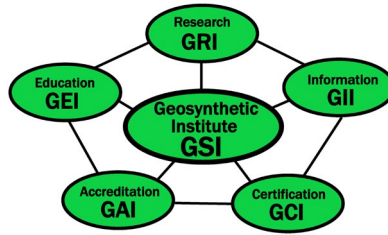


The GSI Newsletter/Report



Geosynthetic Institute

Vol. 38, No. 2

June, 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

Announcing an RFP for GSI

GSI is in the process of transitioning to the next generation of leadership and venue. For the past forty years it has been directed by someone in the Koerner family (Robert (1984-2014) and George (2015-present) in Philadelphia, PA USA. It is now time for someone else to take the reins and help move the institute forward.

The Geosynthetic Institute (GSI) currently has a request for proposal (RFP) out and is accepting proposals until September 20th, 2024. GSI has a strong balance sheet that can accommodate new ideas and big thinkers. We have a diverse and strong membership which brings ideas to fruition. It is an exciting time to be in Geosynthetics and the future looks very bright. If you are interested in our RFP and a scorecard on how GSI's ascendancy Ad hoc committee will grade your proposal, please contact gsigeokoerner@gmail.com and jamie@geosynthetic-institute.org for more information.

GSI's Officers and Board of Advisors (BOA)

2024-2026 Board of Advisors

GSI continues to have virtual quarterly meetings with the Board of Advisors via Zoom. The 2Q BOA meeting was held on June 28, 2024. We thank GSI's BOD, BOA and Special Ad Hoc Committee for their guidance in this period of transition.

Term Ends 2024

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

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) email: Jacek.kawalec@vp.pl

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. GRI GS-27 "Determining the Rate of Capillary "Wicking" Within Geosynthetics"

This test method was developed by the Geosynthetic Research Institute (GRI), with the cooperation of the member organizations. The method is applicable to many geosynthetics and is used to determine the rate of capillary wicking. The method covers the measurement of liquid transport on a specimen of known cross section as it is exposed to Distilled Deionized Deaired (DDD) water at a known environmental conditions. It has a relevance to a broad range of geosynthetics and its applicability is seen mainly in the transportation arena. **The test method is now moving through ASTM as WK 90123.**

3. GeoMat Specification

GSI is undertaking a new effort in regards to a GeoMat Specification. This specification will cover open 3-D mats and composite structures. Such mats are constructed of continuous polymeric fibers that are fused where they intersect. They can be used in a multitude of applications from drainage to reinforcement. This specification is being developed by the Geosynthetic Research Institute (GRI), with the cooperation of the member organizations for general use by the public. The specification will sets forth a set of minimum, physical,

mechanical, hydraulic, chemical and endurance properties that must be met.

4. Chlorine Aging

Chlorine aging of geomembranes has been an endeavor that has taken much effort at GSI. This important characteristic is covered under GRI GM-24 "Standard Practice for "Incubation and Subsequent Evaluation of Double 180° (Star) Folded Geomembranes". **This practice has now moved into ASTM as WK 89344.**

5. JET Filter Investigation

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 has written 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. As seen in the pictures below, the process is scalable to the lab and will be presented to ASTM for consideration in the ASTM D1987 test method task group.

6. Arrhenius Modeling

CARPI Inc. is sponsoring Arrhenius Modeling of four PVC geomembranes formulations at GSI. The Arrhenius method assumes that the mechanism of degradation at elevated temperature is similar to that of degradation under ambient conditions. This ten years plus effort is a huge undertaking for the institute. It keeps our endurance test lab solvent and operable and has provided justification for a large maintenance contract form Q-Panel for several years. We currently have three QUVA fluorescent devices running around the clock at 75, 65 and 55 degrees Celsius servicing this project. We are very grateful for CARPI Inc.'s continued support and interest in the long term durability of their products made at different manufacturing facilities around the world.

7. Strain Hardening and Stress Cracking

The Institute has had a major effort of relating the stress cracking performance of HDPE geomembranes to strain hardening modulus (SHM). The SHM is based on ASTM D6693 testing. This test method is used to develop a test method from which the susceptibility of unaged HDPE geomembrane sheet material to stress cracking under a constant tensile load condition and an accelerated environmental condition can be predicted using strain hardening modulus value. This comparison of characteristics of similar materials by standardizing the method for deriving the onset, modulus, and break point on the stress-strain curve from an HDPE Tensile Test. Strain hardening data can be appropriate for assessing the stress crack susceptibility of HDPE geomembranes. However, it should be very clearly stated that this method shows a good correlation between strain hardening modulus and stress crack performance within a specific formulation (resin type plus master batch). In addition, this method shows very poor correlation between strain hardening modulus and stress crack performance across different formulations. As such, this method is a useful manufacturing quality control (MQC) tool but is not appropriate for setting specification criteria by engineers to compare different geomembranes. To this end, if formulations are compared, they should be of the same supplier, grade, and density. We are looking forward to collaborating with ASTM, Jan Retzlaff (GeoScope) and the ISO crew on this subject.

As many of you know, the Geosynthetic Institute is in search of an alternative surfactant for stress cracking tests for HDPE geomembranes. It has been brought to the attention of the ASTM D5397 task group 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 via this method.

GSI is working with the ISO task group on this subject. The German committee of NAUE, SKZ, SOLMAX and HKA are currently in round robin testing with three different GRI geomembranes using ROKAnol IT10.

8. HP GM Specifications

GM-13 and GM-17 have achieved acceptance and adaption in many markets and countries throughout the world. The documents have been modified over time with 16 and 14 modifications/revisions, respectively. However, the barrier market has significantly expanded in scope, range and expected performance over the past decade. A “one size fits all” approach, while appropriate in the past, is no longer adequate to address the industry’s needs. For this reason, GSI has contracted a group of talented engineers and scientists with a wealth of knowledge on formulating and manufacturing PE geomembranes to prepare new specifications for geomembrane barriers based on application requirements including, but not limited to durability, lifespan, barrier properties and other factors. This process included investigation of existing databases from multiple sources with review and discussion of the proposed levels and values. This effort accomplished the following objectives:

- a. Proposed new DRAFT standards that respond to the current Wide variety of HDPE geomembrane applications.
- b. Tools for accelerating the measurement of stress crack resistance, resistance to oxidation and resistance to UV exposure, PROVIDED CORRELATION is performed.
- c. A Protocol for the “fingerprinting” of a geomembrane formulation in order to track consistency and relationship to observed durability performance.
- d. DRAFT Tech Notes that address ongoing issues (surface defects, engineered layers, recycled content and formulation definition).

9. GM Seam Specifications

GSI currently has twelve (12) barrier specifications. It has been requested that each have an accompanying seam specification. It is envisioned that the series of seam specification will be expanded to include the following:

19a, GM-13 HDPE, GM-17 LLDPE, GM-18 fPP

19b, GM-22 PE-R, GM-25 LLDPE-R, GM-28 CSPE-R, GM-34 EIA-R

19c, GM-21 EPDM

19d, GM-30 RCPE

19e, GM-38 BGM

GRI GM-22 PE-R B, GCL-3 and GS-33 VB film will not be covered by a seam specification and GSI will stay away from a PVC specification as a result of duplication of effort with ASTM.

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

IGS Geosynthetic Handbook

George R. Koerner, editor of the IGS handbook, has submitted the first draft of the handbook. It is now being reviewed by the IGS handbook committee. This handbook will be a dynamic document that will continue to evolve over time, updating as new information and technologies develop. This practical text is intended to serve as a general reference document in the field of geosynthetics. Polymeric construction materials used in civil applications are now commonly accepted as solutions to geotechnical and environmental engineering challenges. This handbook offers a comprehensive overview of geosynthetics and their various applications. The targeted release is for end of 2024. The chapter breakdown and authors of the handbook are as follows:

- I **Introduction to Geosynthetics**
(George Koerner)
- II **Geosynthetics in Roads and Pavements**
(Eli Cuelho)
- III **Geosynthetics in Subsurface Drainage/Water Storage** (Barry Christopher)
- IV **Geosynthetics in Erosion and Sediment Control**
(Joel and Jay Sprague)
- V **Geosynthetics in Reinforced Soil Systems**
(Chris Lawson)
- VI **Geosynthetics in Seepage Control Systems**
(Kent von Maubeuge)
- VII **Geosynthetics in Environmental Protection**
(Kerry Rowe)
- VIII **Geosynthetics Support Systems**
(George Koerner)
- IX References / Links



2nd ICGEE 2024 Conference – Busan, South Korea

We were pleased to participate in the 2nd ICGEE 2024 conference successfully held in Busan, South Korea on April 19-20, 2024. The conference had academics and practitioners from twelve different countries who shared their scientific achievements in the field of Geosynthetics and Environmental Engineering. The conference promoted relevant engineering research and applications in a vast range of topics, including geosynthetics and sustainability. The event offered a pleasant environment in downtown Busan to establish avenues for new cooperation and network with old friends (Prof. Han-Yong Jeon). All accepted and presented papers were published in **Springer Book Series 'Lecture Notes in Civil Engineering' [ISSN: 2366-2557]**. **GSI presented a paper on "Rationale for the GRI-GM34 Specification on EIA (PVC + KEE) Geomembranes."**



Dr. Grace Hsuan, Geo, Dr. Bao-Lin Hwu and Mrs. Hwu

Bao-Lin Hwu and his wife visited GSI in May. It was great to see them again. Bao-Lin is a General in the Taiwanese Army. He was also a graduate student under Dr. Robert M. Koerner for a master degree in 1983 and a doctorate in 1988. All are in good health, retired and presently traveling the globe. We are grateful to be counted as friends.

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 Koerner to 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.html. Non-members can purchase the reports from the online GSI bookstore. There are 45 Whitepapers which are free to everyone.

Progress within GEI (Education)



Back row left to right; George Koerner, Geosynthetic Institute (GSI), Eric Lamontagne, GE Environmental, Richard Thiel, Thiel Engineering, Eric Blond, Consultant and convener, Dave McLaury, Consultant. Front row left to right; Todd Harman, Hallaton, Eddie Weiser, Leister, Kerry Rowe, Queens University and Amir Shahkolahi, Global Synthetics, IGS-TC moderator.

Held every four years, GeoAmericas explores the appropriate use and beneficial impact of geosynthetics on civil infrastructure and sustainability throughout the Americas. The 2024 conference, which is a major regional technical conference and trade show of the

international Geosynthetics Society (IGS) is organized by IGS North America. The 5th Pan-American Conference on Geosynthetics was held April 28-May 1, 2024 in Toronto Canada. This was a huge event with over one thousand attendees and a sold-out exhibit.

GSI had a massive itinerary at this event. We had our annual meeting which was well attended by over forty people in addition to participating in a panel session on cold weather seaming which was our favorite technical event at the conference with a fantastic cast, seen previously. Cold Weather Seaming of Polyethylene Geomembranes is not for the faint at heart. Geomembrane deployment can occur over a wide range of temperatures and environmental conditions. As the installation temperatures get colder, all geomembrane materials become stiffer and more challenging to handle. For most geomembranes, typical deployment methods will work in temperatures down to freezing (0 °C is the typical regulatory lower temperature threshold for seaming). However, in some applications particularly mining, work needs to be continued well below freezing (0 °C).

With the above in mind, ASTM D35.10 convened a session on “Welding of Thermoplastic Geomembranes in Arctic Conditions” (i.e. cold weather) at GeoAmericas 2024 on April 30 2024 in Toronto Canada. We had thirty people in the room with much field experience for a robust discussion after five-minute presentation by each speaker. Below are a few comments from the panel session when installing liners on extremely cold days.

- Anticipate a loss of geomembrane flexibility at cold temperatures. This loss of flexibility makes it more difficult to unroll and can make the material stiff. The warmer you can keep the material during deployment, the more flexible and easier it will be to deploy. Consider warming the geomembrane if possible. The best practice is to keep the geomembrane in a heated storage area for at least 8 hours on the day before installation.
- A side-effect of the loss of flexibility is that the material shrinks depending on its coefficient of thermal expansion and contraction. This shrinkage may manifest itself into wrinkles that do not lay flat in the cold. One may also need to incorporate slack into the site so there is not trampolining of the liner or excessive tension in cold conditions.
- In cold weather, getting the subgrade prepared is more challenging, which could lead to problems with puncture and damage to the geomembrane. Ice and snow on the subgrade can also hide loose rocks that could damage a liner.

- Frost on the subgrade presents a real challenge. At times, a rub sheet or traveling platform (wooden board with a rope attached to advance it incrementally) may be required in difficult areas.
- If the wind gets a hold of a liner, it can cause damage to the geomembrane. Holding the liner in place with ballast during installation is very important. This is typically done with sand bags which need to be on hand in advance of deployment. It is recommended that wind sheds be used. The merits of tent enclosure over and around the seaming area was questioned due to the sweat lodge effect.
- Use a thicker geomembrane which has greater toughness and will hold up to rough handling in extreme conditions.
- It was determined that the limit of cold weather seaming is between -20/-15 °C. This is the result of the dew point which is the temperature at which water vapor can condense. Note that the dew point equal frost point below freezing and that it goes asymptotic between -20/-15 °C.
- No seaming during precipitation events
- Remove frost and contaminants in the area to be bonded just prior to seaming. Managing moisture and contaminants in the area to be bonded is critical and time consuming. Be sure to wipe residual moisture dry from area to be bonded just prior to seaming. This may require a large team of laborers. Also, difficulties with textured geomembranes acknowledged.
- Preheat and tack welds are critical. May need salamander heaters to control seaming Eco system.
- Profile of fillet extrusion weld optimized at two times parent material thickness (i.e. 60 mil geomembrane 120 mil extrusion bead height off of base of the geomembrane. GRI GM9 needs to be changes in this regard.
- The wedge of the fusion welded might need to be elongated. This results in greater energy emitted into the bonded area. To compensate for this greater energy the temperature and weld speed needs to be decreased.
- The use of smart welders with data acquisition (DAQ) systems was recommended. DAQ welders feature displays that show continuous output of key welding parameters (temperature ambient and wedge, pressure and speed). Control, monitor, and record entire welding eco system was identified as critical. Again, slower rates of seaming should be anticipated.
- Health and safety become more difficult
- 10% thickness reduction may be a good indication of long-term seam quality
- More frequent trial weld testing but take less destructive samples. Might want to take destructive seam samples from beginning or

end of run. May also want to consider “sister” destructive seam samples for testing latter if discrepancies arise.

We also helped to publish and present the following five papers at the conference:

- “When Field Seam Test Results Fail, Yet Laboratory Test Results Pass: A Practical Approach to Understanding Why” with Christopher Eichelberge, AGRU America and Ryan Kamp, Chesapeake Containment System, Inc.
- “Stress Relaxation of Smooth HDPE Geomembranes”
- “Exhumation of a Coated Polyester (PET) Geogrid from a Masonry Block Retaining Wall after 20 Years of Service”
- “Lifetime considerations of geotextile UV exposure before installation” with David Beaumier, SAGEOS/CTT Group Stephan Fourmont Afitex-Telex Geosynthetics Inc.
- “Unconfined Interfacial Friction of Geosynthetic Cementitious Composite Mats” with Lee Church and Charles Plumridge of Concrete Canvas Ltd,



Jej & Shobha Bhatia, Geo and Jamie Koerner, Reza Mahmoudipour, Richard Bathurst, Jorge Zornberg, Maria Patricia Guerra Escobar

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.

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

- 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"

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)
3. Designing with Geosynthetics (Recordings are available)

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

GSI Fellowships - 2024

GSI Fellowships to graduate students pursuing either a masters or doctoral degree related to geosynthetics will be awarded again this year.

Please note that proposals for individual student fellowship awards for the 2024-'25 Academic Year are due on **Monday, August 19, 2024.**

Activities within GAI (Accreditation)



Dr. Junghyo Kim, Dr. Hogan Kim, Geo. Dr. Hwa Young Kim (FITI President) and Seok Min Hong

The preceding picture was taken during a visit to FITI Head Quarters in Seoul Korea, April 14, 2024. GSI strengthens its relationship with FITI, a fully accredited lab in fourteen domestic locations and nine others throughout Asia. They even have two laboratories in the USA. FITI provides testing services to support many industries including Geosynthetics. They conduct ISO and ASTM Methods to the highest level of quality in our industry. FITI's equipment, documentation and testing protocols were evaluated for adherence to consensus test methods. The lab is audited every five years, and they conduct yearly proficiency test to ensure compliance with requirements.



The Geosynthetic Institute just acquired 2 more Q-Panel QUV devices (right side of picture)



58th GAI-LAP Semi Annual Meeting

ASTM D35 Geosynthetic held its Committee Week June 12, 2024 - April 14, 2024 at the Marriott Downtown Philadelphia, Pennsylvania, U.S.A. It was a fantastic event with overflowing crowds of more than 100 participants. Our ASTM staff manager, [Travis Murdock](#) said that “this was the most people he has ever seen attending such an event.” So nice to have a good show in our home town (ASTM & GSI).

ASTM Committee D35 on Geosynthetics was formed in 1984, (i.e., we celebrated 40 years in style!). D35 meets twice each year, in January and

June, with task group and main committee meetings over three days. ASTM D35 is composed of subcommittees that address specific segments within geosynthetics covered by technical subcommittee. Our specific subcommittees are listed below.

- [D35.01](#) Mechanical Properties
- [D35.02](#) Endurance Properties
- [D35.03](#) Permeability and Filtration
- [D35.04](#) Geosynthetic Clay Liners
- [D35.05](#) Geosynthetic Erosion Control
- [D35.06](#) Geosynthetic Specifications
- [D35.10](#) Geomembranes
- [D35.90](#) Executive
- [D35.93](#) Editorial and Terminology
- [D35.96](#) US TAG to ISO/TC221 on Geosynthetics
- D35.24 Sustainability

In addition to the subcommittee meetings, we had a special presentation by Theresa Lioux (AeroAggregates) and Frank Adams (WSP Inc.). They both talked on how ASTM impacted and influenced their careers. You could tell the presentations were good and on topic by the number of questions that were asked.



Gary Torosian (GTX and Chairman of ASTM D35) Theresa Lioux (AeroAggregates) and Frank Adams (WSP Inc.) Bob Mackey (S2Li) and Ryan Collins (Haliburton)

We could not be in Philly without a party to celebrate the 40th anniversary. GSI took the opportunity to host ASTM D35 for a cookout at our home in Penn Valley and then an open house at GSI the following day. The weather cooperated and all were well fed and appeared very happy. A big shout out to ASTM for providing bus transportation to and from the hotel and the GSI BOD for facilitating the two events.



ASTM D35 40th Anniversary Party at the Koerner's Philadelphia, PA U.S.A.



On Friday, June 14, the Geosynthetic Institute had an open house at 475 Kedron Avenue. It tied nicely into the ASTM D35 Annual Meeting, which was held in Philadelphia, PA earlier in the week. We enjoyed seeing members and giving them a history and tour of the Institute.

Interest in the GAI-LAP program continued to grow. This year, we already have 6 new laboratories, located in USA, Canada, UAE and Taiwan, that are scheduled for audits.

GAI-LAP Laboratories:

- 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 (128 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
bktan@solmax.com
- 46^B - TAG Environmental Inc. (13 tests)
Manpreet Saini-- (705) 725-1938
manpreet.Saini@tagenv.com
- 49^B - Engepol Geosintéticos (16 tests)
Patricia Natali -- (55) 51 3303-3901
patricia@engepol.com
- 50^B - ADS, Inc. Hamilton (87tests)
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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.

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>

TRI Australasia will be teaching the QA/QC of Geosynthetics used in Waste Containment (in person) on July 15-16, with the GCI-ICP exams given on July 17.

TRI Austin will be teaching training courses virtually on October 28-31, with the GCI-ICP exams given on-line on Friday, November 1.

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

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	38	12 (31%)	31	6 (19%)
Total	1293	188 (14%)	1204	141 (12%)

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

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

While a field inspector cannot require proper design or direct a contractor how to build a wall, flaws can be identified for possible design modification or mitigation action. Furthermore, and at minimum, construction practices can be observed and corrected if inadequate or improper. The official launch of this inspection program

was on December 1, 2011 with a course and the examination afterward. A somewhat revised course on November 29, 2012 was presented. Presently, the corresponding course for this certification program has been transferred into a series of six presentations that have been recorded and can be viewed at your leisure.

Program #3 - Geosynthetic Designer Certification

Please see www.geosynthetic-institute.org/gdcpintro.pdf 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.

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.

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

GSI Member Organizations

We Sincerely Thank all 63 (47 full and 16 associate) Members Organizations of the GSI family for their continued guidance and support. Without members, GSI could not exist. The current GSI member organizations and their contact members are listed 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

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

Solmax Geosynthetics

John Henderson/John Lostumbo/Rene Laprade [BOA]

Minerals Technology/CETCO

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Huesker, Inc.

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NAUE GmbH & Co. KG

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Propex Operating Company LLC

Drew Loizeaux/Noah Nichols

TRI Environmental Inc.

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

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CARPI, Inc.

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AGRU America, Inc.

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Waste Management Inc.

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GeoComp/GeoTesting Express

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ATARFIL

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Gabriel Martin/Nacho Garcia Arroyo

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INOVA Geosynthetics/AERO Aggregates

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