FGI Webinar: Geosynthetics Discipline & Its Interaction with Geotechnical Engineering

Presented by:
Dr. J. P. Giroud (President, Geosynthetics Consultants; First President, International Geosynthetics Society; Member, National Academy of Engineering)

Host:
Dr. Timothy Stark (Professor, University of Illinois; Technical Director, Flexible Geomembrane Institute)

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Introduction & Background
This webinar addressed the fundamental role and philosophical underpinnings of geosynthetics within modern geotechnical engineering. Dr. Giroud, a foundational figure in the field, positioned geosynthetics as the most significant innovation in geotechnical engineering during the second half of the 20th century.

He argued that contemporary practice is now virtually impossible without these materials, moving beyond a simple product-based view to establish geosynthetics as a mature engineering discipline. The presentation focused on practical and fundamental reasons for geosynthetics' success, along with challenges and future directions.

Practical Basis for Success
Dr. Giroud identified two primary practical reasons for widespread adoption:

Variety of Products
Geotextiles, geomembranes, geogrids, geonets, and geocomposites offer engineered properties that outperform natural materials in specific functions: reinforcement, drainage, filtration, containment, and separation.

Manufacturing Capability
Consistent, reliable production with strict quality control ensures dependable performance in critical applications.

Fundamental Reasons for Success
Three core principles explain geosynthetics' compatibility with geotechnical engineering:

Need for Continuous Materials
Soil is particulate and vulnerable to tensile stress. Geosynthetics provide continuity, maintaining structural integrity.

Need for Two-Dimensional Materials
Layered construction in geotechnical structures requires 2D elements for separation, reinforcement, or encapsulation. Flexibility allows geosynthetics to accommodate differential movement without stress concentrations.

Efficiency of One-Dimensional Components
Most 2D geosynthetics are made from fibers, ribs, or yarns. Molecular orientation increases tensile strength, providing high performance with material economy.

Key Challenges Facing the Discipline
Dr. Giroud highlighted several ongoing challenges:

"Cartoon Design" Trend
Engineers may copy standardized details without site-specific analysis, discouraging innovation.

Education and Conservatism
Engineers need training to understand advanced geosynthetic behavior.

Durability and Environmental Considerations
Long-term performance must be supported by field data. Microplastic concerns are minor compared to benefits like water conservation, erosion control, and pollution prevention.

Conclusions & Future Directions
The webinar concluded with a strong affirmation of the geosynthetics discipline:

- It is supported by fundamental principles and a vast knowledge base.
- Innovation continues to advance practical applications.
- The field is well-positioned to tackle 21st-century challenges such as climate change adaptation, environmental protection, and sustainable development.

Additional Information

- Full recording and PDF slides are available on the Flexible Geomembrane Institute website.
- Next webinar: Best Practices for Geomembrane Penetrations and Attachment Details.
- Dr. Giroud addressed additional attendee questions in writing following the live session.