The GSI Newsletter/Report

Geosynthetic Institute

Vol. 38, No. 4 December, 2024

This quarterly newsletter, now in its 36th year, presents the activities of GSI and its related institutes to all who are interested. It is available on the institute's home page at www.geosynthetic-institute.org. It also serves as a quarterly report to its member organizations. Details are available by contacting George R. Koerner or Jamie Koerner at phone (610) 522-8440; or e-mail at gsigeokoerner@gmail.com or Jamie@geosynthetic-institute.org

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

2024-2026 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.

Term Ends 2025

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

Term Ends 2026

- Henry Mock – WSP
  (Consultants)
  email: henry.mock@wsp.com
- Anthony Johnson – Agru America Inc.
  (Barrier Group)
  email: ajohnson2@AgruAmerica.com
- Jacek Kawalec – Tensar
  (International - 2)
  e-mail: Jacek.Kawalec@vp.pl

Term Ends 2027

- Burrill (Bo) McCoy - Waste Management Inc.
  (Owners and Operators)
  e-mail: bmccoy2@wm.com
- Rene Laprade - Solmax Geosynthetics
  (Geotextiles and Geogrids)
  e-mail: rlaprade@solmax.com
- Sam Allen – TRI Environmental Inc.
  (Test Laboratories)
  e-mail: Sallen@tri-env.com

GSI continues to have virtual quarterly meetings with the Board of Advisors via Zoom. The 4Q BOA meeting was held on December 20, 2024. The transition plan for GSI and timeline for implementation was discussed at the meeting. The results will be announced in the 1st Quarter of 2025. We thank everyone involved in this process for their time and efforts.

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IN THIS ISSUE

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 and new research details. Please contact George or Grace if you have advice or concerns.

George Koerner (gsigeokoerner@gmail.com)
Grace Hsuan (hsuanyg@drexel.edu)

1. Durability of Geosynthetics: (15 materials)

Durability of Exposed Geosynthetics (GM, GT, GG, HPTRM, Turf, WD & GCCM) GSI is using two outdoor exposure racks and six UV fluorescent devices to estimate the projected exposed lifetime of a litany of different geosynthetics. We currently have 15 geosynthetic materials under investigation. The goal of the study is to quantitatively illustrate the durability of these materials and to correlate outdoor exposure to accelerated weathering.

2. Freeze-Thaw Cycling of GCCM's:

We are freeze thaw durability testing Geosynthetic Concrete Composite Materials (GCCM's). Freeze-thaw testing, also known as freeze-thaw stability testing, is a process that subjects materials to repeated cycles of freezing and thawing to evaluate their stability and durability. This method is used in a variety of industries, including geosynthetics. Freeze-thaw weathering occurs when porosity within the GCCM allows water to infiltrate into it. Water enters cracks in the GCCM, when temperatures drop, the water freezes and expands causing cracking and weakening of the material. We are testing four different materials and monitor the flexural performance (ASTM D8058) of each GCCM over time by comparing the retained flexural strength. We have had a setback with this work. We did not freeze and thaw the GCCMs with the proper protocol and ruined the entire batch of samples in the process. This was a costly mistake and resulted in much wasted time and effort. We hopefully will restart this effort in 2025.

3. Arrhenius Modeling for Lifetime Prediction:

GSI is evaluating four 2.5 mm thick Carpi PVC geomembranes at the institute. The CARPI system consists of a very robust PVC geomembrane used as part of a patented system for waterproofing and draining the upstream face of all types of dams and hydraulic structures. The CARPI system provides protection from the deterioration phenomena caused by seepage of reservoir water into such a structure. Obviously, the lifetime prediction of geomembranes used in such critical applications is important. In fact, it is the most frequently asked question when dealing with liner materials used in infrastructure repair. The answer to this question is accomplished via laboratory time-temperature-superposition (TSS) testing followed by Arrhenius modeling.

CARPI has been very generous in the past and continues to support Arrhenius modeling at GSI. We utilize three and as many as six ultraviolet weathering devices (ASTM D7238 QUVA) set at 55, 65 and 75°C temperatures for this purpose. Periodically, we remove the incubating samples and die cut test specimens to determine strength and elongation. These results are then compared to results of the original as-manufactured values for a percent strength retained and a percent elongation retained. The data-to-date for the four geomembranes are developing nicely at 10,000 Light Hours. However, we probably have another 20,000 Light Hours to go before half-life is experienced in some of the materials.

The Geosynthetic Institute (GSI) is grateful to receive the contract to perform laboratory testing on the four CARPI PVC Geomembranes. Even though we are in the early stages of this project, we hope the effort will be fruitfull.

4. Bituminous Geomembranes:

Bituminous geomembranes (BGM) are very low permeability synthetic membrane barriers used in geotechnical engineering applications used to control fluid (liquid or gas) migration. BGM are manufactured by impregnating a non-woven polyester geotextile and a fiberglass layer with an elastomeric bitumen compound. The geotextile provides mechanical strength and puncture resistance. The bitumen provides the waterproofing properties of the geomembrane and ensures its longevity. GSI is finishing a long set of testing on five B-GM from Axter Coletanche in support of GRI-GM38 "Standard Specification for Test Methods, Test Properties and Testing Frequency for Bituminous Geomembranes (BGM)". The testing has included physical, mechanical, chemical and endurance testing over a large range of materials. It proves that the new specification is rigorous and capable of differentiating between good and bad materials.

5. Geomat Specification:

The Geosynthetic Institute (GSI) has a long history of creating industry wide generic specifications for geosynthetics. At present, we have twenty-four promulgated and three others under development. Like all engineered materials, geosynthetics need general requirements/thresholds to incorporate into plans and specifications. GSI has a new GeoMat specification entitled GRI-GS35 Standard Specification for "Test Methods, Required Properties and Testing Frequency for Geomats Drainage Composites". This specification covers open three-dimensional mats and composite structures. Geomats are constructed of continuous polymeric fibers that are fused where they intersect. They can be used in a multitude of applications from drainage, erosion control and reinforcement applications. Both polypropylene and polyamide GeoMats are covered in the specification. These cores can be married to a geotextile filter on one or both sides to form a drainage geocomposite. Such materials combine drainage, protection and filtration all in one product. The specification addresses the use of GeoMat's in drainage applications.

6. High Performance Turf Reinforcement Matts:

High performance turf reinforcement matts (HP-TRM) are perfect for slope and channel protection against soil erosion. Such three-dimensional HP-TRM are covered under GRI-GC14 Standard Specification for "Test Methods, Required Properties and Testing Frequency for High Performance Turf Reinforcement Mats". This specification has just gone through a new revision with several improvements. It has also expanded its coverage from three to four categories namely "Rugged, Standard, Moderate and Non-Critical". Please check out the updates on our website under specifications.

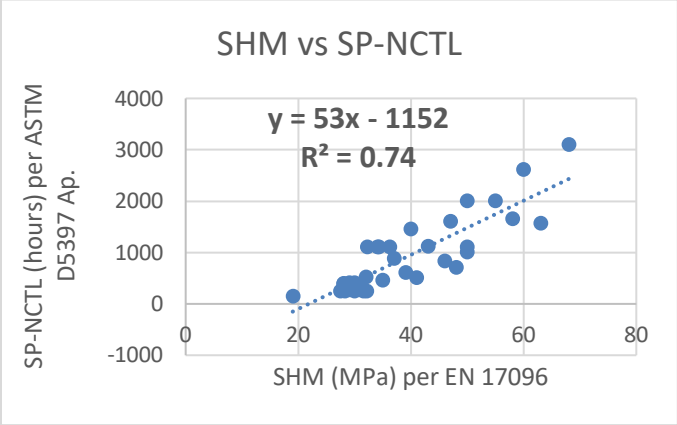
7. Jet Filter Test Method:

JET Filter Test Method and Specification: Earth retaining structures, such as seawalls, bulkheads, bridge abutments and retaining walls, require proper drainage. Inevitably, hydrostatic water pressure builds up behind such walls over time. Without proper drainage, the wall will subsequently become distressed and possibly experience failure. Maintainable weep hole filters will extend the life of any new or existing structure. JET Filters have proven to be a maintainable weep hole system for both new construction and retrofits of old infrastructure. They consist of a cage and a removable geotextile cartridge for easy operations and maintenance. GSI is writing a new test method to evaluate these products over time. The long-term flow test is a bit tricky because it deals with partially saturated flow rather than our conventional Darcian flow. However, this is how the product works in the field.

8. Strain Hardening Modulus:

Strain Hardening Modulus (SHM): The strain hardening modulus of an HDPE geomembrane typically falls within a range of 20 MPa to 80 MPa depending on the specific formulation and manufacturing process, with higher values indicating greater resistance to stress cracking, a key property for geomembranes. SHM is measured through tensile testing and determining the modulus of the material prior to break. We believe that the best way to determine the strain hardening modulus of HDPE geomembranes is via EN 17089.

GSI has just completed an extensive investigation of SHM as it relates to Stress crack resistance (SP-NCTL per ASTM D5397 Appendix). The results of this exhaustive study appear in the graphic below. This work was done in support of GSI new high performance HDPE specification GRI GM-42.



9. Replacement Surfactant:

Replacement Surfactant for Igepal CO-630: The ASTM task group regarding ASTM D5397, "Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test," has discovered that the surfactant used in this experiment (Igepal CO-630) is a regulated substance in some countries (i.e., EU REACH directive). For this reason, many labs throughout the world are requesting a substitute-alternative surfactant for determining the stress crack resistance of HDPE. It appears as if the Germans have found such a surfactant in BASF's 804863 / 4B3 ROKAnol® IT10. Dr. Jan Retzlaff of GEOscope GmbH Weimar GERMANY is the convener of this Round Robin NCTL using

Rokanol. It appears that he will publish his results shortly. This is good news for all of us involved with HDPE!

10. New HD-HDPE Specification:

GRI has a new HDPE Specification for Extreme Conditions (GRI GM-42). This specification is accompanied by two practices, (1) GRI GM-40 "Preparation of Film for Accelerated Oxidation Resistance Testing of Polyolefin Geomembranes." This practice is intended for the preparation of thin film samples used for determining an accelerated assessment of product durability in order to reduce the time necessary to assure specification compliance. (2) GRI GM-41 "Accelerated Oxidation Resistance Testing of Polyolefin Geomembranes." This practice is largely informed by the use of procedures found in ISO 13438. This practice employs a series of oxidation resistance experiments using a two-phase approach. Phase 1 involves a water leaching procedure (GRI GM-40) and then Phase 2 involves oven, QUVA or chlorine aging. This specification has been in the works since 2018. We finally promulgated these two practrices and specification in December of 2024.

11. EIA Geomembrane Specification:

EIA geomembranes have been used as liquid and gas barriers in geoenvironmental applications for more than 40 years. The only *generic* specification available to aid engineers was published in 1983 by the National Sanitation Foundation (NSF) as Standard No. 54. The standard provided a list of tests together with their corresponding minimum values. Although four revisions were carried out in the intervening years, the standard was still lagging behind the state-of-practice of the EIA geomembrane industry. Most importantly, the long-term performance of the material was never properly addressed. For a number of interrelated issues, NSF decided to withdraw from the geosynthetic industry by terminating the publication of Standard No. 54 at the end of 1997.

Considering the above situation, a completely new EIA specification was needed. In 1994, at the prompting of the U.S. Environmental Protection Agency, a technical task group was formed within GRI consisting of four EIA geomembrane manufacturers. The group decided that the purpose of the specification was to be directed at manufacturing quality control (MQC) only. This infers that if an owner or specifier has unique or extenuating circumstances for a particular project, modifications in the form of a project specification can be made, however, such changes should be communicated accordingly to the manufacturer.

GSI's new EIA = PVC+KEE specification covers physical, mechanical, chemical and endurance properties of EIA geomembranes. The majority of the required properties are evaluated by test methods established by the ASTM D35 Geosynthetics Committee. In cases where no ASTM standards are available, GRI test methods were developed and are included accordingly. The GRI-GM34 specification covers EIA geomembranes with four different thicknesses (0.76, 0.91, 1.13 and 1.52 mm).

12. Silt Fence Test Methods:

Silt Fence Test Methods: New test methods for determining the Connection Strength of Silt Fences: Procedure "A" Compression (simulates forces from water loading) and Procedure "B" Tension (simulates forces from construction and wind). This is a very common application for geotextiles seen on most construction sites. The purpose of a silt fence is to retain the soil on disturbed land. As the turbid water flows through the geotextile of the silt fence, it clogs the geotextile and builds a progressive dam. Hence the silt fence is designed based on the geotextile strength and the strength of the connections to the main support posts.

Progress within GII (Information)

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
- Quarterly Newsletters
- White papers
- GSI Website
- Bimonthly GMA Techline
- Bimonthly GSI News Column in Geosynthetics Magazine
- Conference Papers
- GRI Reports

Canadian Geotechnical Society – Toronto and Ottawa

I had the great pleasure to present two lectures to the Canadian Geotechnical Society in December. One to the Southern Ontario Section at the Pearson Convention Center near Toronto and the other to the Ottawa Section in the nation's capital. The annual dinners were festive and enlightening. The events progressed quickly with cocktails, socializing, dinner, awards all followed by a lecture on the "History of

Geosynthetics." This presentation traced the history of geosynthetic by highlighting; literature, institutions, legends, polymer development (formulations), manufacturing, applications versus functions all interspersed with case histories. The evolution of geosynthetics has positively influenced Civil Engineering, offering versatile solutions. Their enduring relevance and vital role in shaping the future of infrastructure development, transportation, geotechnical engineering, environmental containment, hydraulics engineering and private development cannot be understated. All seemed to be happy with the lectures which in truth were not very technical.

Attendees at Toronto, Canada Lecture on Dec.10, 2024

Geo-Structures – Pittsburgh

It was a great pleasure to be invited by conference chair Jay McKelvey (Earth Engineering Inc.) to present at Geo-Structures 2024, held in Pittsburgh, PA on November 17–20, 2024. We participated in a panel discussion entitled "Reinforcing the Future: Advancement in Geosynthetic Reinforced Structures" in the Grand Station Ballroom.

Panel presentation topics were as follows:

1. George Koerner, (Geosynthetic Institute, GSI) Half a century of pioneering: tracing 50 years of geosynthetic testing innovations and performance.

2. Vona Ojaruega, (Huesker) From now to next: advancements and the future of geosynthetic reinforcement.

3. Daniel Alzamora, (FHWA)When, where, and how: unpacking the use of geosynthetic reinforcement in civil construction.

4. Archie Filshill (Aero Aggregates) and Louis Dini, (Kiewit Engineering Group, Inc.) A recipe for success: combining geotechnical expertise with geosynthetic reinforcing products for innovative and challenging design solutions.

GSI had a fantastic experience at Geo-Structures 2024 in Pittsburgh, we shared insights and connected with peers in the industry. This conference facilitated the exchange of knowledge and experiences among practitioners, researchers, academics, and constructors regarding geotechnical engineering and construction of earth retaining and underground structures. We also had the opportunity to meet a bunch of young engineers and students at this event which was refreshing.

IGS Geosynthetic Handbook

The chapter breakdown is as follows

I **Introduction to Geosynthetics**

II **Geosynthetics in Roads and Pavements**

III **Geosynthetics in Subsurface Drainage/Water Storage**

IV **Geosynthetics in Erosion and Sediment Control**

V **Geosynthetics in Reinforced Soil Systems**

VI **Geosynthetics in Seepage Control Systems**

VII **Geosynthetics in Environmental Protection**

VIII **Geosynthetics Support Systems**

IX **References / Links**

We will keep you updated on the progress of the handbook, which is targeted for release in 2025.

GEOFRONTIERS Conference

The 2025 Geofrontiers Conference will be held in Louisville, Kentucky on March 2- 5.

Registration can be made at:
http://geotechnicalfrontiers.com/attend/register/

Geosynthetic Institute's upcoming Activities:

- **Peru and Chile Audits Jan 17-24**
- **ASTM Houston January 29**
- **Geofrontiers in Kentucky March 2-5**
- **Seoul Korea Conference March 22-24**

Members Only Section on Website

Accessible with a members-only password. Your contact person/persons (names listed beneath member company) must obtain a password from Jamie Koernerto access the members-only section of the Geosynthetic Institute website. Jamie can be reached by e-mail at 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. Access to these reports are in the password protected section of the GSI website at www.geosynthetic-institute.org/member/reports.htlm. Non-members can purchase the reports from the online GSI bookstore. There are 45 Whitepapers which are free to everyone.

Progress within GEI (Education)

University of Illinois Chicago Webinar

We presented for the University of Illinois Chicago (UIC) International Webinar Series on Geoenvironmental Engineering, Sustainability and Resiliency. The webinars within the series are on a wide range of topics related to geoenvironmental engineering, land contamination and waste management. Our one-hour presentation was on December 5th on "Landfill Liner Performance Evaluation from Exhumed Case Histories" and was attended by several hundred people from all over the world. You can presently check out the presentation on YouTube https://www.youtube.com/watch?v=qSuadmbpqnw.

Professor Krishna Reddy is providing a wonderful service to the profession with these recorded webinars. It was a pleasure to participate and show how geosynthetic successfully reduce human health and environmental risks.

GSI Fellowships - 2024

The 17 graduate students listed below have been chosen to receive this year's GSI $5000 Fellowship Award.

2024-2025 Fellowship Recipients

STUDENT	RESEARCH TOPIC	PROFESSOR	UNIVERSITY
G. Tavakoli Mehrjardi	Probability and rate of microplastics	Wichtmann	Ruhr U, Germany
Asad Ahmad	GG-reinforced MSE wall with horizontal obstructions	Bodet	Purdue U
Hanri Zhao	Effect of Hydration Conditions on Shear Strength of HDPE GM and GCL interface	Tian	George Mason U
Ashray Saxena	GS reinforcement reducing asphalt overlay thickness	Zornberg	U of Texas at Austin
Wei Sun	Smart GT for Real Time soil monitoring through AI	Zhang	U of Mass Amherst
Sufal Biswas	Evaluation of GG reinforced soil at bridge abutment with pile foundation	Sasanakul	U of South Carolina
Shanmukha S.A. Gonnabathula	Performance Eval. Of Wicking Geotextile in Enhancing Unpaved Pavements	Puppala	Texas A&M
Leonardo V. Paixao Daciolo	Effect of PFAS solution on GM service life	Rowe	Queen's U, Canada
Jose Wilson Batista da Silva	Effect of the welding quality and GM thickness on long-term performance of HDPE fusion seams	Rowe	Queen's U, Canada
Abdalla Abouyoussef	Effect of Homogenization and Dissection approaches on the Standard OIT of Multilayered GM	Abdelaal	Queen's U, Canada
Kasra Salemi Kouchesfahani	Physical Modelling of GS waste Covers under Differential Settlement	Brachman	Queen's U, Canada
Candas Oner	Modeling based design & optimization of Spider-web inspired GG in composite Geomaterials systems	Frost	Georgia Institute of Technology
Emre Duman	A novel multi-functional experimental setup to assess GG and aggregate interaction etc.	Frost	Georgia Institute of Technology
Mozaher Ul Kabir	Moisture Reduction in Unsaturated Soils with High Fines Contents using Wicking GT	Han	U of Kansas
Andrea Maria Pereira Vieira	Mechanism Evaluation of GS Encased Column-Supported Embankments with Basal Reinforcement etc.	Portelinha	UFSC, Brazil
Karolina Maria dos Santos	Milling aspects of GS reinforced pavements and the influence of G-RAP on recycled asphalt mixtures	Correia	UFSC, Brazil
Fatih Polat	Influence of Anion Type, Cation Exchange, & Temp. on Membrane Behavior and Diffusion in GCL	Lord	Villanova U

Congratulations to all Geosynthetic Institute 2024-2025 Fellowship Recipients!

Webinars – Prerecorded

The following prerecorded webinars are available to purchase on our website. The GSI webinars (1 ½ hours in duration) cover a large variety of topics related to geosynthetics.
www.geosynthetic-institute.org/webinar.htm

GSI 1 "A Data Base and Analysis of 320 Failed MSE Walls With Geosynthetic Reinforcement"
GSI 2 "MSE Wall Back Drainage Design"
GSI 3 "MSE Wall Remediation and Monitoring"
GSI 4 "MSE Wall Inspection"
GSI 5 "Geosynthetics in Hydraulic Applications"
GSI 6 "Geosynthetic Applications Used in Heap Leach Mining"
GSI 7 "Geosynthetics in Agriculture and Aquaculture"
GSI 8 "Geosynthetics Applications in the Private Sector"
GSI 9 "Behavior and Analysis of Twenty Solid Waste (Landfill) Failures"
GSI 10 "Wet (Bioreactor) Landfills for Rapid Degradation of MSW Organics"
GSI 11 "Lateral and Vertical Expansions Over Old and Existing Landfills"
GSI 12 "Landfill Covers: Past, Present, Emerging"
GSI 13 "Beneficial Uses of Abandoned and/or Closed Landfills"
GSI 14 "Lifetime Predictions of Covered and Exposed Geosynthetics"
GSI 15 "In-Situ Stabilization of Soil Slopes Using Nailed (or Anchored) Geosynthetics"
GSI 16 "Sand Drains-to-Wick Drains-to-Sand Columns (Including a Major Failure Case History)"
GSI 17 "Geosynthetics in Erosion Control"
GSI 18 "Pond Liner Design and Performance"
GSI 19 "Wave (or Wrinkle) Management [For Proper Deployment of GM"
GSI 20 "Geosynthetic Drainage Materials: Applications, Design, Installation and Performance"
GSI 21 "A Brief Overview of Geosynthetics and Their Major Applications"
GSI 22 "Geosynthetic Reinforced MSE Walls; Overview, Failures and Items for Improvement"
GSI 23 "Geosynthetic Filters: Concerns and Issues"
GSI 24 "Disposal of Coal Combustion Residuals"
GSI 25 "Soil Consolidation by Wick Drains, aka PVDs"
GSI 26 "Applications and Design of Geotextile Tubes"
GSI 27 "Stability Design of Landfill Cover Soils"
GSI 28 "Geomembrane Puncture"
GSI 29 "QA/QC of Geosynthetics"
GSI 30 "Lifetime Durability of Geosynthetics"
GSI 31 "Laboratory Testing of Geosynthetics"
GSI 32 "Sustainability with Geosynthetics"
GSI 33 "Ultraviolet Resistance of Geosynthetics"
GSI 34 "Geosynthetics in Roadways"
GSI 35 "Geosynthetics used in Canal Linings"
GSI 36 "Geosynthetics as Hydraulic Barriers"

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

The following pre-recorded courses are available through our online bookstore to both members and non-members.

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 and scroll down to Course #3. Here you will see the requisite details. The course itself is completely synchronized with the 6th Edition of the DwG textbook. It consists of 1540 slides with ~ 18 hours of voice over; about one minute for each slide.

Contact Jamie Koerner at jamie@geosynthetic-institute.org if you want additional information.

Activities within GAI (Accreditation)

The GAI-LAP program continues to grow steadily with much interest internationally and with the proficiency test program (PTP)

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

Audit at Huitex Testing Laboratory in Taiwan

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

1[A] - TRI/Environmental Inc. (158 tests)
Jarrett Nelson -- (512) 263-2101
jnelson@tri-env.com

3[A] - WSP (43 tests)
Henry Mock -- (770) 492-1893
Henry.Mock@wsp.com

4[C] - Geosynthetic Institute (108 tests)
George Koerner -- (610) 522-8440
gsigeokoerner@gmail.com

8[B] - Solmax Geosynthetics (Propex) - Ringgold (18 tests)
Todd Nichols -- 438-553-3757
tnichols@solmax.com

9[B] - Lumite (17 tests)
Rebecca Kurek -- (770) 869-1787
rkurek@lumiteco.com

13[A] - Precision Geosynthetic Labs (TRI Env.) (77 tests)
Chad Blackwell -- (714) 520-9631
cblackwell@tri-env.com

14[A] - Geotechnics (55 tests)
J. P. Kline -- (412) 823-7600
JPkline@geotechnics.net

20[A] - GeoTesting Express, MA (63 tests)
David Norton - (978) 635-0424
dnorton@geotesting.com

22[B] - CETCO Hoffman Estates (11 tests)
Minerals Technologies Inc.
Dennis Wind – (847) 851-1904
Dennis.wind@mineralstech.com

24[B] - CETCO Lovell (12 tests)
Minerals Technologies Inc.
Ryan Nicholls -- (307) 548-6521
Ryan.Nicholls@mineralstech.com

25[B] - Solmax (TenCate), Pendergrass (13 tests)
Randy Johnson-- (706) 693-2226
rjohnson@solmax.com

26[B] - Agru America Inc. (27 tests)
Vicky Bryant-- (843) 546-0600
Vbryant@AgruAmerica.com

29[e] - FITI Testing and Research Institute (80 tests)
Hang Won-Cho -- 82-2-3299-8071
hwcho@fitiglobal.com

31[D] - NYS Dept. of Transportation (8 tests)
Jim Simonds -- (518) 485-5707
Jim.Simonds@dot.ny.gov

34[B] - Solmax (GSE) - Houston, TX USA (24 tests)
Sai Prasad Namburi
sprasad@solmax.com

38[C] - CTT Group SAGEOS (125 tests)
Oliver Vermeersch -- (450) 771-4608
overmeersch@gcttg.com

40[B] - Solmax (GSE) - Kingstree, SC USA (14 tests)
Bruce Pressley -- (843) 382-4603
bpressley@solmax.com

41[A] - SGI Testing Service, LLC (19 tests)
Zehong Yuan -- (770) 931-8222
ZYuan@sgilab.com

45[B] - Solmax (TenCate) Malaysia SDN Bhd. (29 tests)
Boon Kean Tan -- (603) 519 28576
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46[B] - TAG Environmental Inc. (13 tests)
Manpreet Saini-- (705) 725-1938
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49[B] - Engepol Geossinteticos (16 tests)
Patricia Natali -- (55) 51 3303-3901
patricia@engepol.com

50[B] - ADS, Inc. Hamilton (8 tests)
Justin Elder -- (513) 896-2065
justin.elder@ads-pipe.com

51[B] - SOLMAX - Canada (20 tests)
Claude Cormier -- (450) 929-1234
ccormier@solmax.com

53[B] - Polytex Autofagasta (19 tests)
Mario Contreras Cardenas -- 011 55-288-3308
mcontreras@polytex.cl

55[B] - Atarfil Geomembranes (21 tests)
Gabriel Martin Sevilla -- 34 958 439 200
gmartin@atarfil.com

56[B] - Polytex Santiago (15 tests)
Sebastian Iturrita Monroe-- 011 56-2-677-1000
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57[B] - Solmax (TenCate) - Cornelia (26 tests)
Taylor Kolesnick-- (706) 778-9794
kolesnick@solmax.com

58[B] - Propex Furnishing Solutions - Hazlehurst (10 tests)
Lee Branch -- (912) 375-6180
Lee.Branch@propexglobal.com

59[B] - Holcim Solutions & Products (9 Tests)
Janie Simpson -- (864) 439-5641
Janie.Simpson@holcim.com

60[B] - TDM Geosintéticos S.A. (21 tests)
Henry De La Cruz -- 051-1-6300330
Hdelacruz@tdmgeosinteticos.com.pe

61[B] - Viaflex (24 tests)
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62[B] - SOLMAX - Selangor - Malaysia (18 tests)
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pcteoh@solmax.com

63[A] - TRI-SC Labs (20 tests)
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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 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 under "certification" for a description and information on all three of them.

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

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

Inspector Certification Test Results 2006-2024

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	81	18 (22%)	76	13 (17%)
2024	67	17 (25%)	57	10 (17%)
Total	**1322**	**193 (15%)**	**1230**	**145 (12%)**

Program #2 - Inspection of MSE 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 for the requisite details. Included are introduction requirements, application, reference material, sample questions, proctor manual and proctor application. You must have six-months of geosynthetic designer experience to take the exam.

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

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. GSI has affiliated institutes in two countries (Korea 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). **INHA University** is located in Incheon and the geosynthetics laboratory is led by Professor Han-Yong Jeon. Please note that the 3rd International ICGEE 2025 conference will be held in Seoul, South Korea from March 22-24, 2025.

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 continued support, especially during this transition period. Without members, GSI could not exist. The current GSI member organizations and their contact members are listed to the right and on the following page.

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
WSP Inc.
Frank Adams/Paul Whitty/Linda Grover/Henry Mock [BOA]
Tensar International Corporation, Division of CMC
Mark H. Wayne/Joseph Cavanaugh/Jacek Kawalec [BOA]

GSI Member Organizations (cont)

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TRI Environmental Inc.
Sam R. Allen [BOA]/C. Joel Sprague
U. S. Army Corps of Engineers
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Chevron Phillips Chemical Co.
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Civil & Environmental Consultants, Inc.
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AGRU America, Inc.
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INHA (GSI-Korea)
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Waste Management Inc.
Greg Cekander/Burrill (Bo) McCoy [BOA]
GeoComp/GeoTesting Express
W. Allen Marr/Gary Torosian/Joe Tomei
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