Center for Polymer Reinforced Structures (CPReS)

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Geosynthetic Institute

475 Kedron Avenue
Folsom, PA 19033-1208 USA
TEL (610) 522-8440
FAX (610) 522-8441

Dr. Y. (Grace) Hsuan
Associate Prof. of Civil Engineering
Drexel University
grace.hsuan@coe.drexel.edu

Dr. Dov Leshchinsky
Professor of Civil Engineering
University of Delaware
dov@ce.udel.edu

Dr. George R. Koerner
Associate Director
Geosynthetic Institute
gkoerner@dca.net

ANNOUNCEMENT

The Geosynthetic Institute is proud to announce the formation of a new center within its various existing activities. The Center for Polymeric Reinforcement of Structures, aka CPReS, will focus on the following:

(i) polymeric reinforced walls (modular block walls, and others)
(ii) polymer reinforced steep soil slopes
(iii) polymeric reinforced foundation systems (over pile foundations, spanning voids, etc.)

It will function under the guidance and direction of Dr. Grace Hsuan (with activities at Drexel University), Dr. Dov Leshchinsky (with activities at University of Delaware) and Dr. George Koerner (with activities at the Geosynthetic Institute). Dr. Bob Koerner will serve in an advisory role. The mission, goals, and initial tasks of CPReS follow.

Mission Statement

The Center for Polymer Reinforced Structures (CPReS) is a center within the Geosynthetic Institute (GSI) which focuses on the proper use, design, testing, installation and monitoring of geosynthetic reinforcement and related materials in walls, slopes and foundation reinforcement applications.

Goals and Objectives

The goals of CPReS in implementing our mission statement are to perform and facilitate research and development on geosynthetics and related materials for reinforcement in geotechnical engineering applications. Primary focus is on walls, slopes and foundation reinforcement. These applications of geotechnical engineering are among the most challenging and yet beneficial structures that are known to mankind, yet must be accomplished so as to maximize benefit and longevity while minimizing cost and maintenance. The objectives of the center include, but are not limited to, the following:

1. **Conducting research on geotextile and geogrid reinforcement materials, as well as on related geosynthetics; such as drainage geocomposites, geomembranes and polymer pipe for use in walls, slopes and foundation reinforcement.**
2. **Conducting research on related materials within the wall, slope or foundation reinforcement system; such as masonry blocks, backfill materials, drainage soils, solid waste, etc.**
3. **Develop and promote manufacturing specifications and construction installation guides for the relevant geosynthetics and related materials.**
4. **Develop and/or adopt computer codes for design and analysis of the various applications being addressed.**
5. **Add to the existing database of geosynthetic and related materials information and, where appropriate, generate new categories for such information that is developed over time.**
6. **Provide training and tutorial services to member organizations and project sponsors as well as their associates and employees.**
7. **Develop and provide courses, conferences, symposia, workshops and training courses on the information database as it is being generated.**
8. **Develop E-learning venues whenever possible for electronic dissemination of the generated information.**
9. **Provide forensic services on both field successes and failures for walls, slopes and foundation reinforcement applications.**
10. **Develop a library of case histories in the relevant categories of walls, slopes and foundation reinforcement as to long-term performance of individual components and the system as a whole.**

Activities-to-Date

Three proposals have been solicited and have been received. They are being acted upon accordingly.

From Dr. Hsuan the proposed activity will be involved with testing using the Stepped Isothermal Method (SIM). The project consists of four major tasks:

1. **Verification of the SIM test procedure and data analysis technique**
2. **Comparing creep data between SIM with Time-Temperature-Superposition (TTS) tests**
3. **Effect of material properties on creep behavior**
4. **Comparing creep behavior between PET yarns, strips and other emerging polymer materials**

From Dr. Leshchinsky the proposed activities will first be involved with design considerations when encountering limited space for full reinforced lengths. Rock outcrops encroaching into the reinforced zone for partial or full height is the common field situation. The second is to understand and develop proper design methods for the use of low permeability backfill soils in the reinforced zone of SRWs. The project consists of these major tasks:

1. **Literature survey of successes and failures**
2. **Analysis using limit equilibrium and finite difference methods, "FLAC" in particular.**
3. **Design considerations to augment existing computer codes for this quite commonly encountered situation.**

From Dr. George Koerner the proposed activity is to build a small segmental retaining wall here at GSI (which we need to accommodate our air conditioning condensers) with pH monitoring directly between the blocks. The wall will consist of three different commercially available blocks and a control wall made from plastic blocks, and will be monitored over the next 3 to 5 years.

Financial Implications

Two students, one at Drexel and one at Delaware, will be funded on the basis of this initiative. They will be identified by their respective advisors and will be known as "GSI-Fellows". This funding will be on an annual basis, with continuation being dependent upon the year-end deliverables in the form of a formal written report.

There is no additional funding being requested by GSI member organizations for this initiative. Access to information generated by non-GSI member organizations and individuals is being considered by the GSI Board of Directors. Information will be forthcoming.

Please don’t hesitate to contact any of us regarding this new venture for GSI. We are all excited about its implementation and look forward to its results within the forthcoming year and for many years in the future.