Geosynthetics Conference: CASE STUDIES

Sharing

PRACTICAL Applications

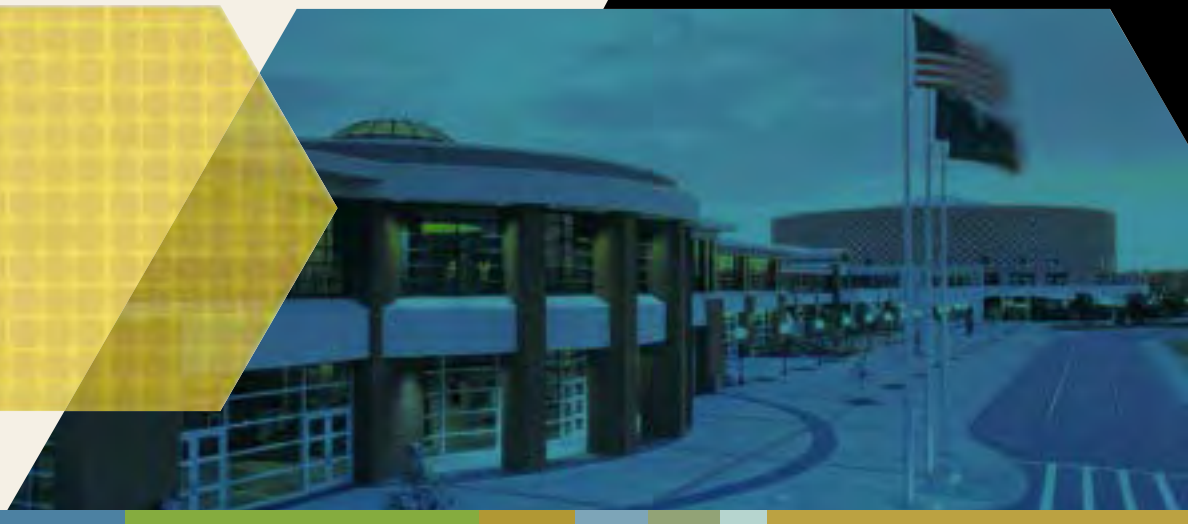
March 8–10, 2020

North Charleston, SC USA

Charleston Area Convention Center

GeosyntheticsConference.com

SHOW GUIDE



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IFAI Geosynthetic Materials Association

Geosynthetics Magazine

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Raven is a vertically-integrated leader in polymer manufacturing and the production of high-performance geomembranes, providing design-build expertise and certified world-class installation services for the geosynthetics industry. Raven provides a complete selection of advanced multi-layer geomembranes used in containment linings and floating cover systems, along with all the supportive materials and accessories needed for successful installations.

Raven produces engineered scrim-reinforced geomembranes, and advanced gas barriers to effectively contain hazardous liquids, solids, odors, and gases for long-term sustainability. Select Raven products are directly formulated to meet GRI-GM standard specifications, state and federal regulations, and NSF/ANSI certifications. All products are produced under the stringent Raven ISO 9001 certified management system and GAI-LAP accredited test program.

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Geosynthetics
Conference: **CASE STUDIES**

March 8–10, 2020 | North Charleston, SC USA

Sharing Practical Applications

SHOW INFORMATION

SCHEDULES AND PROGRAMMING

EXHIBITORS

Geosynthetics
Conference: **CASE STUDIES**

THE OFFICIAL PUBLICATION OF
Geosynthetic Materials Association
IGS NORTH AMERICA

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Welcome

Welcome to Geosynthetics Conference 2020: CASE STUDIES

Robert Lozano
Geosynthetics 2020 Conference Chair

Welcome to North Charleston and the Geosynthetics Conference 2020: CASE STUDIES! This conference is the first of its kind, specifically dedicated to providing practical geosynthetics education through case studies. The educational sessions and exhibition have been carefully curated to include a large variety of applications to provide insight and inspiration that can be applied to your own future projects. As an attendee at Geosynthetics 2020, you have access to an impressive array of exhibitors, six special sessions provided by Supporting Organizations, three short courses, and more than fifty geosynthetics case studies to explore.

The conference kicks off on Sunday with three half-day Short Courses and the IGS-NA Workshop: Professional Issues in Geosynthetics Engineering. That night the Welcome Reception is open 5–7 pm, participants will enjoy cocktails and appetizers while exploring the exhibit booths and getting to know each other.

The technical program opens on Monday at 8:30 am with the Welcome Plenary featuring a look at three local projects presented by Sarah Hamrick Gaffney, P.E., SCDOT; Michael S. Ulmer, P.E., S&ME Inc.; and Hanna Gervais, P.E., and Jason Inskeep, EIT, U.S. Army Corps of Engineers. You won't want to miss it.

While you are here, be sure to take some time to explore the area—Downtown Charleston is rich in history, full of unique restaurants and evening hotspots. The conference hotels provide transportation to the Convention Center and other locations in a three-mile radius, including the visitor center where a bus to downtown Charleston awaits. Thank you for joining us—have a great time!

Again, on behalf of the Organizing Committee, welcome to Geosynthetics Conference 2020: CASE STUDIES!

ABOUT CHARLESTON

Charleston, South Carolina, has been consecutively named the No. 1 City in the United States and Canada by the readers of *Travel + Leisure* and *Condé Nast Traveler*, and was the first domestic destination to earn the coveted No. 1 City in the World ranking. The convention center is just a quick bus or cab ride away from downtown Charleston, which you are sure to explore.

Living History Is Everywhere

Picturesque and exquisitely preserved, Charleston is a visual feast of antebellum architecture, cobblestone streets, flickering lanterns and historic landmarks. Ready to explore? Check out these can't-miss options every history buff needs to visit in the Lowcountry.

- Drayton Hall
- Boone Hall Plantation
- Charles Town Landing
- Fort Moultrie
- The Hunley
- Patriots Point Naval Museum
- Tastemakers Abound

Visit **www.charlestoncvb.com** for information regarding transportation, dining, nightlife and recreation, as well as local event information.

Conference Organizers

Geosynthetic Materials Association

The Geosynthetic Materials Association (GMA) provides engineering support, business development opportunities, in-person and online educational programming, government relations expertise, and industry recognitions. GMA influences specifications and lobbies on behalf of member companies. GMA targets key U.S. states to expand the geosynthetics market. GMA provides a network to exchange information, solve common problems and develop mutually beneficial relationships.

GMA is a central resource for information on geosynthetics and provides a forum for consistent and accurate information in order to increase acceptance and promote the correct use of geosynthetics.

Since GMA's inception, geosynthetics use has expanded into nearly all areas of civil, geotechnical, environmental, coastal and hydraulic construction. GMA industry events provide networking opportunities and exposure to the industry for engineers, specifiers, contractors, government agencies and academics.

www.geosynthetics.ifai.com

Industrial Fabrics Association International

The Industrial Fabrics Association International (IFAI) is a not-for-profit trade association serving 1,550 company members involved in the global specialty fabrics marketplace. IFAI operates 17 product divisions—including GMA—and three country-specific divisions conducting targeted programs and conferences for specialty fabrics products manufacturers. IFAI is headquartered in Roseville, Minn.

- IFAI supports and augments the geosynthetics industry with these contributions:
  - Promotes GMA, a central resource for the industry and a forum for the development of specifications and standardization
  - Publishes industry-leading *Geosynthetics* magazine and other journals
  - Collaborates with the International Geosynthetics Society (IGS), IGS North America and the Geosynthetic Institute

www.ifai.com

SAVE *the* DATE

Geosynthetics Conference

Feb. 21–24, 2021 | Kansas City, MO USA
Kansas City Convention Center

2021 Conference Information

Geosynthetics Conference 2021 is a four-day conference full of technical papers, special sessions and a busy show floor. It is also the second time the conference has been co-located with the International Erosion Control Association's Annual Conference. All attendees will have access to both show floors and education sessions based on registration types. We are anticipating 3,000 participants and 300 exhibitors. Mark your calendars now for this exciting event. Start making your plans now to join us February 21–24, 2021, in Kansas City, Mo. The call for proposals and abstracts is now open.

www.GeosyntheticsConference.com

GEOSYNTHETICS CONFERENCE 2020 ORGANIZING COMMITTEE

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Jennifer Nicks, Ph.D., Federal Highway Administration
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Todd Berger, *Geosynthetics* magazine

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SUPPORTED BY

IGS NORTH AMERICA

IGS-NA is the North American Chapter of the International Geosynthetics Society (IGS). IGS-NA has more than 200 individual members from academia, independent testing laboratories, geotechnical consultant firms, federal and state governments agencies, and industry.

SUPPORTING ORGANIZATIONS

Association for Mechanically Stabilized Earth (AMSE)
ASTM International
Canadian Geotechnical Society (CGS)
Carolinas Chapter of Geo-Institute
China Nonwovens & Industrial Textiles Association (CNITA)
Deep Foundations Institute (DFI)
Erosion Control Technology Council (ECTC)
Fabricated Geomembrane Institute (FGI)
Federal Highway Administration (FHWA)
Geo-Institute (GI)
Geosynthetic Institute (GSI)
International Association of Geosynthetics Installers (IAGI)
International Geosynthetics Society—North America (IGS-NA)
Transportation Research Board (TRB)
United States Universities Council for Geotechnical Education and Research (USUCGER)
University of South Carolina—Dept of Civil and Environmental Engineering (U of SC)

SUPPORTING MEDIA

Geosynthetics magazine
Civil + Structural Engineer magazine
Informed Infrastructure magazine
Geosynthetic News Alerts (GNA)

Supporting Organizations

Association for Mechanically Stabilized Earth (AMSE)

AMSE promotes the use of MSE retaining structures engineered and supplied through a single source of responsibility and constructed in accordance with specifications which ensure value, performance, reliability and long-term safety. AMSE members produce complete MSE wall systems that use steel and, in some situations, geosynthetic soil reinforcements.
Booth 508 | www.amsewalls.org

ASTM International

ASTM International Committee D35 on Geosynthetics develops test methods, specifications, guides, practices and terminology dealing with geosynthetics. To join committee D35, contact Katerina Koperna at kkoperna@astm.org.
www.astm.org

Canadian Geotechnical Society (CGS)

The Canadian Geotechnical Society (CGS) is the leading organization for geotechnical engineering and related geoscience in Canada. The CGS is dedicated to the advancement of knowledge and the creation of opportunities to exchange information among individuals from academia (both faculty and students), consulting, government, industry, contractors, and various providers of geotechnical related products and services.
www.cgs.ca

Carolinas Chapter of G-I

www.geoinstitute.org/chapters/carolinas-chapter

China Nonwovens & Industrial Textiles Association (CNITA)

China Nonwovens & Industrial Textiles Association (CNITA) is the only national association related to nonwovens and industrial textiles around China. As a bridge between governments and enterprises, it services the whole industry chain of nonwovens and industrial textiles from raw materials to end-use products. Geosynthetics committee, as one of 10 committees of our association, plays an important role in the current and future development of the geosynthetics industry around china. As the committee member and China NMC of ISO/TC 221(Geosynthetics), and also director of standardization committee of industrial textiles (SAC/TC209/SC7), CNITA devotes itself to the domestic and international standards of geosynthetics.

Deep Foundations Institute (DFI)

DFI is an international association of contractors, engineers, manufacturers, suppliers, academics and owners in the deep foundations industry. Our multidisciplinary membership creates a consensus voice and a common vision for continual improvement in the planning, design and construction of deep foundations and excavations. We bring together members through networking, education, communication and collaboration.
www.dfi.org

Erosion Control Technology Council (ECTC)

www.ectc.org

Fabricated Geomembrane Institute (FGI)

The Fabricated Geomembrane Institute (FGI) is an industry/academic consortium of organizations interested in, and involved with, fabricated geomembranes and geosynthetics. The FGI is located at the University or Illinois at Urbana-Champaign in the Department of Civil and Environmental Engineering. The FGI includes all fabricated geosynthetics, i.e., all geosynthetics that are seamed and folded in a factory, transported to a site and deployed by unfolding the fabricated panel.
Booth 510 | www.fabricatedgeomembrane.com

Federal Highway Administration (FHWA)

www.fhwa.dot.gov

Geo-Institute (GI)

The Geo-Institute is a member organization of more than13,000 individual and corporate geo-professionals who share a mutual interest in protecting the public and improving and sustaining the built environment.

We investigate natural and human-made hazards, assess the earth's soils and rock properties, and construct sound and reliable engineered facilities and structures.

Today's successful geo-professional possesses the knowledge and expertise needed to resolve or to prevent problems through any number of specific areas including sustainability; deep foundations; earth retaining structures; earthquake engineering; soil dynamics; embankments, dams, and slopes; engineering geology; geoenvironmental engineering; geosynthetics; soil erosion; grouting; pavements, rock mechanics; and unsaturated soils.
www.asce.org/geotechnical-engineering/geo-institute

Geosynthetic Institute (GSI)

GSI's mission is to develop and transfer knowledge, assess and critique geosynthetics, and provide services to the member organizations.
www.geosynthetic-institute.org

International Association of Geosynthetic Installers (IAGI)

International Association of Geosynthetic Installers (IAGI) is a dynamic association of geosynthetic professionals created by and for installers. IAGI's mission is to advance installation and construction technologies as well as to provide a central clearinghouse for worldwide industry information.

www.iagi.org

International Geosynthetics Society—North America (IGS-NA)

IGS-NA is the North American chapter of the International Geosynthetics Society (IGS). IGS-NA has more than 200 individual members from academia, independent testing laboratories, geotechnical consultant firms, federal and state government agencies, and industry.
Booth 809 | www.igs-na.org

Transportation Research Board (TRB)

The Transportation Research Board (TRB) provides innovative, research-based solutions to improve transportation. TRB is a program unit of the National Academy of Sciences, Engineering and Medicine, a nonprofit organization that provides independent, objective, and interdisciplinary solutions. TRB manages transportation research by producing publications and online resources. It convenes experts that help to develop solutions to problems and issues facing transportation professionals. TRB also provides advice through its policy studies that tackle complex and often controversial issues of national significance.
www.trb.org

United States Universities Council on Geotechnical Education and Research (USUCGER)

The United States Universities Council on Geotechnical Education and Research (USUCGER) was founded in 1985 to provide advocacy for the continued development and expansion of high-quality geotechnical engineering research and education by U.S. academic institutions. This discipline has evolved to include geotechnical, geomechanical, geoenvironmental, geological, and geophysical engineering.

USUCGER's overarching objective is to enhance both the community and the economy, and, through that, the quality of life, by the development and effective implementation of geotechnical infrastructure design techniques that ensure safety, health, security, and support the integrity of the environment, both in the United States and abroad. USUCGER strives to achieve this through interaction with regulatory and funding agencies, and by promoting cooperation and discussion among geotechnical engineering faculty affiliated with U.S. member institutions.
www.usucger.org

University of South Carolina—Dept of Civil and Environmental Engineering

The department of Civil and Environmental Engineering at UofSC is at the forefront of research and education on intelligent and sustainable infrastructure. Our cutting-edge research aims at discovering knowledge and providing practical solutions to societal challenges. Our educational programs aim at training the engineer of the future. This is an engineer capable of designing innovative solutions with far-reaching societal impact.
Booth 807 | www.cec.sc.edu

Conference Overview

CONFERENCE LOCATION

Charleston Area Convention Center
5000 Coliseum Dr.
North Charleston, SC 29418

Geosynthetics Conference 2020: CASE STUDIES is a special edition of the Geosynthetics Conference. This offering features in-depth case studies highlighting practical applications from across the geotechnical industry. Here you will connect with industry professionals on the show floor and through short courses, plenary sessions, case study presentations and panel discussions presented by industry experts. Walk the show floor to see the latest developments in geotechnical products and services offered by the industry's top companies and organizations. Plan for plenty of opportunities to network and socialize.

Important Announcements

> Registration badges and tickets are required for all conference events.
> All sessions and speakers are subject to change.
> Please be considerate of others and turn off noisemaking electronic devices during all sessions.
> Smoking is not permitted inside the Charleston Area Convention Center.
> Paging of attendees is not possible.
> Cameras and video recording are not permitted at any event or in the exhibit hall.
> See registration staff if you require special accommodations.

Show Floor Reception

Explore the exhibit show floor, visit with product and service vendors, and network with industry professionals while enjoying a beverage and hors d'oeuvres.

Special Sessions

Geosynthetics Conference 2020 features six special sessions, each organized by one of the conference supporting organizations.

MONDAY, MARCH 9

10:15–11:30 am | Room 12

Organized by the Geosynthetic Institute (GSI)

Three Case Histories Illustrating How Geosynthetics Were Used Effectively for Soft Soil Stabilization Project Near Pigeon Point, Delaware

1:30–2:45 pm | Room 12

Organized by ASTM

How ASTM Standards Are Impacted by Case Histories

3:15–4:30 pm | Room 12

Organized by the Fabricated Geomembrane Institute (FGI)

Panel Discussion: Construction with Fabricated Geosynthetics

TUESDAY, MARCH 10

9–10:15 am | Room 12

Organized by the Geosynthetic Materials Association (GMA)

Growing the Geosynthetic Marketplace: GMA's Mission

10:30–11:45 pm | Room 12

Organized by the Fabricated Geomembrane Institute (FGI)

Roundtable Discussion—Women in Geosynthetics

1:30–4:15 pm | Room 12

Organized by the Association for Mechanically Stabilized Earth (AMSE)

Vertical and Near-Vertical Geosynthetic-Reinforced MSE Structures—Case Studies on the Influence of Backfill on Alignment of Concrete and Wire Facings

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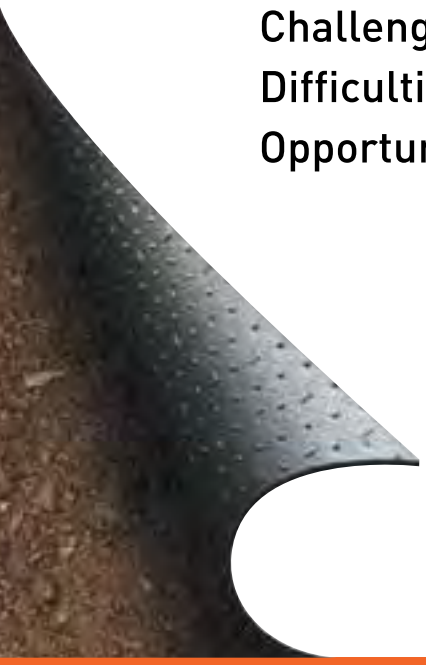

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Daily Schedule

SUNDAY | MARCH 8

7 am–5 pm

Registration Open

1–5 pm ➤ 2nd Floor Meeting Rooms 6–12

IGS-NA WORKSHOP
Professional Issues in Geosynthetics Engineering

SHORT COURSES
Geosynthetic Barriers in Relevant Applications

Geosynthetics in Erosion and Sediment Control

Improving Roadway Performance with Geosynthetics

5–7 pm ➤ Exhibit Hall B

Welcome Reception

Download the Geo 2020 App Today!

MONDAY | MARCH 9

7 am–5 pm

Registration Open

7:30–8:30 am ➤ Foyer Ballroom C

Coffee Break

8:30–10 am ➤ Ballroom C

WELCOME PLENARY
I-26 Volvo Interchange – Design Build Project

Using Geosynthetics to Help Solve Geotechnical Challenges in the High-Seismic, Soft-Ground Environment of the Port Access Road Design-Build Project

Clouter Creek Placement Area—Before and After Geotextiles

9 am–5 pm ➤ Exhibit Hall B

Exhibits Open

Learning Zone sessions
Environmental Applications (11:30 am)
Material Properties/QA/Testing (12:15 pm)
Pavement/Transportation Applications (1 pm)

10:15–11:30 am ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Barriers 1
Drainage

SPECIAL SESSION
Three Case Histories Illustrating How Geosynthetics Were Used Effectively for Soft Soil Stabilization Project Near Pigeon Point, Delaware

11:30 am–1:30 pm ➤ Exhibit Hall B

Lunch in Exhibit Hall

1:30–2:45 pm ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Barriers 2
Reinforced Walls
Protection 1

SPECIAL SESSION
How ASTM Standards are Impacted by Case Histories

2:30–3:30 pm ➤ Exhibit Hall B

Afternoon break on the show floor

3:15–4:30 pm ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Vegetation
Reinforced Slopes
Transportation

SPECIAL SESSION
Panel Discussion: Construction with Fabricated Geosynthetics

TUESDAY | MARCH 10

7 am–5 pm

Registration Open

8–9 am ➤ 2nd Floor Foyer

Coffee Break

9–10:15 am ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Column Supported Embankments
Reinforced Foundations 1
Landfill Covers

SPECIAL SESSION
Growing the Geosynthetics Marketplace: GMA's Mission

9 am–5 pm ➤ Exhibit Hall B

Exhibits Open

Learning Zone sessions
Pavement/Transportation Applications (11:45 am)
Environmental Applications (12:30 pm)
Material Properties/QA/Testing (1:15 pm)

10:30–11:45 am ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Airfield Pavements
Reinforced Foundations 2
Protection 2

SPECIAL SESSION
Women in Geosynthetics Roundtable Discussion

11:45 am–1:30 pm ➤ Exhibit Hall B

Lunch in Exhibit Hall

1:30–2:45 pm ➤ 2nd Floor Meeting Rooms 6–12

CASE STUDY SESSIONS
Barriers 3
Environmental
Innovative Backfill

1:30–4:15 pm ➤ 2nd Floor Meeting Rooms 6–12

SPECIAL SESSION
Vertical and Near-Vertical Geosynthetic-Reinforced MSE Structures—Case Studies on the Influence of Backfill on Alignment of Concrete and Wire Facings

Part 1: Welded Wire- and Gabion-Faced MSE Structures (1:30 pm)

Part 2: Precast Concrete Panel-Faced MSE Structures (3 pm)

2:30–3:30 pm ➤ Exhibit Hall B

Afternoon break on the show floor

Geosynthetics Learning Zone

Join us on the show floor to explore the basics of geosynthetics. Everyone is invited regardless of registration type. The Learning Zone is an area of the show floor with material samples and educational boards. It is also home to the Introduction Series.

Introduction Series

Designed for new users, this series of short, targeted presentations is delivered by some of the best-known speakers in the industry. They will teach you what geosynthetics are and how they fit into various projects.

MONDAY, MARCH 9

Geosynthetics Learning Zone | Show Floor (Hall B)

11:30 am–Noon

Environmental Applications

Kuo Tian, Assistant Professor, George Mason University

12:15–12:45 pm

Material Properties/QA/Testing

Robert Mackey, P.E., S2Li

1–1:30 pm

Pavement/Transportation Applications

Jie Han, Ph.D., P.E., F.ASCE, University of Kansas

TUESDAY, MARCH 10

Geosynthetics Learning Zone | Show Floor (Hall B)

11:45 am–12:15 pm

Pavement/Transportation Applications

Jie Han, Ph.D., P.E., F.ASCE, University of Kansas

12:30–1 pm

Environmental Applications

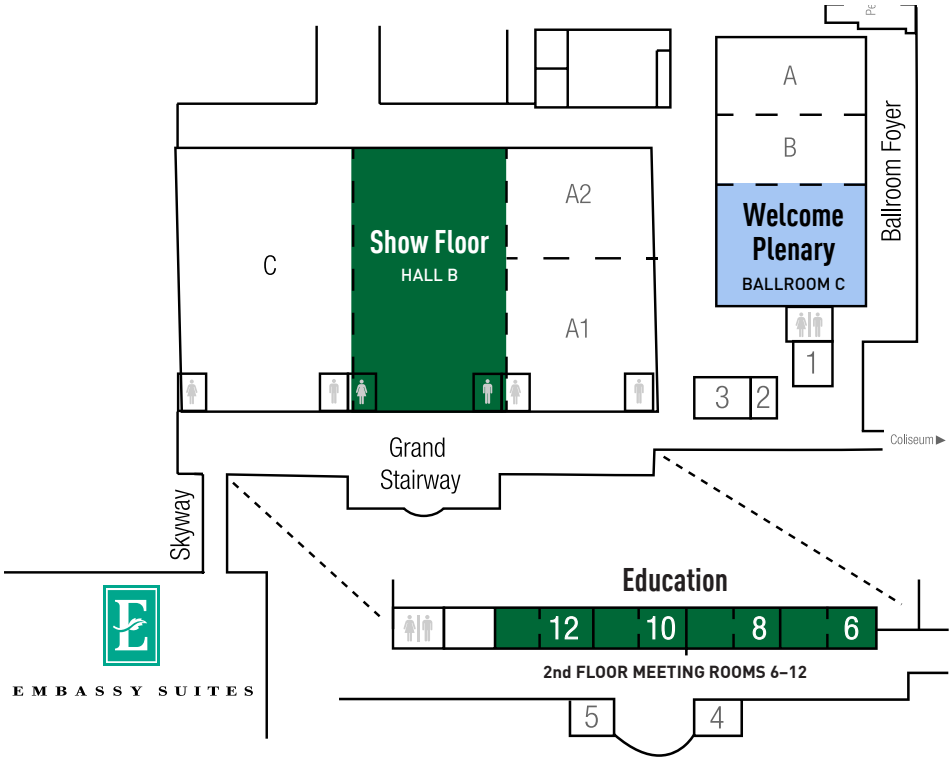
Kuo Tian, Assistant Professor, George Mason University

1:15–1:45 pm

Material Properties/QA/Testing

Robert Mackey, P.E., S2Li

Facility Map



Welcome Plenary

MONDAY, MARCH 9

8:30–10 am ➤ Ballroom C

The Welcome Plenary features three local case studies, each detailing a project in Charleston, SC. Speakers represent the South Carolina Department of Transportation (SCDOT), S&ME Inc. and the U.S. Army Corps of Engineers. Attendees will learn how the unique challenges of design and installation in Charleston's wetlands and soft soil conditions were overcome across three distinct projects.

I-26 Volvo Interchange—Design Build Project

Sarah Hamrick Gaffney, P.E., District Construction Engineer, SCDOT, District 6

The I-26 Volvo Interchange is a fully directional interchange in Berkeley County that will provide access from I-26 to Volvo Car Drive. The interchange is located at mile marker 189, which is approximately two miles east of SC 27/Ridgeville Road (Exit 187) and approximately five miles west of Jedburg Road (Exit 194). The interchange includes both at-grade and flyover ramps, four ramps and three bridges.

This project was designed to provide direct access to the SC Volvo Manufacturing Facility and Camp Hall Commerce Park and to alleviate traffic congestion at Exit 187 and Exit 194 of I-26 East and West.

Environmental Concerns and Wetland Impacts

The Soter Mitigation and FONSI Determination of Camp Hall Site

Geotechnical Design

Construction Considerations

Ground Improvements

Muck Excavation

Cement Soil Stabilization

Sand Blankets

Wick Drain Installation

Geogrid Placement

Settlement Monitoring

Slope Construction

Using Geosynthetics to Help Solve Geotechnical Challenges in the High-Seismic, Soft-Ground Environment of the Port Access Road Design-Build Project

Michael S. Ulmer, P.E., Principal Engineer/VP, S&ME Inc.

The Port Access Road provides a direct connection from I-26 to the Hugh Leatherman Container Terminal through the former Charleston Navy Complex. The project is in a high seismic hazard area and includes eight miles of bridge structures and embankments through highly variable subsurface conditions that include uncontrolled fill, liquefying sand and highly compressible clay. The team performed significant geotechnical explorations to fully characterize the alignment. Designers collaborated to develop cost-effective foundations to meet stringent SCDOT requirements in adverse soil conditions. Geosynthetics were used to help stabilize soft subgrade and to reinforce embankments, and in the design of reinforced soil slopes. This presentation presents the site conditions and geotechnical challenges, and how geosynthetics were used to meet these challenges.

Clouter Creek Placement Area—Before and After Geotextiles

Hanna Gervais, P.E., and Jason Inskeep, E.I.T., U.S. Army Corps of Engineers

Clouter Creek Placement Area is an integral asset in the management of dredged materials from the Charleston Harbor Navigation Project supporting the South Carolina State Ports Authority's Port of Charleston. The facility is located on approximately 1,400 acres in Charleston Harbor and was built in the 1940s and 1950s by pumping dredged material into the marshes. Over time, the entire area was diked and the former marsh and creeks were reclaimed for upland placement of dredged material. Over the past decade, one particular location has seen multiple failures every time the top elevation of the dikes would reach 20 to 22 feet. After doing subsurface investigations and slope stability modeling, we designed a project that required partial excavation of the existing dike and two layers of high-strength geotextile fabric to reach the design elevation of 20 feet. Construction was completed in the fall of 2018, and the site will receive maintenance and harbor deepening dredged material in the coming years.

Short Courses

SUNDAY, MARCH 8

Geosynthetics Conference 2020 features three half-day short courses on Sunday, March 8, 1–5 pm. Each short course offers participants four professional development hours (PDH). Short courses are included with all full registrations.

1–5 pm ➤ Room 6

Geosynthetic Barriers in Relevant Applications

Instructors: Kent Von Maubeuge, NAUE GmbH & Co. KG; George Koerner, Ph.D., Geosynthetic Institute

Most regulations describe barrier material properties in detail or refer to existing specifications. However, some regulations show a shortage of other relevant design parameters, such as design issues, external effects, durability issues, installation considerations and quality control/assurance.

Over the past 40 years, the advantages in utilizing geosynthetic barriers versus traditional barrier materials have been well documented: e.g., greater project economy, extended service lives, enhanced environmental protection and greater site safety. Achievements such as conserving water resources and enabling beneficial site reuse have given geosynthetic engineering a level of social importance. This is especially true in modern waste management cell design, a barrier application that has been so successful that it has influenced the design and specification of geosynthetics into mining, water and wastewater, and industrial applications. The principles and practices of design using geosynthetic barriers take into account a number of different parameters considered by professionals engaged in the process.

This course on geosynthetic barriers aims to assist the process by identifying the various characteristics of barrier types and comparing them with the requirements of a variety of different applications. It also offers design advice to professionals involved in the design of civil engineering and construction solutions using geosynthetic materials. Overall, the intent is to encourage the appropriate selection of materials and design methods to suit particular applications, rather than to redesign projects to suit predetermined materials. Many aspects of the design process have been considered as well as the parameters of various sites and applications.

Therefore, good design needs to consider the cost-effectiveness of any solution but must first qualify and meet all technical and service expectations of the stakeholders in the end-use. All engineers must have current working knowledge of the sort of costs incurred by their designs, but the view was taken that to try and incorporate such parameters into the standards would be virtually impossible and almost certainly inaccurate.

This course will cover these aspects and give a guide for various applications and talk about possible future topics, such as sustainability and life-cycle analysis.

1–5 pm ➤ Room 8

Geosynthetics in Erosion and Sediment Control

Instructor: C. Joel Sprague, P.E., TRI/Environmental Inc.
Guest Instructor: Markus Wilke, Business Development Manager—Hydraulics & Dewatering, HUESKER Synthetic GmbH

Erosion and sediment control systems have been developed to help satisfy regulations designed to prevent sediments from reaching surface waters. Geosynthetic "enhanced" erosion and sediment control systems perform unique and quantifiable functions while simultaneously introducing ever greater versatility and cost-effectiveness. Geosynthetics are now commonly used along with temporary, degradable materials for the enhancement of vegetative establishment; as long-term, nondegradable materials to extend the erosion control limits of vegetation or soil; as primary slope or channel linings; and as components in silt fences and turbidity curtains and an ever-growing array of sediment retention devices. This ever-expanding use has led to industry-wide initiatives to promote the correct specification and use of geosynthetics in erosion and sediment control, along with efforts to facilitate more comprehensive quality systems in manufacturing and better measurements of performance via new and better test methods.

1–5 pm ➤ Room 10

Improving Roadway Performance with Geosynthetics

Instructor: Jie Han, Ph.D., The University of Kansas

This course addresses unpaved roads (e.g., haul roads, gravel roads and railroads) and paved roads (asphalt and concrete pavements) stabilized with geosynthetics such as geotextiles, geogrids and geocells. The course examines the mechanisms associated with the use of geosynthetics to stabilize a road section, provides design guidelines to quantify the benefits of geosynthetics for different roadway applications, and presents case histories to demonstrate the successful use of geosynthetics to solve common and challenging roadway problems and improve their performance.

IGS-NA Workshop

SUNDAY, MARCH 8

Professional Issues in Geosynthetics Engineering

This four-hour workshop is organized by the North American Chapter of the International Geosynthetics Society. It includes a happy hour reception and is open to all conference attendees. Additional fee applies.

1–5 pm ➤ Room 12

Ethics in Geosynthetics and Civil Engineering

Boyd Ramsey, Boyd Ramsey Consulting LLC

Ethics are a part of our everyday lives. We make decisions daily on a broad range of ethical topics, what is "right" and "wrong," what is fair, what needs to be disclosed and what can be held private. This 60-minute workshop explores the varieties of ethical and unethical behaviors, points out examples of companies and organizations within our industry that publish ethical standards and codes of conduct, and give some peer-to-peer feedback on common situations and gray areas and how to manage these.

Geopipes

Michael Pluimer, Ph.D., University of Minnesota Duluth

In 2018 the American Association of State Highway and Transportation Officials (AASHTO) updated their M 294 standard specification for corrugated polyethylene pipes to allow the incorporation of postconsumer and postindustrial recycled materials into these products. The updates were based on the research and conclusions from two National Cooperative Highway Research Program (NCHRP) projects and a Ph.D. dissertation: NCHRP Project 4-32, *Performance of Corrugated Pipe Manufactured with Recycled Polyethylene Content*, published as *NCHRP Report 696*; NCHRP Project 4-39, *Field Performance of Corrugated HDPE Pipes Manufactured with Recycled Materials*, published as NCHRP Report 870; and *An Evaluation of Corrugated HDPE Pipes Manufactured with Recycled Materials for Commuter Railroad Applications*, Ph.D. dissertation by Michael Pluimer. The author's service-life prediction model developed in his Ph.D. dissertation was published as AASHTO R 93 and used to establish minimum criteria for the stress crack resistance properties of pipes manufactured with recycled materials. The changes to AASHTO M 294 resulted in the incorporation of more sustainable materials into our drainage infrastructure and will have a lasting positive impact on our society.

This presentation provides a summary of the changes to AASHTO M 294 to incorporate the use of recycled materials into the specification, along with the basis for the revisions. It also details the new test specifications and requirements that resulted from the research and outlines the service-life prediction and verification methodology that was developed. The research projects that provided the basis for these changes spanned 11 years and were budgeted for $950,000, making this the most robust body of research on recycled materials for pipe applications published to date. More than 1,000 different tests were conducted on 28 different recycled materials and 75 different blends of virgin and recycled materials, including service-life validation testing on 24 full-scale pipes manufactured with various blends of recycled materials.

Geosynthetic Installation Issues for Designers

Chris Eichelberger, AGRU America Inc.

"How did this happen?"—A discussion regarding examples of successful and "less than" successful geosynthetic applications/projects throughout the project delivery life cycle.

The geosynthetics industry benefits from prescribed regulations from the Environmental Protection Agency and state agencies in the required containment and closure rules for wastes such as municipal solid waste, construction and demolition debris, industrial, hazardous and coal combustion residuals. Geosynthetic materials are also used to protect and store liquids ranging from drinking water to mineral rich solutions from the mining industry. Beyond the rules, the industry further benefits from sample specifications, best practice guidelines, case histories, and the wealth of knowledge and experience from tenured professionals utilizing the materials on a daily basis. This discussion will look at the required steps of a geosynthetic project and review recent applications from within the industry.

Education Schedule

Short Courses, IGS-NA Workshop, Case Study Sessions and Special Sessions

SUNDAY, MARCH 8

	ROOM 6	ROOM 8	ROOM 10	ROOM 12	BALLROOM C
1–5 pm	SHORT COURSE Geosynthetic Barriers in Relevant Applications	SHORT COURSE Geosynthetics in Erosion and Sediment Control	SHORT COURSE Improving Roadway Performance with Geosynthetics	IGS-NA WORKSHOP Professional Issues in Geosynthetic Engineering	

MONDAY, MARCH 9

	ROOM 6	ROOM 8	ROOM 10	ROOM 12	BALLROOM C
9–10 am					WELCOME PLENARY
10:15–11:30 am	CASE STUDY SESSION Barriers 1	CASE STUDY SESSION Drainage		SPECIAL SESSION Three Case Histories Illustrating How Geosynthetics Were Used Effectively for Soft Soil Stabilization Project near Pigeon Point, Delaware	
1:30–2:45 pm	CASE STUDY SESSION Barriers 2	CASE STUDY SESSION Reinforced Walls	CASE STUDY SESSION Protection 1	SPECIAL SESSION How ASTM Standards Are Impacted by Case Histories	
3:15–4:30 pm	CASE STUDY SESSION Vegetation	CASE STUDY SESSION Reinforced Slopes	CASE STUDY SESSION Transportation	SPECIAL SESSION Panel Discussion: Construction with Fabricated Geosynthetics	

TUESDAY, MARCH 10

	ROOM 6	ROOM 8	ROOM 10	ROOM 12	BALLROOM C
9–10:15 am	CASE STUDY SESSION Column Supported Embankments	CASE STUDY SESSION Reinforced Foundations 1	CASE STUDY SESSION Landfill Covers	SPECIAL SESSION Growing the Geosynthetic Marketplace: GMA's Mission	
10:30–11:45 am	CASE STUDY SESSION Airfield Pavements	CASE STUDY SESSION Reinforced Foundations 2	CASE STUDY SESSION Protection 2	SPECIAL SESSION Women in Geosynthetics Roundtable Discussion	
1:30–2:45 pm	CASE STUDY SESSION Barriers 3	CASE STUDY SESSION Environmental	CASE STUDY SESSION Innovative Backfill	SPECIAL SESSION Vertical and Near-Vertical Geosynthetic-Reinforced MSE Structures—Case Studies on the Influence of Backfill on Alignment of Concrete and Wire Facings **Part 1:** Welded Wire- and Gabion-Faced MSE Structures	
3–4:15 pm				SPECIAL SESSION Vertical and Near-Vertical Geosynthetic-Reinforced MSE Structures—Case Studies on the Influence of Backfill on Alignment of Concrete and Wire Facings **Part 2:** Precast Concrete Panel-Faced MSE Structures	

Case Study Sessions

MONDAY, MARCH 9

10:15–11:30 am ➤ Room 6

Barriers 1

Moderator: Tim Stark, University of Illinois at Urbana-Champaign

Use of Geosynthetic Clay Liners (GCLs) as Groundwater Protection in Infrastructure Constructions
Kent Von Maubeuge, NAUE GmbH & Co. KG

Eagle Gold Mine Emergency Spillway Lining Using Geosynthetic Cementitious Composite Mats (GCCM)
Ron Drewry, Titan Environmental; Phill Greer, Concrete Canvas Ltd.; Will Crawford, Concrete Canvas Ltd.

Environmental Containment Using Reinforced Composite Geomembranes: Qualitative and Quantitative Efficiencies in Installation and Performance
Richelle Delia, Owens Corning Geosynthetics

10:15–11:30 am ➤ Room 8

Drainage

Moderator: Piergiorgio Recalcati, TENAX SpA

One of the Largest Prefabricated Vertical Drain Installations in U.S. Accelerates Port of Charleston Expansion
Aaron Goldberg, Soil & Material Engineers (S&ME); Martin Taube, Menard USA; Richard Goodrum, Clock Spring/NRI—Geotree Concrete Solutions; Ian Brake, Menard/US Wick Drain

Use of Wicking Geotextile to Dehydrate Road Embankment under Unsaturated Conditions
Xiong Zhang, Missouri University of Science and Technology

Behavior of a Drainage Geosynthetic and Reinforced Geomat for the Remediation of a Dismissed Industrial Site in Milano City Area
Piergiorgio Recalcati, TENAX SpA; A. Crippa, TENAX Corp.; D. Cazzuffi, CESI SpA

1:30–2:45 pm ➤ Room 6

Barriers 2

Moderator: Robert Wallace, AECOM

Almost Three Decades of Leak Location Data Compiled
Matthew Kemnitz, Leak Location Services Inc.

Sanitary Sewer Overflow Management Using Geomembranes—One City's Successes and Challenges
Felon Wilson, Seaman Corp.

Construction of Columbus Water Reservoir Geosynthetic Liner System
Timothy D. Stark, University of Illinois at Urbana-Champaign; Daniel S. Rohe, Environmental Protection Inc.

1:30–2:45 pm ➤ Room 10

Protection 1

Moderator: Daniele Cazzuffi, CESI SpA

Conductive Multi-Linear Drainage Geocomposites for Improved QA/QC of Leachate Double-Lined Ponds
Stephan Fourmont, AFITEX-Texel Geosynthetics Inc.; Andrew Jung, Western GeoSystems

Soil Bioengineering Design for Highly Steepened Waterway Banks
Robbin Sotir, Robbin B. Sotir & Associates Inc.

Geosynthetic Cementitious Composite Mat (GCCM) Installed as a Shroud over Wire Baskets for Protection and Containment
Richard Goodrum, Clock Spring/NRI—Geotree Concrete Solutions

1:30–2:45 pm ➤ Room 8

Reinforced Walls

Moderator: Milad Saghebfar, MC2 Engineers

GRS-IBS—Cost Analysis and Comparison
Daniel Alzamora, Federal Highway Administration; Jennifer Nicks, Federal Highway Administration; Mike Adams, Federal Highway Administration

Investigation and Rehabilitation of Bridge Abutment MSE Wall Instability
Marshall Addison, Consulting Geotechnical Engineer

3:15–4:30 pm ➤ Room 8

Reinforced Slopes

Moderator: Paul Frankenberger, The Reinforced Earth Co.

Realignment of County Highway with One of the Largest Geogrid-Reinforced Slope Projects Constructed in the State of Minnesota
Stephan Gale, Gale-Tec Engineering Inc.; Nathan Lichty, Gale-Tec Engineering Inc.

A 60-Meter High Geogrid Reinforced Steep Slope for the Stabilization of a Landslide in Northern Italy
Daniele Cazzuffi, CESI SpA; Piergiorgio Recalcati, TENAX SpA

Performance of High-Strength Geogrid in Reinforced Soil Slope and the Yeager Airport
Robert Bachus, Geosyntec Consultants; John Lostumbo, TenCate Geosynthetics Americas

3:15–4:30 pm ➤ Room 10

Transportation

Moderator: Murad Abu-Farsakh, Louisiana Transportation Research Center
Sponsored by Tensar International Corp.

Field-Verified Benefits of Geogrids to Reduce Risk and Improve Performance of Flexible Pavements
Garrett Fountain, Tensar International Corp.; Mark Wayne, Tensar International Corp.; Bryan Gee, Tensar International Corp.

Recyclable Paving Fabric Protects Indiana Interstate
David Andrews, Propex; Mark Marienfeld, TreadMark

Bituminous Geomembranes (BGM), over 20 Years of Presence in the USA in Transport Applications
Natalie Daly, Axter Coletanche Inc.; Ted Aguirre, Axter Coletanche Inc.; Bertrand Breul, Axter Coletanche Inc.

3:15–4:30 pm ➤ Room 6

Vegetation

Moderator: Stephan Fourmont, AFITEX-Texel Geosynthetics Inc.
Sponsored by Tensar International Corp.

The Skeleton Keys of Turf Reinforcement
Lisa Simms, East Coast Erosion Control

Norton Branch Vegetated Reinforced Soil Slope Revisited after 25 Years
Robbin Sotir, Robbin B. Sotir & Associates Inc.; Mark Wayne, Tensar International Corp.

Maurice River and Johnson Creek Soil Bioengineering Stabilization and Restoration
Robbin Sotir, Robbin B. Sotir & Associates Inc.

Case Study Sessions

TUESDAY, MARCH 10

9–10:15 am ➤ Room 6

Column Supported Embankments

Moderator: Stephan Gale, Gale-Tec Engineering Inc.

Load Transfer Platform with PVA Uniaxial Geogrids—Costa Verde Project
Wilfredo Rodríguez, Freyssinet Tierra Armada; Renzo Sardon, Freyssinet Tierra Armada; Jorge Herrera, Freyssinet Tierra Armada; Nelson Berrospid, Freyssinet Tierra Armada

Expedited Repair of Railroad Track Subgrade Failure Using a Column-Supported Geosynthetic Reinforced Load Transfer Platform
Scott Mackiewicz, Braun Intertec; Morgan Race, Braun Intertec; David A. Johnson, BNSF Railway

9–10:15 am ➤ Room 10

Landfill Covers

Moderator: Abigail Gilson, TRI/Environmental Inc.

Case Studies of Extreme Weather Performance of Engineered Turf Final Cover System
Ming Zhu, Watershed Geosynthetics; Brad Cooley, Watershed Geosynthetics; Mike Ayers, Watershed Geosynthetics

Guam ORDOT Vegetated Landfill Cap with Geocells
Michael Jotzke, Geo Products LLC

9–10:15 am ➤ Room 8

Reinforced Foundations 1

Moderator: Robert Lozano, The Reinforced Earth Co.

A Case Study of the Construction of a Roadway Fill over a Large Water Body Utilizing a Geotextile Reinforced Earth Foundation with Challenging Soil and Construction Conditions
Brent Marjerison, WSP Canada Inc.; Brock Nesbit, TenCate Geosynthetics Americas; Adrien Blais, Canada Ministry of Highways

Geosynthetics Reinforced Railway Twinning Project—Canadian National Railway—Aurora, ON
René Laprade, TenCate Geosynthetics Americas

10:30–11:45 am ➤ Room 6

Airfield Pavements

Moderator: L. David Suits, LDS Geosynthetic Consultant Services
Sponsored by Tensar International Corp.

Use of Geosynthetics in Airport Pavements
Jeffrey Gagnon, Federal Aviation Administration

Mechanical Stabilization of Foundation Soils for Airfield Pavements in the Mid-Atlantic Coastal Region
Andrew Isenhour, Tensar International Corp.; Bryan Gee, Tensar International Corp.

10:30–11:45 am ➤ Room 10

Protection 2

Moderator: Adam Maskal, Solmax

Innovative Geosynthetic Saves 100-Year-Old Panama Canal
Tom Stephens, TenCate Geosynthetics Americas

Scour and Riverbank Protection in the United Kingdom
Christopher Quirk, NAUE America Inc.

10:30–11:45 am ➤ Room 8

Reinforced Foundations 2

Moderator: Robert Lozano, The Reinforced Earth Co.

A Case History of Geogrid versus Aggregate Piers for Settlement Mitigation
Djan Chandra, Leighton and Associates Inc.

Geogrid-Stabilized Working Platform for Ringer Crane in Southern U.S.
Lois Schwarz, Tensar International Corp.; Mark Wayne, Tensar International Corp.

1:30–2:45 pm ➤ Room 6

Barriers 3

Moderator: Kent Von Maubeuge, NAUE GmbH & Co. KG

Druid Hill Reservoir—Lined Cofferdam
William Shehane, Seaman Corp.; Scott Brinkerhoff, Hallaton Environmental Linings

The Capabilities and Limitations of Electrical Leak Location
Abigail Gilson, TRI/Environmental Inc.

1:30–2:45 pm ➤ Room 8

Environmental

Moderator: Adam Maskal, Solmax

Use of Geosynthetics in Remediation of Bauxite Residue Disposal Area
Bill Smith, Tetra Tech Inc.; Ron Morosky, Alcoa Corp.; John Gardner, Smith Gardner Inc.

Salt Gradient Solar Pond Containment Liner Installation for Distilling Large Ponds of Brine Water to Fresh Potable Water
Pat Elliott, Raven Engineered Films

A Geosynthetics No-Soil Solution for Closure
Robert Wallace, AECOM; Brenda Palermo, AECOM

1:30–2:45 pm ➤ Room 10

Innovative Backfill

Moderator: Archie Fillshill, AeroAggregates LLC

Reconstruction of Failed Roadway Embankments Using Tire-Derived Aggregate Mechanically Stabilized Earth Walls—Ortega Ridge Road Case Study
Christopher Sneddon, Santa Barbara County Public Works; Christian Doolittle, Santa Barbara County Public Works; Joaquin Wright, GHD Inc.; Christopher Trumbull, GHD Inc.

Rebuilding Mountains with Expanded Polystyrene
Brendan Stepek, Schnabel Engineering LLC; Gary Brill, Schnabel Engineering LLC

Special Sessions

MONDAY, MARCH 9

10:15–11:30 am > Room 12

Three Case Histories Illustrating How Geosynthetics Were Used Effectively for Soft Soil Stabilization Projects Near Pigeon Point, Delaware

Moderator: George Koerner, Geosynthetic Institute (GSI)

This presentation will illustrate three different case histories in which geosynthetics were used to stabilize very soft soils near the Delaware River. The sites are as follows;

1. A retaining wall supporting a municipal solid waste disposal facility on Cherry Island in Wilmington, Del., operating since 1985, started reaching its full operational capacity by the early 2000s, causing the Delaware Solid Waste Authority (DSWA) to consider solutions for extending the life of the landfill. Subsurface conditions at the site consisted of medium to dense residual sand, overlain by a 60-to-100-foot thick layer of weak and low-permeability alluvial deposits and dredge materials, with significantly low undrained shear strengths, in the order of 200 pounds per square foot (psf). A vertical expansion of the landfill would, therefore, lead to significant settlements and excess pore pressures. To deal with this challenge, the consulting engineers adopted a composite foundation scheme, consisting of prefabricated vertical drains (PVDs) and a mechanically stabilized earth (MSE) berm using high-strength geotextiles and geogrids. The construction sequence started with the installation of more than 81,000 PVDs, in the foundation area of the berm, measuring more than 6.8 million feet in total length. Two layers of a high-strength reinforcement geotextile with drainage sand were placed on top of the PVDs, providing quality backfill at the base of the berm as well as a drainage reservoir for the water produced during sub-soil consolidation. Additional reinforcement at the mid-height of the berm was guaranteed by two high-strength geotextile layers. Additionally, the berm construction included the use of polyester geogrid with embedment lengths ranging from 20 to 80 feet. The final inclination of the berm was 1H:3V (one horizontal, three vertical), significantly steeper compared to 8H:1V initial inclination estimated without the application of the above composite foundation solution.
2. Geotextile Reinforcement of Soft Landfill Process Sludge to Facilitate Final Closure: An Instrumented Case Study. High-water-content, fine-grained sludges have posed a formidable disposal challenge for engineers throughout history. Usually, the low shear strength combined with the magnitude of the proposed overburden loads requires the sludge to be stabilized before it is covered. Numerous ground-modification techniques are available to aid in this stabilization. However, this project utilizes a high-strength geotextile placed directly on the unstable sludge to stabilize in situ.
3. A 2,500-meter long dredge disposal area containment embankment averaging 4 meters in height was constructed at Wilmington, Del., along the Delaware River. The construction was accomplished using high-strength geotextiles as reinforcement over a foundation consisting of soft, weak silts and clays. PVDs were also used to speed consolidation of the first stage of the embankment to allow for the second stage of embankment construction 3 meters above sea level. The project was groundbreaking back in 1988 and was the keynote address for the Geosynthetic Institute first of 25 specialty conferences on geosynthetics in Philadelphia, Pa.

1:30–2:45 pm > Room 12

How ASTM Standards Are Impacted by Case Histories

Moderator: Bob Mackey, ASTM

ASTM standards are developed to address various areas interest. These standards can be test methods, standard guides, standard practices or specifications. Although each ASTM geosynthetic test method was developed to address a specific physical property or performance criteria, the methodology of a standard test method is revised on a regular basis due to improved knowledge through case histories. These case histories usually show one or more of the following:

> deficient test apparatus or procedures to adequately simulate performance test conditions
> difficulty testing new geosynthetic products
> improved knowledge of test parameters, test conditions, or geosynthetic products
> new demands of users (e.g., Federal Highway Administration)
> poor precision and bias results of the current test method

Within this session, ASTM members of D35 Committee on Geosynthetics will present how geosynthetic standards and particular test methods are reviewed and revised based on case histories. The presenters will show how these case histories impacted specific test methods and the resulting revisions.

Case History: History and Review of the ASTM International Test Standards for the Interface Shear Test and Future Considerations
Gary T. Torosian, Geocomp Corp./GeoTesting Express Inc.

Case Histories Illustrating How ASTM Test Methods Are Used to Demonstrate Performance and Compliance with GRI-GM13 Specification for HDPE Geomembranes
George R. Koerner, Geosynthetic Institute (GSI)

Minimum Average Roll Value (MARV) Impact on the Geotextile Industry Highlighted a Need for a Systematic Approach Resulting in Development of ASTM Method
Beth Young, TenCate Geosynthetics Americas

Index Property Test of Bentonite-Polymer Geosynthetic Clay Liner
Kuo Tian, George Mason University

3:15–4:30 pm > Room 12

Panel Discussion: Construction with Fabricated Geosynthetics

Moderator: Timothy D. Stark, Fabricated Geomembrane Institute (FGI)

Panel Members: Pat Elliott, Director of Installation Services, Raven Engineered Films; Dan Rohe, President, Environmental Protection Inc.; Ronald K. Frobel, MSCE, P.E., Owner/Principal, R. K. Frobel & Associates Consulting Engineer; Duff Simbeck, Vice President, Simbeck and Associates; and Douglas Hilts, P.E., S.E, Owner/Principal, Hilts Consulting Group

This panel discussion will assemble industry leaders to discuss the advantages and disadvantages of factory fabrication versus field fabrication. The panel members will investigate different labor rates, production per day, quality, testing, weather impacts, etc., for factory fabrication versus field fabrication of geosynthetics. This should result in a lively debate about current fabrication, testing and installation trends.

Special Sessions

TUESDAY, MARCH 10

9–10:15 am > Room 12

Growing the Geosynthetic Marketplace: GMA's Mission

Moderator: Boyd J. Ramsey, Geosynthetic Materials Association (GMA)

Over the last 23 years, the Geosynthetic Materials Association (GMA) has been instrumental in helping to grow the geosynthetic industry in North America through education and advocacy. GMA has worked with government on the local, state and federal levels; engaged Congress and federal agencies; helped to create and review geosynthetic/construction specifications and documents; and conducted educational seminars. GMA has also engaged with other industry groups to represented the interests of geosynthetics.

GMA leaders will speak of key moments in the history of GMA and its impact on events, specifications, regulations and legislation. This session will include a summary of GMA's accomplishments and with that, a demonstration of the value of GMA and the return that is being enjoyed by GMA's supporters in particular and the overall industry in general.

GMA leaders will also make an in-depth presentation of the future plans of the association and its impact on the geosynthetic marketplace.

10:30–11:45 am > Room 12

Women in Geosynthetics Roundtable Discussion

Moderator: Jordan Wiechmann, Plastatech

Panel Members: Tonya Switalski, General Manager, Titan Environmental USA; Christine Thomas, Vice President of Administration, COMANCO; Andrea Sasu, Global Marketing Director, Solmax; and Fabiana Arriaga, Ph.D., P.E., Geosyntec Consultants

The Fabricated Geomembrane Institute at the University of Illinois has created a group titled "Women in Geosynthetics (WIG)" in order to promote the advancement of women in the geosynthetic industry through education, networking and mentoring opportunities.

Women in Geosynthetics' roundtable discussion will include the following points of interest:

> maintaining a work/life balance

> maximizing the benefits of social media

> opportunities for women in the geosynthetics industry

> recruiting women into the geosynthetics industry

> professional and collegiate mentorship opportunities

> partnering women professionals with female graduate and undergraduate students

1:30–4:15 pm > Room 12

Vertical and Near-Vertical Geosynthetic-Reinforced MSE Structures—Case Studies on the Influence of Backfill on Alignment of Concrete and Wire Facings

Moderator: Robert Gladstone, Association for Mechanically Stabilized Earth (AMSE)

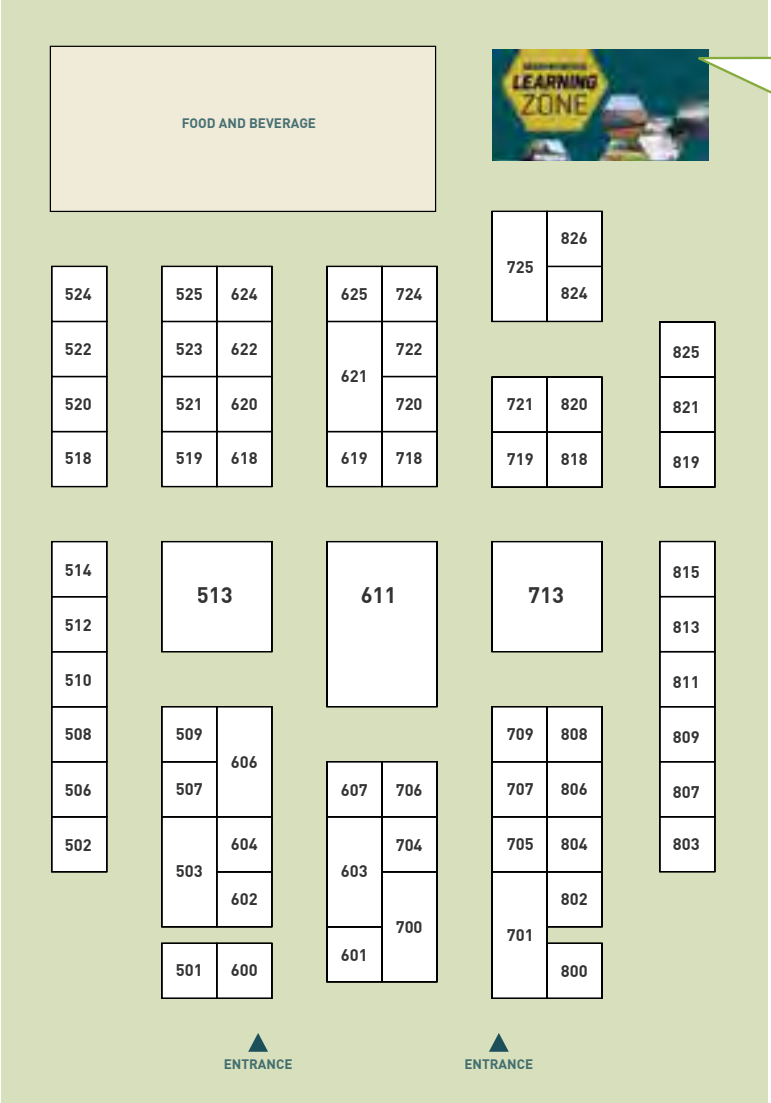
Achieving MSE wall facing alignment is a critical part of meeting specifications and satisfying customers. Facing alignment depends not only on contractor construction practices, but also on backfill properties, consistency of the supply and installation quality control. Whether the facing is precast or dry-cast concrete, gabions or other wire mesh configurations, results depend significantly on the properties of the backfill. Building tall and/or complex structures exacerbates this dependency.

The Association for Mechanically Stabilized Earth (AMSE) has brought together technical representatives whose presentations will highlight the critical role of backfill in achieving required alignment of geosynthetically reinforced MSE structures with various facings.

Part 1 1:30–2:45 pm Welded Wire- and Gabion-Faced MSE Structures

Part 2 3:00–4:15 pm Precast Concrete Panel-Faced MSE Structures

Show Floor Map



Geosynthetics Learning Zone

Join us on the show floor to explore the basics of geosynthetics. Everyone is invited regardless of registration type. The Learning Zone is an area of the show floor with material samples and educational boards. It is also home to the Introduction Series.

HALL B

SHOW FLOOR HOURS

SUNDAY, MARCH 8
Welcome Reception
5–7 pm

MONDAY, MARCH 9
9 am–5 pm

TUESDAY, MARCH 10
9 am–5 pm

REGISTRATION HOURS
(Hall B Foyer)

Sunday, March 8 | 7 am–5 pm
Monday, March 9 | 7 am–5 pm
Tuesday, March 10 | 7 am–5 pm

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Company Index

The companies in **bold** *are exhibitors with advertisements in this publication.*

Applications, Products and Services Listings

The companies in **bold** *are exhibitors with advertisements in this publication.*

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TMP America Inc. 803

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The companies in **bold** *are exhibitors with advertisements in this publication.*

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The companies in **bold** *are exhibitors with advertisements in this publication.*

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NCIF International Merchandising Co. 514
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City Sewing Machine LLC 604
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AGRU America Inc. 713
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Company Directory » Ac–Ci

ACE Geosynthetics ✦ GMA

BOOTH 821

Taichung, Taiwan
+88 626595926

ACE Geosynthetics is the leading manufacturer of geosynthetics in Asia providing integrated, geosynthetic-related products and solutions for worldwide engineering projects including MSE, environmental remediation, erosion control, shoreline protection and coastal structure construction.

Aero Aggregates

BOOTH 818

Eddystone, PA
United States
+1 610 447 8900
www.aeroaggregates.com

Ultra-Lightweight Foamed Glass Aggregates are produced from 100% post-consumer recycled glass. The aggregates have a highly frictional surface and combined with a low unit weight, inertness, high permeability, and insulating properties, foamed glass aggregate is ideal as a lightweight backfill.

AGRU America Inc. ✦ GMA

COVER 4
BOOTH 713

Georgetown, SC
United States
+1 843 546 0600
www.agruamerica.com

AGRU America is the world's leading manufacturer of flat die extrusion geomembranes, geocomposites, geotextiles, geo clay liners and fittings. Part of the worldwide AGRU Group, an Austrian family-owned business since 1948, the company has production facilities in Austria, the United States, Germany and China.

American Excelsior Co. ✦ GMA

BOOTH 523

Arlington, TX
United States
+1 817 385 3500
www.curlex.com

American Excelsior is a manufacturer of erosion and sediment control products with manufacturing locations and distribution partners all across the U.S., making products and personal assistance always close to you or your job site. Learn more about the Curlex brand by visiting www.curlex.com.

Armorform

BOOTH 524

Houston, TX
United States
+1 832 731 0754
www.armorform.com

Armorform® is a highly engineered fabric-formed concrete erosion control and scour prevention system. Armorform® utilizes double layer woven geotextiles engineered exclusively to serve as forms for casting concrete erosion control revetments and linings for use in all forms of civil construction.

Association for Mechanically Stabilized Earth

BOOTH 508

Reston, VA
United States
+1 571 392 5901
www.amsewalls.org

AMSE promotes the use of MSE retaining structures engineered and supplied through a single source of responsibility and constructed in accordance with specifications which ensure value, performance, reliability and long-term safety. AMSE members produce complete MSE wall systems that use steel and, in some situations, geosynthetic soil reinforcements.

Atarfil USA Inc. ✦

PAGE 7
BOOTH 718

Suffolk, VA
+1 751 263 4057
www.atarfil.com

Atarfil specializes in High Performance geomembranes for safe containment solutions: waste (environmental protection, waste disposal and capping), water (storage, canals, floating covers, ornamental, evaporation, irrigation for agriculture, aquaculture), and mining (heap leach, tailing dams, closures).

Axter Coletanche Inc.

BOOTH 806

Saint-Laurent, QC
Canada
+1 514 903 1912
www.coletanche.com

Bituminous Geomembrane for waterproofing construction and civil engineering works. Coletanche® offers its expertise and provides robust products especially designed for environmental, hydraulic, transport, containment and other construction applications.

Basic Concepts Inc.

BOOTH 824

Anderson, SC
United States
800 285 4203

BOSTD America ✦ GMA

BOOTH 625

Blackwell, OK
United States
+1 580 722 2100
www.bostd-america.com

We are an international manufacturer of earth stabilization and other geosynthetics. Our company's E'GRID geogrids and E'DRAIN drainage products are recognized worldwide for their high quality and cost effectiveness. BOSTD is now seeking U.S. distribution partners for biaxial geogrid product lines.

Burke Industries ✦ GMA

PAGE 25
BOOTH 820

San Jose, CA
United States
+1 408 297 3500
www.burkeind.com

Since 1969 Burke Industries has been a leading pioneer in producing CSPE-based geomembranes for use as lining and floating covers for potable water. Multi-ply constructions and custom colors available and all are NSF-61 and AS/NZ 4020. Knowledge and accountability are cornerstone to our reputation.

Chesapeake Containment Systems Inc.

BOOTH 600

Statesville, NC
United States
+1 704 208 3440
www.ccsliners.com

Chesapeake Containment Systems, Inc. (CCS) is a professional environmental construction firm dedicated to serving its customers since 2007. We provide services from geosynthetic installations, piping systems, repairs and inspections, floating covers and concrete protective liners.

City Sewing Machine LLC

BOOTH 604

Dallas, TX
United States
+1 972 243 3522
www.citysewingmachine.com

City Sewing Machine is one of the largest industrial sewing companies in North America. We are an authorized distributor of Union Special and Juki machines as well as Genuine (OEM) parts. We take pride in servicing our customer needs from sales of new machines, used machines as well as thread, needles and many other types of supplies.

Civil + Structural Engineer Magazine

BOOTH 522

Fayetteville, AR
United States

Cooley/Engineered Membranes ✦

The Americas • Asia • Europe • Middle East

PAGE 23

BOOTH 624

Pawtucket, RI
United States
+1 401 724 9000
www.cooleygroup.com

Core applications include primary/secondary commercial containment (fuel, chemical, and oil), military inflatable boats, waterproofing (below-grade and tunnels), and water protection/preservation geomembranes (reservoir liners and floating covers)—including potable water-grade coated fabrics.

CTT GROUP ✦

BOOTH 724

Saint-Hyacinthe, QC
Canada
+1 450 778 1870
www.gcttg.com/en

We offer the most comprehensive suite of testing, certification, expertise and research services. Specialized in geomembrane, GCL, geogrid, geotextile, geocomposite, plastic pipe, geofoam and other geo-materials, accredited GAI-LAP and ISO17025. State-of-the-art facility in Canada, serving the world.

DEMTECH Services Inc. ✦

BOOTH 705

Placerville, CA
United States
+1 530 621 3200
www.demtech.com

Our goal is to furnish the most reliable, durable and fastest equipment possible. Powered by innovation, Demtech equipment leads the industry for quality and affordability. We look forward to servicing your geosynthetics installation equipment needs.

The DrainGreat Company LLC ✦

BOOTH 804

Greenville, SC
United States
+1 864 627 7751
www.draingreat.com

DrainGreat was originally developed by Wurster Engineering and Construction for soil nail walls. DrainGreat is used in many parts of the world for soil nail walls, but also for many other applications where you need to connect a drainpipe to drain board.

e2 – E Squared ✦ GMA

BOOTH 709

Hillside, NJ
United States
+1 908 558 0899
www.e2techtextiles.com

Engineered Polymer Technologies' line of XTRM PLY® Geomembranes provides supported and unsupported products in a thickness range of 1.6 mil. to 120 mil and in widths up to 120" (3.05 m). Polymer options include EIA, PVC, LLDPE (smooth and textured surface), TPU, and PP.

East Coast Erosion Blankets ✦ GMA

BOOTH 722

Bernville, PA
United States
+1 610 488 8496
www.eastcoasterosion.com

East Coast Erosion is a leading manufacturer of erosion blankets and turf reinforcements mats. With multiple facilities and international distribution we can quickly provide product. Our main values are quality products and excellent service.

Enka® Solutions ✦ GMA

BOOTH 622

Enka, NC
United States
+1 828 665 5004
www.enkasolutions.com

Enka® Solutions is a leading international producer and supplier of high-quality polymeric 3D-mats, geogrids, geotextiles, composites and special engineered products, which are applied for erosion control, soil stabilization and drainage amongst others, with proven track record of decades.

Environmental Specialties International Inc. (ESI)

BOOTH 706

Baton Rouge, LA
United States
+1 225 291 2700
www.esiliners.com

Having installed over 2.5 Billion square feet of geosynthetics involving more than 2,000 projects in 50 states, Environmental Specialties International (ESI) is the largest geosynthetic installation contractor in the United States. We have the competency and capability to complete your project as you'd expect.

EPI The Liner Company ✦ GMA

PAGE 21

BOOTH 521

Traverse City, MI
United States
800 655 4637
www.geomembrane.com

For over 35 years EPI has focused on quality products, fair prices, and commitment to service. Originally created in 1980 to serve the oil industry in Michigan, EPI is a full service geosynthetic supplier having fabricated over 500 million square feet of flexible geomembrane liners.

Fabinno Co. Ltd. ✦

BOOTH 619

Seoul, South Korea
+82 263 008 888
www.fabinno.com

Fabinno contributes to a cleaner and healthier world by developing environment-friendly industrial fabrics. Our fabrics are recyclable, dioxin-free, heavy metal-free and light weight with strong and durable properties.

Fabricated Geomembrane Institute (FGI)

BOOTH 510

Urbana, IL
United States
+1 217 333 3929
www.fabricatedgeomembrane.com

Fabricated Geomembrane Institute (FGI) is a industry/academic consortium of organizations interested in – and involved with – fabricated geomembranes. The FGI is located at the University of Illinois at Urbana-Champaign in the Department of Civil and Environmental Engineering.

Geo Products LLC

BOOTH 620

Houston, TX
United States
+1 281 820 5493
www.geoproducts.org

Geo Products manufactures the EnviroGrid cellular confinement system. Our EnviroGrid geocell is a lightweight, expandable confinement system an economical erosion barrier or structural foundation. The main applications are soil stabilization, slope and channel erosion control and retaining walls.

Geosynthetic Materials Association

GEOSYNTHETICS LEARNING ZONE

Roseville, MN | USA
www.ifai.com
www.gmanow.com

The Geosynthetic Materials Association (GMA) is the geosynthetics industry association representing manufacturers, distributors, and service providers. GMA provides member companies with engineering support, business development, education, and government relations.

Geosynthetics Magazine

GEOSYNTHETICS LEARNING ZONE

Roseville, MN | USA
www.geosyntheticsmagazine.com

Geosynthetics is a publication for civil engineers, contractors and government agencies in need of expert information on geosynthetic engineering solutions. *Geosynthetics* presents articles from field professionals for innovative, exemplary practice. *Geosynthetics* magazine is the industry news leader and is the official publication of GMA and IGS-NA.

GeoTree Solutions (GeoTree)

BOOTH 802

Houston, TX
United States
855 655 6750
www.geotreesolutions.com

GeoTree Solutions is a leading global provider of highly engineered solutions for repairing, rehabilitating, strengthening and protecting critical infrastructure spanning the water and wastewater, oil and gas, industrial, and civil sectors. To learn more, visit www.geotreesolutions.com.

HUESKER Inc. ✦ GMA

PAGE 22

BOOTH 701

Charlotte, NC
United States
+1 704 588 5500
www.huesker.com

HUESKER is the leading global manufacturer of geosynthetics, agricultural, and industrial textiles. Providing unique engineered solutions for earthworks and foundations, roads and pavements, environmental engineering, hydraulic engineering, industry, mining, and agriculture.

hydroGEOPHYSICS Inc. ✦

BOOTH 502

Tucson, AZ
United States
+1 520 647 3315
www.hgileakdetection.com

HGI has extensive experience providing leak detection and leak location technology on buried tanks, ponds, dams, and geosynthetics for municipal, mining, industrial, and nuclear facilities. We work successfully on dry or solution filled structures and in resistive or highly conductive solutions.

Informed Infrastructure

BOOTH 825

West Allis, WI
United States
www.informedinfrastructure.com

Informed Infrastructure, the magazine for civil & structural engineers, provides news and information on the latest trends in projects, products, and technology via a magazine, eNewsletter, website, webcasts, and video.

International Geosynthetics Society – North America

BOOTH 809

Jupiter, FL
United States
+1 561 768 9487

IGS-NA (The North American Chapter of the International Geosynthetics Society) is an organization in which individual and student members comprise the learned society whose mission is to support the development of geosynthetic technologies through education, communication and networking.

Intertape Polymer Group ✦ GMA

BOOTH 601

Sarasota, FL
United States
800 565 2000
www.itape.com

From agricultural irrigation to industrial applications, AquaMaster Geomembranes are the proven choice for your site requirements. Intertape Polymer Group (IPG) provides sound solutions for water resource management and a wide range of civic and industrial applications.

Jai Corp Ltd.

BOOTH 811

Mumbai, India
+91 22 61155230
www.jaicorpindia.com

We are pleased to introduce Jai Corp Ltd. as one of the largest plastic processors in India. We started operations in 1987 with pp woven geotextile. Today Jai Corp Ltd. has one of the largest weaving capacities of about 70,000 metric tons annually.

Leak Location Services Inc. ✦ GMA

BOOTH 519

San Antonio, TX
United States
+1 210 408 1241
www.llsi.com

Leak Location Services Inc. (LLSI) specializes in electrical leak location surveys of geomembranes for a broad spectrum of applications to include frac ponds, landfills, surface impoundments, heap leach pads, and more for the waste management, energy, mining, oil and gas industries worldwide.

Leister Technologies LLC ✦ GMA

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BOOTH 507

Itasca, IL
United States
+1 630 760 1000
www.leisterusa.com

Leister manufactures a full range of equipment suitable for geo installation, including a line of extrusion welders, wedge welders, hot air tools and test equipment that are well-suited to the demands of geosynthetics installation and plastic fabrication. Leister's got it covered.

MEGAPLAST India

BOOTH 725

Mumbai, India
+91 226106 6005
www.megaplast.in

Megaplast is a leading manufacturer of geomembranes. We are manufacturing geomembranes that are 8 meters wide, adhering to the highest quality standards. We have state-of-the-art testing facilities, which is GAI-LAP certified. We have our product certified for GM13 from TRI. We manufacture black and other colors.

Midwest Canvas Corp. ✦

BOOTH 618

Chicago, IL
United States
+1 605 988 4941
www.midwestcanvas.com

We are a manufacturer of polyester string reinforced polyethylene films and extruded non-reinforced films up to 20 mils.

Munsch U.S.A./Munsch Gmbh

BOOTH 719

Placerville, CA
United States
www.munschwelding.com

Plastic Welding and testing equipment for the geosynthetics industry.

MVS ACMEI Technologies Private Limited ✦ GMA

BOOTH 506

Hyderabad, India
+91 9393 922 442
www.mvsgroup.co.in

MVS ACMEI has proven its presence in the industry with its wide range of products and solutions. We are the first company to successfully market 12 feet wide geomembranes from 10 MIL to 45 MIL with UV Exposure warranty up to 20 years.

NCIF International Merchandising Co.

BOOTH 514

Qingdao, China
+86 532 8569 7596
www.ncifgroup.com

NCIF started as a woven geotextile manufacturer in China in 2008 and has grown to be a trusted supplier of geosynthetic products, construction materials, and agricultural fabrics worldwide.

Nedia Enterprises Inc. ✦ GMA

BOOTH 800

Ashburn, VA
United States
+1 571 223 0200
www.nedia.com

Nedia Enterprises offers a complete line of erosion control, sediment control, and bioengineering products made primarily from natural fibers. We provide innovative quality products and excellent service to our customers in the erosion control and bioengineering industry.

Owens Corning ✦ GMA

PAGE 3

BOOTH 611

Toledo, OH
United States
800 567 9727
www.owenscorning.com/rhinomat

Owens Corning develops, manufactures, and markets insulation, roofing, and fiberglass composites. Owens Corning expanded that core in 2016 to include manufacturing geosynthetics for water management, oil and gas mining, and agricultural applications under the RhinoMat™ and RhinoSkin™ brands.

Plastatech Engineering Ltd. ✦ GMA

BOOTH 621

Saginaw, MI
United States
800 892 9358
www.plastatech.com

Plastatech® produces calendered and extruded PVC films, weft-inserted textiles, reinforced and non-reinforced geomembranes, and laminated vinyl fabrics that are used for tension structures, commercial roofing, temporary shelters, agricultural storage, pond liners, and other applications.

Polyweld USA Inc. ✦ GMA

BOOTH 606

Houston, TX
United States
+1 281 821 4156
www.polyweldusa.com

Polyweld USA was founded in 1984 to address the various challenges encountered during liner installation by the teams working onsite at various project locations. Since then we have become a competitive leader in manufacturing welding equipment for a vast array of geomembranes and geosynthetics.

Presto Geosystems

BOOTH 525

Appleton, WI
United States
+1 920 738 1342
www.prestogeo.com

Presto Geosystems partners with engineers to solve challenging soil stabilization problems with the world's origina l, and most complete geocell system-GEOWEB®. The GEOWEB 3D system stabilizes unpaved roads, slopes, channels and creates vegetated MSE retaining walls. Free project evaluations.

Propex GeoSolutions ✦ GMA

BOOTH 503

Chattanooga, TN
United States
+1 423 553 2036
www.propexglobal.com

Propex Geosolutions is a global leader in geosynthetic and erosion control solutions for earth stabilization, offering a portfolio that helps build and rebuild key infrastructure across the globe.

Raven Engineered Films ✦ GMA

COVER 2

BOOTH 603

Sioux Falls, SD
United States
+1 605 335 0174
www.ravenefd.com

Raven Engineered Films is an innovative 60-year manufacturer of advanced geomembrane liners and covers. Producing reinforced, non-supported, textured, geo-composites, and EVOH barrier geomembranes in 20-80 mils. From GRI-GM geomembranes to NSF certifications, Raven provides leading-edge solutions.

The Reinforced Earth Co.

BOOTH 808

Reston, VA
United States
800 446 5700
www.reinforcedearth.com

Reinforced Earth® MSE walls are economical gravity structures having high strength, a limited footprint, flexibility to distribute loads evenly, and a variety of architectural finishes.

Re-Gen Enterprises

BOOTH 520

Meridian, ID
United States
+1 307 696 5431
www.re-genenterprises.com

Re-Gen Enterprises is the pioneer in liner removal solutions. Our aim is to save you time and resources in removing existing liner. We look forward to meeting you!

Rocscience

BOOTH 813

Toronto, ON
Canada
+1 416 698 8217
www.rocscience.com

Rocscience is a world leader in developing 2D and 3D software for civil, mining, and geotechnical engineers. For over 20 years, we've used leading-edge research to build geotechnical tools used by more than 7,000 engineers around the world for slope stability, excavation design, and geotechnical analysis.

Seaman Corporation ✦

BOOTH 607

Wooster, OH
United States
+1 330 262 1111
www.xrgeomembranes.com

XR Geomembrane products, manufactured by Seaman Corporation, have more than 40 years of proven performance. As the best coated fabric products in the world, XR Geomembranes are highly engineered for the very toughest of applications and used in a wide variety of industries.

SKAPS Industries ✦ GMA

BOOTH 819

Athens, GA
United States
+1 706 354 3700
www.skaps.com

SKAPS Industries is a high quality leading manufacturer and supplier of geosynthetics products. We hold a strong market presence in over 60 countries. Customer satisfaction is of utmost importance to us and we at SKAPS ensure it by providing excellent customer service. Visit our website at www.skaps.com.

Solmax International Inc. ✦ GMA

BOOTH 513

Varennes, QC
Canada
+1 450 929 2544
www.solmax.com

Solmax is positioned among the worldwide leaders in the manufacturing of geomembranes and offers both containment and fluid transportation solutions including HDPE pipes, valves, fittings and accessories. Our vision: Covering the world, protecting the earth.

Strata Systems Inc. ✦ GMA

BOOTH 720

Glen Raven, NC
United States
800 680 7750
www.geogrid.com

Strata Systems is the manufacturer and worldwide distributor of advanced soil reinforcement products that deliver system solutions for MSE retaining walls, reinforced steep slopes, embankments over soft soils, and load support applications. Our technical resources ensure innovative geo-solutions.

Synteen Technical Fabrics ✦ GMA

BOOTH 518

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www.synteen.com

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www.tmpgeosynthetics.com

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Western Green is one of the largest erosion control manufacturers in the country and a leader in the industry, representing brands Western Excelsior and North American Green. In business since 1977, we specialize in manufacturing and distributing quality erosion and sediment control solutions.

Wind Defender LLC

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Wind Defender LLC is a full-service geosynthetics distribution company and sole provider of the Wind Defender® ballast system for exposed membrane covers. Direct all inquiries to Elliot Pugh at 570-617-7479 or elliot@wind-defender.com.

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