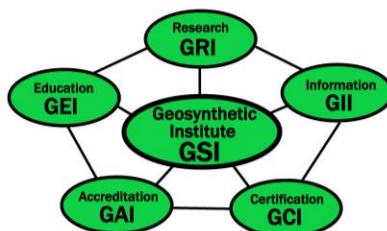


# The GSI Newsletter/Report



## Geosynthetic Institute

Vol. 34, No. 3

September, 2020

This quarterly newsletter, now in its 34<sup>th</sup> year, presents the activities of GSI and its related institutes to all who are interested. It is available on the institute's home page at [www.geosynthetic-institute.org](http://www.geosynthetic-institute.org). It also serves as a quarterly report to its member organizations. Details are available by contacting George R. Koerner or Marilyn Ashley at phone (610) 522-8440; fax (610) 522-8441 or e-mail at [gsigeokoerner@gmail.com](mailto:gsigeokoerner@gmail.com) or [marilyn@geosynthetic-institute.org](mailto:marilyn@geosynthetic-institute.org).

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

The Board of Advisors (BOA) will be meeting virtually on September 30, 2020 to discuss quarterly activities and the effects of COVID 19 on the Geosynthetic Institute as well as the entire geosynthetics community. Suggestions from this meeting and action plans will be published in the December Newsletter.

The Board of Advisors have reviewed the 2020-2021 GSI Fellowship submittals and the recipients for these \$5000 fellowship awards have been chosen. Students who are chosen will be contacted by September 30, and an announcement to the geosynthetic industry will be made shortly after. For more details about the 2020-2021 fellowships, go to the Information section of this newsletter.

We want to thank all members who took the time to answer our 2020 Membership Survey. We especially appreciate the written feedback, as this is helpful to truly understanding the areas which GSI needs to improve upon. Overall, the grade given was a 4.5, with the certification program at a 4.1 (low) and Education, as well as geosynthetic advocacy, at 4.7 (high) out of a possible score of 5. The need for new research and updating existing geosynthetic research was made very clear by the members who responded.

### 2020-2022 Board of Advisors

#### Term Ends 2020

- Tony Eith - CEC Consultants, Inc. (Consultants and Testing Labs)  
email: [teith@cecinc.com](mailto:teith@cecinc.com)
- Jimmy Youngblood - GSE Environmental (Geomembranes and GCL's)  
e-mail: [jyoungblood@solmax.com](mailto:jyoungblood@solmax.com)

- Moreno Scotto - Maccaferri (International - 2)  
e-mail: [moreno.scotto@gmail.com](mailto:moreno.scotto@gmail.com)

#### Term Ends 2021

- Burrill (Bo) McCoy - Waste Management Inc. (Owners and Operators)  
e-mail: [bmccoy2@wm.com](mailto:bmccoy2@wm.com)
- David Andrews – Propex (Geotextiles and Geogrids)  
e-mail: [David.Andrews@propexglobal.com](mailto:David.Andrews@propexglobal.com)
- Sam Allen – TRI Environmental Inc. (At-Large)  
e-mail: [Sallen@tri-env.com](mailto:Sallen@tri-env.com)

#### Term Ends 2022

- Kent von Maubeuge – NAUE GmbH & Co. KG (International-1)  
email: [kvmaubeuge@naue.com](mailto:kvmaubeuge@naue.com)
- Vergil Rhodes – C.P. Chemical (Resin and Additives Group)  
email: [RhodeVH@cpchem.com](mailto:RhodeVH@cpchem.com)
- David Carson – U.S. EPA (Agencies)  
email: [carson.david@epa.gov](mailto:carson.david@epa.gov)

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- 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. *Those projects marked with an asterisk have written papers available; please ask and we will send them accordingly.* Contact George Koerner ([gsigeokoerner@gmail.com](mailto:gsigeokoerner@gmail.com)), Grace Hsuan ([hsuanyg@drexel.edu](mailto:hsuanyg@drexel.edu)) for details and/or discussions.

- 1. 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) often uses a wrap-around configuration leaving the geogrid exposed to the atmosphere. A project being conducted by George Koerner is presently investigating the behavior of two different geogrids and two erosion control materials at a local landfill over time. These four materials are also being exposed on the roof of the GSI carport. A 50-year time frame is envisioned! The long-term behavior will eventually be compared to our UV laboratory predicted database.
- 2. Laboratory Exposed Lifetime of Geomembranes\*** - GSI is using three UV-fluorescent devices to estimate the projected exposed lifetime of six different types of geomembranes. They are HDPE, LLDPE, fPP, EPDM and PVC (N.A. and European). They are being incubated at 60, 70, and 80°C until half-life of strength and elongation are measured. The goal is lifetime prediction. Incubation times are now over 60,000 light hours (8.2 years) and several are not yet complete. They will probably take as long as 90,000 light hours ( $\approx$  12.3 years). The information up to this point in time was made available to the public on April 6, 2016 at the GeoAmericas Conference in Orlando, Florida. It has been republished in the International Geosynthetics Journal. A copy is available. It is now also being offered as a 90 min. webinar.
- 3. HDPE Geomembrane Lifetime as a Function of Thickness** - This often-encountered question is being evaluated at elevated temperature exposure at 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 decades long study are change in thickness and presence of crazing or cracking. Time will tell!
- 4. Laboratory Exposed Lifetime of PVC (European) Geomembranes** - We have been evaluating five different European formulations for nine 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. The project also allows us to distinguish between PVC geomembranes manufactured in North America versus Europe. The differences are in the type of plasticizers used in the formulations as well as thicknesses. The program will end this year but may be extended with new formulations.

- 5. Direct Shear Testing Under Extreme Conditions** - Weather and climate change have resulted in new boundary conditions for many of our projects employing geosynthetics. Historically, climate change (especially changes in temperature) impacts have not been considered when testing direct shear performance. At the request of four member companies, GSI is now conducting tests and collection data on direct shear testing at extremely cold (below freezing) or hot (85°C) temperatures to see if this is a realistic concern. In addition, over the past decade there has been several landfill sites that have experienced exothermic reactions. Therefore, there is a need to quantifiably assess the performance of landfill liner and cover systems under these conditions. This work might help in mitigating the consequences of extreme temperatures on containment systems. Currently, there is a clear gap in the state of knowledge in terms of assessing the performance, resilience, and risk of such events.
- 6. pH Between Masonry Block Wall Units\*** - George Koerner has been measuring the pH between three types of masonry blocks for over eight 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 they are now down to eight and lower. George has published a paper in this regard.
- 7. Slow Pressurization of HDPE Geomembranes in Axi-Symmetric Testing\*** - The ASTM D5716 method of testing geomembranes in a 3-D axis-symmetric mode uses a pressure rate of 6.9 kPa/min (1.0 psi/min). While such a rate is appropriate for most geomembrane types, it is very fast for HDPE which is semi-crystalline and cannot readily stress relax so as to accommodate the applied pressure. 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, begun in 2017, is at a rate of 6.9 kPa/six months (1.0 psi/six months) and it will take an estimated five years to conclude. Recently, yield was observed in the deformed geomembrane but air pressure is still sustained. A preliminary paper was presented at Geosynthetics '15 in Portland.
- 8. Generic Standards** - A major continuing effort is ongoing with respect to the development and updating of GRI's generic geosynthetic standards. As customary, "standards" consist of

specifications, guides, practices and test methods. The current status of these standards is as follows.

- 8a. **GRI Specifications** - Currently we have 21 generic specifications on most of the products generally used. The notable exception is geogrids, which is, and has been for years, very contentious with no obvious accommodations. Incidentally, all are currently copyrighted.
- 8b. **GRI Guides** - Currently we have 12 guides on detailed aspects of geosynthetics, their installation and project performance. Topics vary widely; from statistical sampling-to-constructing test pads. Topics of interest for our development should be communicated to George or Bob Koerner.
- 8c. **GRI Practices** - Currently we have 8 practices on wide ranging topics generally used in design methods. They are very detailed and sometimes are based on our concept of what we perceive to be “best practice”.
- 8d. **GRI Test Methods** - Currently we have 29 test methods available on the following geosynthetic types:

- Geotextile Related - 2
- Geogrid Related - 2
- Geomembrane Related - 6
- GCL Related - 2
- Geocomposite Related - 11
- Geosynthetic (multipurpose) Related - 6

Additionally, 31 of our test methods have been co-opted by ASTM and we have depreciated our version. Incidentally, our test methods are for members only and are in the password protected portion of our website. We are delighted to report that ASTM has given the David Suits Award to GSI for our cooperation in sharing these GRI standards. We will continue to distribute our test methods in this manner, but specifications, guides and practices are available free as mentioned previously.

- 9. **Wind Whip of Geosynthetics** - The “wind whip” behavior of geosynthetics is a phenomenon defined by measurable negative property changes to a coupon after exposure to sustained wind speeds over time. GSI has created a standard practice to simulate this environmental phenomenon in a laboratory using a commercially available wind tunnel as seen in Figure 1. The properties of exposed specimens can be compared to the unexposed “as-received” material properties, yielding a percent retained value. Target properties include tensile performance, normalized thickness, and mass per unit area. In addition, qualitative observations (wrinkles, fraying, cracking, flaking, exposed scrim, etc.) of the material can be contrasted before and after exposure in the wind tunnel at a given speed for a known duration.

Currently GSI is testing the following group of geomembranes in two different configurations (flag and awning):

- HDPE (S & T) use GRI-GM13
- LLDPE (S & T) use GRI-GM17
- fPP & fPP-R use GRI-GM18
- EPDM & EPDM-R use GRI-GM21
- PE Barriers use GRI-GM22
- LLDPE-R GMs use GRI-GM25
- CSPE-R use GRI-GM28
- RCPE GMs use GRI-GM30

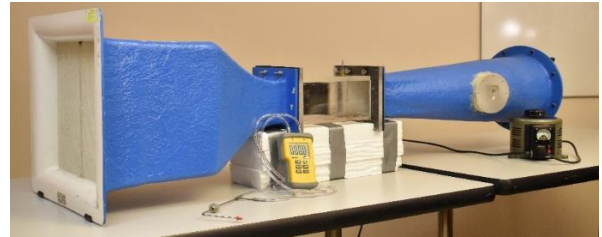


Figure 1 - Photograph of Wind tunnel set up showing motor control rheostat (input), and digital manometer (output)

This new tool will help us evaluate index geosynthetics wind resistance. It allows us to explore the new paradigm of geosynthetics in exposed applications on a very basic level and is a first step in conformance testing for a possible new specification for materials used in such applications.

## Albedo Effect of Different Color Geosynthetics

It's tempting to start designing your exposed geomembrane by choosing a color, but the appearance is just one of the many factors to consider when choosing a color. White versus black have vastly different properties, and are likewise more or less appropriate for your project depending on where you're located and the local weather and temperatures.

There's been a long-standing debate between the merits of black and white geomembranes, but the environmental benefits of 'exposed-membrane, with high solar reflectance and thermal emittance have been well established. This means white surfacing reduces the amount of solar radiation (heat) collected thereby lowering the amount of energy used to power cooling systems—in turn reducing contributions to global warming.

All that being said, you might immediately think, 'that white is best' but there's so much more to consider when choosing between the two. For those in colder

climates, having a white roof could lead to higher heating costs. This is because the less heat your roof retains, the more you'll need to rely on your heating system to warm the building. Another reason white roofs aren't ideal for northern climates is because of the snow and ice. With a white cooler roof, snow and ice is likelier to collect and build up, which can be problematic if you're in an area that receives significant snowfall during the winter. White roofs have a tendency to stay icy and snow covered for long periods of time, which can make maintenance of mechanical units dangerous or difficult. Ice and snow that lingers on white roofs also has a higher chance of sliding off a sloped roof and causing damage.

As a result, the color you go with will largely depend on your climate. Black roofs are known for their ability to absorb a great amount of the Sun's heat energy, which causes the roof surface to become extremely hot. They're typically made out of rubber or more precisely, Ethylene Propylene Diene Monomer, EPDM rubber roofing. White roofs on the other hand reflect most of the Sun's heat energy, cooling the roof surface. White roofs are commonly constructed out of TPO or PVC. Therefore, black roofs used on buildings located in Northern USA might provide lower heating costs compared to buildings with white roofs in the North during winter; but white roofs stay cooler, potentially lower cooling costs in the summer.

Does that mean a black roof is ideal during the winter, and a white roof is better during the summer? Not necessarily. Several other elements should be taken into account when determining roof color. Things like the building proportion, geography/climate, and the amount of insulation in the new/existing roof all need to be considered. GSI wrote an award winning paper back in 1995 entitled "Temperature Behavior of Field Deployed HDPE Geomembranes", which compared and contrasted the field performance of different geomembrane colors.

In addition to the above information, we are now entering an age of solar energy and the color of your geomembrane influences this as well. Engineers are not only interested in collecting the direct solar rays but also the albedo effect for the production of energy in photovoltaic projects with bifacial module technology. In this case, different color geomembranes can significantly change the nature of the project. To quantify the affect, we need to discuss Lux, which is a unit of illuminance. It is the SI derived unit of illuminance, measuring luminous flux per unit area. It is equal to one lumen per square meter. In photometry, this is used as a measure of the intensity, as perceived by the human eye, of light that hits or passes through a surface. It can be measured with a standard light meter. Figures 2 and 3 show the process of retrieving the data and the light meter that was used.



Figure 2 - Photo of Jamie taking light meter reading on different color GS



Figure 3 - Photo of light meter

All of the readings for this experiment were taken as Lux readings with a standard light meter in two different configurations. Direct (i.e. Light meter facing up to the sky) contrasted with Indirect (i.e. Light meter facing down at a 30 deg angle to the horizontal, 1.5m off ground surface). The results of the experiment are shown in the following graphs. Both of the graphs in Figures 4 and 5 show recorded Lux readings from four different surfaces (white, black, green grass and exposed dry silty soil). Figure 4 data was taken on a cloudy day, while Figure 5 data was obtained on a sunny day.

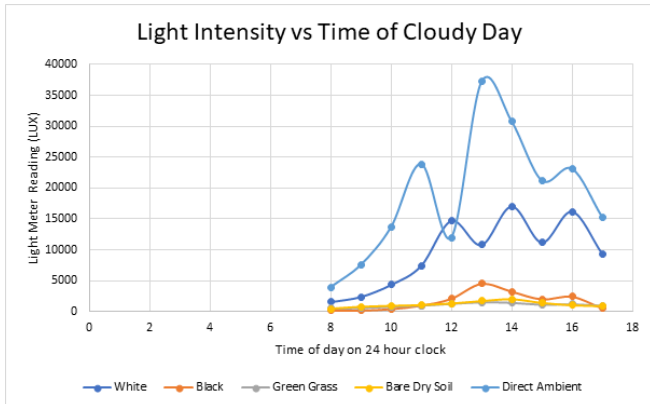


Figure 4 – Graph of Light Intensity vs Time of Cloudy Day

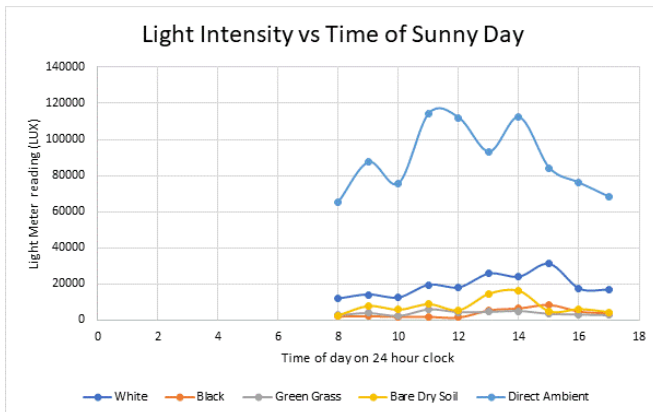


Figure 5– Graph of Light Intensity vs Time of Sunny Day

Conclusions are summarized below:

- On a cloudy day the white GM reflects about half of direct light whereas the black GM only reflects about 6%.
- On a sunny day the white GM reflects about 29% of direct light whereas the black GM only reflects about 4%.
- The green grass and dry bare soil exhibit behavior intermediate to that of the reflective capacity of white GM and adsorptive behavior of black GM.

Please note that all reading were taking in Folsom, PA USA in the summer time. We are sure the latitude and longitude of the readings are factors affecting results as well as other environmental variables. However modest as this experiment was, it yielded intriguing results with real engineering consequences.

## Extreme Direct Shear Testing

GSI is doing direct shear testing under extreme environmental conditions (i.e. specifically extreme temperatures). At the prompting of two member companies, we have been encouraged to initiate an effort in this regard. This work looks at both low normal pressures (0-30 kPa) and high normal pressures (50-300

kPa). The work involves both hot (85°C) and cold (near 0°C) temperatures. As you can in the Figures 6 and 7 below, a modification to our ASTM D5321 Direct Shear box was necessary. As an aside, anyone considering mimicking such work should anticipate challenges with the equipment, (heating and nearly freezing the saturation water surrounding the two halves of the direct shear box significantly influences apparatus wear and tear, (i.e. weathering.) The experimental design of this work is rather straight forward and is outlined in the following steps.

1. Choose the most significant interface. We are starting with NPNW geotextile against textured geomembrane
2. Establish the existing uncertainty with the interface at room temperature
3. Test the interface hot (85°C) at a range of normal pressures
4. Test the interface cold (1°C) at a range of normal pressures
5. Establish if there is a significant reduction in shear strength at these extreme temperatures by analyzing the data and observing the dismantled failure surface carefully to see if there are new mechanisms at play under these extreme conditions.



Figure 6 - Top view of modified direct shear box

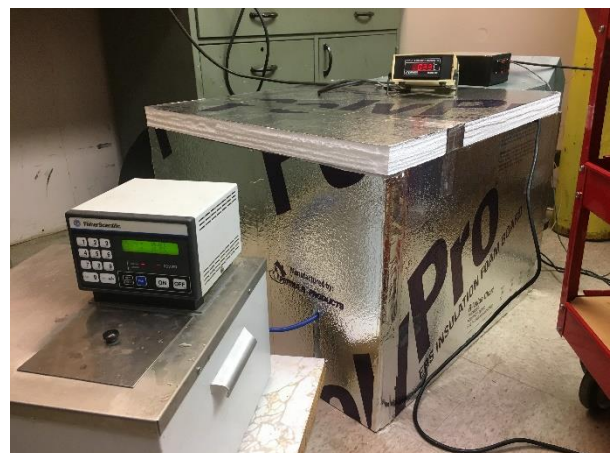


Figure 7 - HVAC unit with temperature controller on direct shear box

Postulations as to the behavior are offered in cases where landfill liners are experiencing subsurface exothermic events or landfill covers are experiencing sudden freeze thaw cycling, but the situation seems to need further research, particularly in light of climate change.

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

### **“GSI Fellowships for Graduate Students”**

The Geosynthetic Board of Advisors (BOA) have reviewed the 2020-2021 proposals and the recipients for this year’s fellowships have been chosen. Our website will be updated shortly with details on students who have been selected. This information can be found at:

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

Ten (10) students were selected for the 2020-2021 GSI Fellowship awards. In the past 5 years of the fellowship awards, the number of new fellowships awarded has ranged from 9 – 18. This year we received no proposals from any European universities nor any universities located in Asia. This came as a surprise, since the average number of proposals from Europe and Asia has been 15% and 6% respectively in past years. History shows that on average 74% of proposals come from USA universities, with the remaining 5% a combination of proposals from universities in Australia, Latin America and Canada. This year, 90% of the fellowship proposals for the 2020-2021 awards came from USA universities.

The uncertainty caused by COVID-19 as to whether campuses would re-open or switch to distance learning may have been a factor. It would be difficult to continue research if a university decided to cancel all in-person classes, since laboratories and research often fall into this category and would be closed. We anticipate that next year we will see proposals once again from universities in Europe and Asia.

Please contact Jamie if you have any questions about the fellowship program or would like additional information.

Jamie R. Koerner  
Office Manager  
[jamie@geosynthetic-institute.org](mailto:jamie@geosynthetic-institute.org)

Our GSI Home Page is accessed as follows:

[www.geosynthetic-institute.org](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:

Newsletter  
Prospectus  
Specifications  
White Papers  
Bookstore  
Keyword Search (new)  
Members Only

Research  
Certification  
Information  
Education  
Accreditation  
Personnel Contacts  
Upcoming Webinars

To go further one needs a members-only password. Your contact person (names beneath member company) must obtain a password from Marilyn Ashley. Marilyn can be reached by e-mail at [marilyn@geosynthetic-institute.org](mailto:marilyn@geosynthetic-institute.org). When you get into this section, the following information is then available.

- GRI Test Methods
- 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)

The Keywords Section contains about 35,000 citations which is the vast (≈ 90%) majority of the geosynthetic literature published in English. It is updated as each published paper is received. Citation retrieval is quite easy 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.

White paper #44 “Relative Sustainability of Road Construction/Repair: Conventional Methods versus Geosynthetic Materials” is available on our website for your review. We are interested in any comments you may have.

Also, if you have topics that you feel warrant a survey, please contact us.

## **Progress within GEI (Education)**

### **GRI Reports**

To date, we have 46 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).

Most of them are also available in hard copy. Our most recent report is:

- #46 - Utilizing PVDs to Provide Shear Strength to Saturated Fine-Grained Foundation Soils

### Webinar Wednesdays

Webinar Wednesdays started as a reaction to the COVID-19 pandemic and the necessity to remain in lockdown. With so many employees working remotely and the slower pace due to a downturn in the economy, George and the BOAs felt that it was a good time to reach out to the geosynthetic community through a virtual platform. GSI wasn't alone in this venture, but we recognized the importance of helping engineers get their PDHs while working remotely. After choosing important topics relating to geosynthetics and adding several new hot topic webinars, a schedule was made and Webinar Wednesdays began. The last several webinars have gotten reviews saying they were both informative and entertaining. Below is a recap of webinars that have been offered this year, with Webinar Wednesdays beginning on March 25 thru July 8, 2020.

DATE	TITLE	Registrants # of Companies	# Portals
1/22/20	Geosynthetic Drainage Material	8	12
2/19/20	Pond Liner Design	3	17
3/25/20	Stability Design of Landfill Covers	7	32
4/8/20	GM Puncture	1	8
4/15/20	Wave Management	4	35
4/22/20	Behavior and Analysis of 20 Solid Waste LF Failure	3	33
4/29/20	QA/QC of Geosynthetics	4	27
5/06/20	MSE Wall Inspection	6	34
5/11/20	MSE Wall Inspection – NY DOT	1	15
5/18/20	GS in Paved and Unpaved Roads	1	425
5/13/20	Applications and Design of Geotextile Tubes	4	5
5/20/20	Geotextiles Filters – concerns and issues	4	8
5/27/20	Lifetime Durability of Geosynthetics	7	47
6/03/20	Testing of Geosynthetics	cancelled	NA
6/10/20	Sustainability with Geosynthetics	2	5
6/17/20	Drainage with Geosynthetics	4	6
6/24/20	In Situ Stabilized of slopes using Geosynthetics	3	16
7/8/20	UV Degradation as it Relates to Polymers	1	3

On July 22, 2020, George Koerner gave a presentation to IGS Brazil on the subject “Geosynthetic Properties of Testing”. The “live” webinar was well received and attracted over 300 participants. One goal of the Geosynthetic Institute is to provide education to the geosynthetic industry. This particular webinar was given free to IGS members and accomplished our education goal by providing important information on testing of geosynthetics.

No Webinar Wednesdays were scheduled during July and August, as these months are typically slow due to summer vacations. We are pleased to announce that as of September 9<sup>th</sup>, Webinars Wednesdays have started up again and will continue throughout the remainder of the year. Currently, webinars are scheduled through December 16, 2020. Check our website for updates at: [www.geosynthetic-institute.org/webinar.htm](http://www.geosynthetic-institute.org/webinar.htm).

The current schedule is as follows:

### GSI Webinars (90 minutes long)

**11:30 AM – 1:00 PM (Eastern Time Zone)**

**Registration at**

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

### **1.5 Professional Development Hours**

**GSI and GMA Members Cost - \$200**

**Nonmembers Cost - \$250**

Date	GSI No.	Title
9/9/20	W-1	A Data Base and Analysis of 320 Failed MSE Walls With Geosynthetic Reinforcement
9/16/20	W-5	Geomembranes in Hydraulic Applications (dams, canals, reservoirs, tunnels, pipes)
9/23/20	W-6	Geosynthetic Applications Used in Heap Leach Mining
10/7/20	W-12	Landfill Covers: Past-Present-Emerging
10/14/20	W-14	Lifetime Predictions of Covered and Exposed Geosynthetics
10/21/20	W-15	In-Situ Stabilization of Slopes Using Nailed (or Anchored) Geosynthetics
10/28/20	W-25	Soil Consolidation Using Wick Drains, aka PVDs
11/4/20	W-29	QA/QC of Geosynthetics
11/11/20	W-31	Testing of Geosynthetics
11/18/20	W-24	Disposal of Coal Combustion Residuals
12/2/20	W-34	Geosynthetics used in Paved and Unpaved Roads
12/9/20	W-17	Geosynthetics in Erosion Control
12/16/20	W-27	Stability Design of Landfill Cover Soils

### 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 available)
2. Construction Inspection of Mechanically Stabilized Earth (MSE) Walls, Berms and Slopes (recordings 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 [jrkoerner@verizon.net](mailto:jrkoerner@verizon.net) if you want information and details.

## Activities within GAI (Accreditation)

As we all respond to the unprecedented events unfolding related to the coronavirus (COVID-19), we want to take a moment to communicate with our accredited laboratories expecting an audit this year. GSI has been monitoring news surrounding COVID-19 and determined steps our institute can take to ensure the wellbeing of our customers and staff.

First and foremost, our thoughts are with those directly and indirectly impacted by the global pandemic. We understand you may need to take time away from your business and your customers. If you find your organization in a unique situation, please let us know how we can assist.

For existing labs expecting an on-site audit this year, we will not be conducting any more on-site audits for the remainder of 2020. Existing lab audits are being postponed until 2021. All GAI-LAP Accreditations in good standing and with passing proficiency results will be granted extensions for next year. We are taking these steps in the best interest of everyone's health and safety.

GSI and GAI-LAP are committed to maintaining the highest level of customer service. Please reach out to us via phone or e-mail. The Institute remains open to staff only at this time. Circumstances continue to change rapidly as more news becomes available, but GSI remains committed to you. We appreciate your continued support and look forward to better times ahead.

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 our 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 training and documentation for specific standard ASTM or ISO 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 257 GAI-LAP test methods available for accreditation. Please consult our home page for a current listing.

As of June, 2020, the following laboratories are accredited by the GAI-LAP for the number of test methods listed in parenthesis. Contact personnel, telephone numbers and e-mails are also listed.

- 1<sup>A</sup> - TRI/Environmental Inc. (155 tests)  
Jarrett Nelson -- (512) 263-2101  
[jnelson@tri-env.com](mailto:jnelson@tri-env.com)
- 3<sup>A</sup> - Golder Associates (43 tests)  
Henry Mock -- (770) 492-8280  
[Henry\\_Mock@golder.com](mailto:Henry_Mock@golder.com)
- 4<sup>C</sup> - Geosynthetic Institute (108 tests)  
George Koerner -- (610) 522-8440  
[gsigeokoerner@gmail.com](mailto:gsigeokoerner@gmail.com)
- 8<sup>B</sup> - Propex Operating Co., Ringgold (17 tests)  
Todd Nichols -- 438-553-3757  
[todd.nichols@propexglobal.com](mailto:todd.nichols@propexglobal.com)
- 9<sup>B</sup> - Lumite (17 tests)  
Rebecca Kurek -- (770) 869-1787  
[rkurek@lumiteco.com](mailto:rkurek@lumiteco.com)
- 13<sup>A</sup> - Precision Geosynthetic Labs (TRI Env.) (84 tests)  
Cora Queja -- (714) 520-9631  
[cqueja@tri-env.com](mailto:cqueja@tri-env.com)
- 14<sup>A</sup> - Geotechnics (50 tests)  
J. P. Kline -- (412) 823-7600  
[JPKline@geotechnics.net](mailto:JPKline@geotechnics.net)
- 20<sup>A</sup> - GeoTesting Express, MA (58 tests)  
Joe Tomei -- (978) 635-0424  
[jdt@geotesting.com](mailto:jdt@geotesting.com)
- 22<sup>B</sup> - CETCO Hoffman Estates (11 tests)  
Minerals Technologies Inc.  
Barbara Gebka -- (847) 851-1904  
[Barbara.gebka@mineralstech.com](mailto:Barbara.gebka@mineralstech.com)
- 24<sup>B</sup> - CETCO Lovell (10 tests)  
Minerals Technologies Inc.  
Stuart Yates -- (307) 548-6521  
[stuart.yates@mineralstech.com](mailto:stuart.yates@mineralstech.com)
- 25<sup>B</sup> - Ten Cate, Pendergrass (12 tests)  
Darrell Scoggins -- (706) 693-2226  
[d.scoggins@tencategeo.com](mailto:d.scoggins@tencategeo.com)
- 26<sup>B</sup> - Agru America Inc. (27 tests)  
Maria Coffey -- (843) 546-0600  
[mcoffey@AgruAmerica.com](mailto:mcoffey@AgruAmerica.com)
- 29<sup>e</sup> - FITI Testing and Research Institute (79 tests)  
Hang Won-Cho -- 82-2-3299-8071  
[hwcho@fitiglobal.com](mailto:hwcho@fitiglobal.com)
- 31<sup>D</sup> - NYS Dept. of Transportation (7 tests)  
Tom Burnett -- (518) 485-5707  
[tburnett@dot.ny.gov](mailto:tburnett@dot.ny.gov)
- 34<sup>B</sup> - Solmax (GSE) - Houston, TX USA (26 tests)  
Lana Hickman  
[Lhickman@solmax.com](mailto:Lhickman@solmax.com)
- 38<sup>C</sup> - CTT Group SAGEOS (123 tests)  
Oliver Vermeersch -- (450) 771-4608  
[overmeersch@gcttg.com](mailto:overmeersch@gcttg.com)
- 40<sup>B</sup> - Solmax (GSE) - Kingstree, SC USA (19 tests)  
Thomas Harrelson -- (843) 382-4603  
[tharrelson@solmax.com](mailto:tharrelson@solmax.com)



- 41<sup>A</sup> - SGI Testing Service, LLC (19 tests)  
Zehong Yuan -- (770) 931-8222  
[ZYuan@sgilab.com](mailto:ZYuan@sgilab.com)
- 42<sup>C</sup> - NPUST (GSI-Taiwan) (71 tests)  
Chiwan Wayne Hsieh -- 011-886-8-7740468  
[CWH@mail.npust.edu.tw](mailto:CWH@mail.npust.edu.tw)
- 43<sup>A</sup> - Ardaman & Associates (19 tests)  
George DeStefano -- (407) 855-3860  
[gdestafano@ardaman.com](mailto:gdestafano@ardaman.com)
- 44<sup>B</sup> - Berry Global Inc. (9 tests)  
Julie Solarz -- (615) 847-7299  
[juliesolarz@berryglobal.com](mailto:juliesolarz@berryglobal.com)
- 45<sup>B</sup> - Ten Cate Geosynthetics Malaysia SDN Bhd. (24 tests)  
Boon Kean Tan -- (603) 519 28576  
[BK.tan@tencategeo.com](mailto:BK.tan@tencategeo.com)
- 46<sup>B</sup> - TAG Environmental Inc. (13 tests)  
Ryan Ackerman -- (705) 725-1938  
[ryan\\_ackerman@tagen.com](mailto:ryan_ackerman@tagen.com)
- 49<sup>B</sup> - Engepol Geosintéticos (16 tests)  
Patricia Ferreira -- (55) 51 3303-3901  
[patricia@engepol.com](mailto:patricia@engepol.com)
- 50<sup>B</sup> - ADS, Inc. Hamilton (7 tests)  
Justin Elder -- (513) 896-2065  
[justin.elder@ads-pipe.com](mailto:justin.elder@ads-pipe.com)
- 51<sup>B</sup> - SOLMAX - Canada (21 tests)  
Claude Cormier -- (450) 929-1234  
[ccormier@solmax.com](mailto:ccormier@solmax.com)
- 53<sup>B</sup> - Polytex Autofagasta (18 tests)  
Mario Contreras Cardenas -- 011 55-288-3308  
[mcontreras@polytex.cl](mailto:mcontreras@polytex.cl)
- 55<sup>B</sup> - Atarfil Geomembranes (21 tests)  
Gabriel Martin Sevilla -- 34 958 439 200  
[gmartin@atarfil.com](mailto:gmartin@atarfil.com)
- 56<sup>B</sup> - Polytex Santiago (13 tests)  
Luedy Utria Caicedo -- 011 56-2-677-1000  
[Lutria@polytex.cl](mailto:Lutria@polytex.cl)
- 57<sup>B</sup> - Ten Cate Cornelia (22 tests)  
Melissa Medlin -- (706) 778-9794  
[m.medlin@tencategeo.com](mailto:m.medlin@tencategeo.com)
- 58<sup>B</sup> - Propex Furnishing Solutions - Hazlehurst (10 tests)  
Victoria Shoupe -- (912) 375-6180  
[Victoria.Shoupe@propexglobal.com](mailto:Victoria.Shoupe@propexglobal.com)
- 59<sup>B</sup> - Firestone (9 Tests)  
Janie Simpson -- (864) 439-5641  
[SimpsonJanie@firestonebp.com](mailto:SimpsonJanie@firestonebp.com)
- 60<sup>B</sup> - TDM Geosintéticos S.A. (16 tests)  
Roberto Diaz -- 051-1-6300330  
[rdiaz@tdmgeosinteticos.com.pe](mailto:rdiaz@tdmgeosinteticos.com.pe)
- 61<sup>B</sup> - Raven Industries (24 tests)  
Clint Boerhave -- (605) 335-0288  
[Clint.Boerhave@ravenind.com](mailto:Clint.Boerhave@ravenind.com)
- 62<sup>B</sup> - SOLMAX - Selangor - Malaysia (14 tests)  
Pei Ching Teoh -- (450) 929-1234  
[pcteoh@solmax.com](mailto:pcteoh@solmax.com)
- 63<sup>A</sup> - TRI-SC Labs (12 tests)  
Jay Sprague -- (864) 346-3107  
[Jesprague@tri-env.com](mailto:Jesprague@tri-env.com)
- 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) (23 tests)  
Riyaz Shaikh  
(0) 022-25003651  
[btira@vsnl.com](mailto:btira@vsnl.com)
- 66<sup>B</sup> - Rowad International Geosynthetics Co. Ltd (13 tests)  
Abdullah Zahrani -- +966-3-812-1360  
[A.alzahrani@rowadplastic.com](mailto:A.alzahrani@rowadplastic.com)
- 68<sup>B</sup> - Shawmut Corporation (4 tests)  
Stacy Chadwell -- (336) 229-5576  
[schadwell@shawmutcorporation.com](mailto:schadwell@shawmutcorporation.com)
- 69<sup>B</sup> - Solmax (GSE) - Rayong - Thailand (14 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 Agricolas y Geomembranas S.A.C. (24 tests)  
Manuel Constantino Olivares Espinoza --  
073-511814-511829  
[calidad@pgaperu.com](mailto:calidad@pgaperu.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. (32 tests)  
Javier Diaz Cipagauta (571) 424-9999  
[jdiaz@geomatrix.com.co](mailto:jdiaz@geomatrix.com.co)
- 76<sup>B</sup> - Tehmco (Chile) (15 tests)  
Rodrigo Campoy 56-22-580-2852  
[rcampoym41@gmail.com](mailto:rcampoym41@gmail.com)
- 78<sup>B</sup> - PQA 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)  
Ping Wang 86-512-6283-1396  
[Pwang@tri-env.com](mailto:Pwang@tri-env.com)
- 80<sup>B</sup> - Texel Technical Materials (11 tests)  
André Parent (418) 387-4801  
[andre.parent@lydall.com](mailto:andre.parent@lydall.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 (GSE) - 6<sup>th</sup> of October City - Egypt (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 (17 tests)  
Manuel Constantino Olivares Espinoza --  
073-511814-511829  
[calidad@pgaperu.com](mailto:calidad@pgaperu.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 (17 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)  
Hermendra Behera - 91-937404-4620  
[geo.sgc@megaplast.in](mailto:geo.sgc@megaplast.in)
- 90<sup>B</sup> - Techfab (India) Industries Ltd. - Daman (8 tests)  
Jagdish Chandra Joshi - 91-22-2287-6224  
[nonwoven.qualitylab@techfabindia.com](mailto:nonwoven.qualitylab@techfabindia.com)  
Anant Kandi - [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)  
Juan David Lopez Torres - 57-1-782-5100 (ext. 1534)  
[juan.david.lopez@mexichem.com](mailto:juan.david.lopez@mexichem.com)
- 96<sup>B</sup> - Tensar China (6 tests)  
Zhu Shaolian - 603-6148-3276  
[zsl@tensar.com.cn](mailto:zsl@tensar.com.cn)
- 97<sup>A</sup> - TUV SUD PSB Singapore (15 tests)  
CHA Ming Yang - 65-6885-1514  
[ming-yang.CHA@tuv-sud.psb.sg](mailto:ming-yang.CHA@tuv-sud.psb.sg)

- 98<sup>B</sup> - NeoPlastic Filmes e Embalagens Plasticas Ltda. (7 tests)  
Daniel Meucci - 55 (11) 4443-1000  
[daniel.meucci@sapphireoffice.com.br](mailto:daniel.meucci@sapphireoffice.com.br)  
Nathalia Santos  
[nathalia.santos@neoplastic.com.br](mailto:nathalia.santos@neoplastic.com.br)
- 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 (11 tests)  
Nilay Patel - 706-336-7000  
[nilay@skaps.com](mailto:nilay@skaps.com)
- 103<sup>B</sup> - STRATA Geosystems Pvt. Ltd. (6 tests)  
C. V. Kanade - 91-22-4063-5100  
[cv.kanade@strataindia.com](mailto:cv.kanade@strataindia.com)

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

It needs to be mentioned that there is a huge continued interest in the GAI-LAP, which speaks volumes of the past and present participants in the program. In short, our community of labs are making a difference in quantifiable quality in the Geosynthetic Industry. Unfortunately, there is now a backlog of laboratories around the world that have applied for a first-year on-site audit. Due to travel restrictions, we had not been able to fulfill these requests, but have just started to resume travel. Currently the labs that are on our short list for first year on-site audits are as follows:

1. TRI, Brisbane Australia
2. Lonax, Brazil
3. TenCate, Seremban Malaysia
4. Sapphire, Spain
5. Geofabrics, Molendinar Queensland Australia

Our first in-person audit since the pandemic began took place on September 4 in Lakewood Colorado at the Advanced Terra Testing laboratory. A picture of the Advanced Terra Testing team is shown in Figure 8.

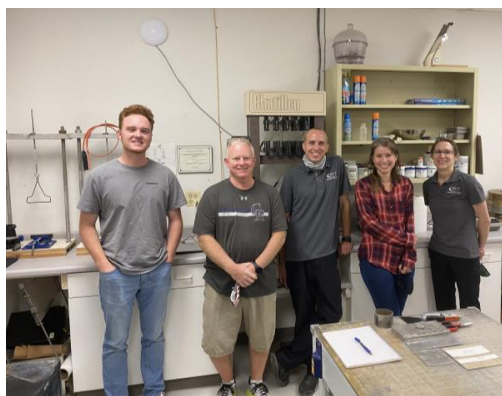


Figure 8 - Photo of ATT's lab personnel, Lakewood, CO USA

In addition, our first virtual audit took place on September 8<sup>th</sup> with Pavco Wavin Tuberias y Geosistemas, whose laboratory is located in Lima Peru. Both laboratories are expected to receive their accreditation before the end of 2020. Feels good to be able to conduct audits again.

We would like to thank all of these companies for their patience during these unprecedented times and would like to assure them that we will answer the call ASAP.

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.

## GRI-GN4 Specification Update

GRI standard specifications developed by the Geosynthetic Research Institute through consultation and review by the member organizations are reviewed on a regular basis and as such subject to change at any time. The most recent revision date is the effective version and it is kept current on the Institute's Website. GRI-GN4 Standard Specification for "Test Methods, Required Properties and Testing Frequency for Biplanar Geonets and Biplanar Geonet Composites" is seeing some major revisions as of late. Three manufactures and several consultants have brought to our attention that the GN-4 specification, in its current form, has transmissivity requirements approximately an order of magnitude higher than published values for standard products. As engineers use GRI-GN4 more and more, this became an urgent issue to addressed ASAP.

In response to this request, GSI embarked on a large ASTM D4716 Transmissivity testing program to quantitatively evaluate values in GRI-GN4 specification. This work counterpoints original testing a decade ago when the specification was first established.

Several items of interest about the new round of test results are listed below;

1. it appears that geonets easily meet the GRI-GN4 specification,
2. it appears that the single sided (GT-GN) and double-sided (GT-GN-GT) geocomposites do not meet the GRI-GN4 specification,
3. Type of soft or hard boundary conditions significantly affect transmissivity results,
4. there is significant material variability in some cases, and
5. specimen saturation is a constant challenge with this test. When PET geotextiles (hydrophilic) made up part of the geotextile portion of the geocomposite, this was not an issue. However, today, most geocomposites are made up of polypropylene (hydrophobic) geotextiles thermally

bonded to geonets forming the drainage geocomposite. We are used a surfactant as a wetting agent to facilitate good saturation, which is a required boundary condition of the test.

In short, expect to see a revision of GRI-GN4 Standard Specification in the next quarter. If you want to get involved with this process, do not hesitate to call us for details.

## GRI Standards - Española

With the cooperation of IGS Chile, GRI standards are in the process of being translated into Spanish. Several translated standards will be available on our website in the near future, and we will continue to update the GSI website as translations become available. There is a need for this project due to the continuing growth of Spanish speaking individuals in both the U.S.A. and worldwide.

We would like to thank all the members of the “IGS Chile Technical Committee of Barriers” for their efforts in this regard. They include, but are not limited to, Fernando Castillo, Andres Leon Saavedra, Bladimir Santacruz and Carlos Bone. We would also like to thank our long time member Mauricio Ossa from Solmax for his expertise and assistance with the translation of the GRI standards.

## Activities within GCI (Certification)

GSI presently has three 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 second (begun 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. They are similar in that a perspective candidate must...

- Be recommended by a superior or professional engineer who knows, and can attest to, at least six months of acceptable experience performing professional services within the specific application area.
- 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 or engineer.

- 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. It is renewable if so desired.

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

This program, now in its Fifteenth (15) year, has been recommended, and in some cases required, by solid waste owners, state regulators, and design consultants for proper QA/QC in field installation of both geosynthetic materials and compacted clay liners. The statistics to date are listed below. As you can clearly see, 2019 was a very good year for the GCI-ICP program. We would like to thank TRI Environmental Inc. for their significant contribution to the success of this certification program. Their promotional strategies and in-house QA/QC course have generated renewed interest in the program. Special thanks to Sam Allen, Jeffrey Kuhn and Mark Sieracke for teaching the course.

#### Inspector Certification Test Results 2006 – 2020

Year	Geosynthetic Materials		Compacted Clay Liners		Commentary
	No. of people taking exam	No. of people failing exam	No. of people taking exam	No. of people failing exam	
2006	141	5 (3%)	128	12 (9%)	2
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	56	6 (11%)	51	6 (12%)	1
2016	36	3 (10%)	35	5 (18%)	0
2017	78	5 (6%)	66	3 (4%)	1
2018	53	5 (10%)	51	1 (3%)	0
2019	114	20 (18%)	119	15 (13%)	11
2020	39	5 (13%)	38	8 (21%)	5
<b>TOTAL (to date)</b>	954	115 (12%)	893	101 (11%)	52 (5%)

There are currently 461 practicing certified inspectors, 376 inspectors (2015-2020) and 85 inspectors (2006-2014) who have renewed to keep certification current.

The GCI-ICP Program had a 53% increase in participants from 2018-2019 and projections for 2020 were originally forecasted at 60 new inspectors. Due to COVID-19 and the cancellation of most in-person conferences and classes, it may be difficult to reach our projection.

GSI 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)

Please contact Jamie Koerner if you are in need of a proctor to administer the GCI-ICP exams.

[jamie@geosynthetic-institute.org](mailto:jamie@geosynthetic-institute.org)

### 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 over a consecutive three-day period. The live on-line course has not been scheduled, however, recordings are available. Contact Jamie Koerner at [jamie@geosynthetic-institute.org](mailto:jamie@geosynthetic-institute.org) for details and arrangements.

The status of the program is shown in the following table. Here it can be seen that this particular GSI certification has been less than anticipated even though we have 340 similar MSE wall failures. We do have one positive announcement regarding the program. We have received our first renewal for inspector certification in March 2020.

Inspector Certification Test Results for  
MSE Walls and Berms Inspectors  
2011 – 2019

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
2016	GSI On-Line Course	2	2
2017-20	GSI On-Line Course	0	0
TOTAL		24	0

### Program #3 - Geosynthetic Designer Certification

The “Geosynthetic Designer Certification Program (GDGP)” is also now available. Please go to [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. In the *requirements* section you will see that the applicant must;

- be a graduate of an accredited engineering program,
- have six-months geosynthetic designer experience,
- complete the application form,
- pay the \$500 fee for 5-years certification, and
- take a 45-question examination with  $\geq 70\%$  passing.

The *examination* itself is subdivided into 15-sections, each consisting of five questions. A candidate must answer any 3 questions in each section, making a total of 45 questions to be answered. Most of the questions are numeric, as is geosynthetic design practice in general. Unlike our other certification examination questions, however, this examination is of an open-book, open-notes format and does require a calculator so as to “crunch the numbers”.

Lastly, please spread-the-word within your organization and to others as well. We sincerely hope that one, or all three, of the above programs will be beneficial in upgrading the technical base of geosynthetic design and installation so as to properly utilize all of our geosynthetic materials in all of their many applications. All three programs are on-going and if you have questions and/or comments please contact us accordingly.

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### 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, 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). 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 a 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. K. Mukhopadhyay was formed in 2015. 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.

## **GSI Member Organizations**

We sincerely thank all of our sponsoring organizations for their continued support, especially during this economic slowdown brought on by COVID-19. Without members, GSI could not exist. We regret the loss of a few sponsors, but are optimistic about the future. The current GSI member organizations and their contact members are listed below.

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