br)

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

7 laboratories joined the GAI-LAP program in 2022 and we have 3 new laboratories to date for this year. If anyone desires more information on the GAI-LAP program, its test methods, the associated laboratories, etc., please go to our website [www.geosynthetic-institute.org/gai/lab.htm](http://www.geosynthetic-institute.org/gai/lab.htm) or contact George Koerner.

## Activities within GCI (Certification)

GSI presently has three separate inspector certification programs. One (began in 2006) is focused on QA/QC of field inspection of waste containment geosynthetics and compacted clay liners. The second (began in 2011) is focused on MSE Wall, Berm and Slope field inspection. The third, on Geosynthetic Designer Certification began on September 1, 2016. See our website at [www.geosynthetic-institute.org](http://www.geosynthetic-institute.org) under “certification” for a description and information on all three of them.

Applications to sit for the GCI-ICP exams need to be submitted to the Geosynthetic Institute for approval prior to taking the exams. Applications and payment information for the exams can be found at: <https://geosynthetic-institute.org/applications.htm>

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

Twenty-seven certified CQA technicians passed the geosynthetic materials and compacted clay exams this quarter. Thank you, TRI Environmental for hosting the GCI-ICP event including the QA-QC course and Inspector certification exams.

The certification program for certified inspectors of geosynthetic materials and compacted clay liners started in 2006. There are currently 575 practicing certified inspectors, 453 inspectors (2018-2023) and

122 inspectors (2006-2018) who have renewed to keep their certification current. The breakdown by year is as follows:

Inspector Certification Test Results 2006-2023

Year	Geosynthetic Materials		Compacted Clay Liners	
	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%)
2007	82	11 (13%)	73	12 (16%)
2008	95	25 (26%)	89	20 (22%)
2009	36	7 (19%)	36	2 (5%)
2010	59	12 (20%)	54	7 (13%)
2011	54	6 (11%)	53	3 (6%)
2012	34	5 (15%)	28	3 (11%)
2013	32	4 (12%)	30	1 (3%)
2014	45	1 (3%)	42	3 (7%)
2015	56	6 (11%)	51	6 (12%)
2016	36	3 (10%)	35	5 (18%)
2017	78	5 (6%)	66	3 (4%)
2018	53	5 (10%)	51	1 (3%)
2019	114	20 (18%)	119	15 (13%)
2020	100	14 (14%)	92	10 (11%)
2021	70	14 (20%)	61	8 (13%)
2022	89	15 (17%)	80	13 (16%)
2023	27	3 (11%)	27	5 (18%)
<b>Total</b>	<b>1201</b>	<b>161(13%)</b>	<b>1124</b>	<b>129(11%)</b>

TRI Environmental Inc. teaches two courses, “Construction QA/QC for Geosynthetic Installation” and “Construction QA/QC for Compacted Clay Liners and GCL Installation” in preparation for taking the Inspector Certification exams.

The Geosynthetic Institute has a pre-recorded “QA/QC of geosynthetics in waste containment facilities” course that can be purchased by anyone wanting to take the course online (accommodates your schedule) in preparation for the GCI-ICP certification exams. More information can be found at: [www.geosynthetic-institute.org/courses.htm](http://www.geosynthetic-institute.org/courses.htm)

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

While a field inspector cannot require proper design or direct a contractor how to build a 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. The official launch of this inspection program was on December 1, 2011 with a course and the examination afterward. A somewhat revised course on November 29, 2012 was presented. Presently, the corresponding course for this certification program has been transferred into a series of six presentations that have been recorded and can be viewed at your leisure.

### **Program #3 - Geosynthetic Designer Certification**

Please see [www.geosynthetic-institute.org/gdcpintro.pdf](http://www.geosynthetic-institute.org/gdcpintro.pdf) for the requisite details. Included are introduction (rationale behind the program was given in a recent GSI Column called "We're Losing the Battle"), disclaimer, requirements, application, reference material, sample questions, proctor manual and proctor application. You must have six-months geosynthetic designer experience to take the exam.

### **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 three countries (Korea, Taiwan and India), 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 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, and additives for GCLs, recycled plastics for improved 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). 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-India** under the direction of Dr. T.V. Sreekumar was formed in 2015. The hosting organization is the Bombay Textile Research Association (BTRA) which is a premier textile research institute providing testing, research, training and consultancy services. BTRA is located in Mumbai, India and is accredited as per ISO 17025. The Geosynthetic test lab is also GAI-LAP accredited. Testing at BTRA is performed as per the latest EDANA, ASTM, INDA, AATCC, ISO, EN and AASHTO international standards. BTRA is known for its excellence in textile R & D and is currently branching out into all forms of geosynthetics with a fantastic R & D laboratory.

### **GSI Member Organizations**

We Sincerely Thank all 63 (47 full and 16 associate) Members Organizations of the GSI family for their continued guidance and support. We added DOW Inc. and Azul Pack Films & Embalgens Brazil (in-progress) to the membership during the last quarter. Without members, GSI could not exist. The current GSI member organizations and their contact members are listed below.

#### **Solmax**

*Mark Harris/Jacques Cote/Simon Gilbert St-Pierre/  
Jimmy Youngblood/Guillaume Beaumier*

#### **U.S. Environmental Protection Agency**

*David A. Carson (BOA)*

#### **Federal Highway Administration**

*Silas Nichols/Daniel Alzamora*

#### **Golder Associates Inc.**

*Frank Adams/Paul Whitty/Linda Grover*

#### **Tensar International Corporation**

*Mark H. Wayne/Joseph Cavanaugh/Jacek Kawalec [BOA]*

#### **TenCate Geosynthetics**

*John Henderson/John Lostumbo/Rene Laprade [BOA]*

#### **Minerals Technology/CETCO**

*Reza Gorakhki/Stacy Byrd/Michael Donovan/Hilary Walker*

#### **Huesker, Inc.**

*Flavio Montez/Andreas Elsing*

#### **NAUE GmbH & Co. KG**

*Alexander Naue/Henning Ehrenberg [BOA]*

#### **Propex Operating Company LLC**

*Drew Loizeaux/Noah Nichols*

#### **Berry Global Inc.**

*Keith Misukanis/Monica Baker*

#### **TRI Environmental Inc.**

*Sam R. Allen [BOA]/C. Joel Sprague*

#### **U. S. Army Corps of Engineers**

*Kevin Pavlik/Richard DePasquale*

#### **Chevron Phillips Chemical Co.**

*Ashish Sukhadia/Lawrence Szmuto/Miranda Rine [BOA]*

#### **CARPI, Inc.**

*Alberto M. Scuero/Massimo Bugliosi/John A. Wilkes*

#### **Civil & Environmental Consultants, Inc.**

*Tony Eith*

#### **AGRU America, Inc.**

*Tom Nichols/Markus Haager*

#### **INHA (GSI-Korea)**

*H.-Y. Jeon*

#### **Waste Management Inc.**

*Greg Cekander/Burrill (Bo) McCoy [BOA]*

#### **GeoComp/GeoTesting Express**

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