

IGS NEWS

NEWSLETTER OF THE INTERNATIONAL GEOSYNTHETICS SOCIETY

Dedicated to the scientific and engineering development of geotextiles, geomembranes, related products, and associated technologies

VOLUME 14 NO. 3

NOVEMBER 1998

IGS Celebrates 15th Anniversary by Professor R.J. Bathurst, IGS President

This issue of IGS News commemorates the 15th anniversary of the IGS. This anniversary marks a stage in the life of our society when we can safely say that we have moved from a young society to a mature and well-established professional society that proudly represents the common interests of its members from around the world. It is worth reflecting back on the history of our society to fully appreciate how far we have come in the last fifteen years.

The initial idea for the formation of our society was discussed at a meeting chaired by Dr. J.P. Giroud in Las Vegas in August 1982 and attended by 150 participants from 34 countries. The society was formed on 10 November 1983 in Paris by 14 delegates from 10 different countries. The late Professor Ch. Schaerer was elected the first president of the "International Geotextile Society".

The founding members are well known names in our geosynthetics fraternity and many remain active today. Readers may wish to read the article by Dr. J.P. Giroud (past-President of the IGS) published in v9 no. 3, 1994 of the IGS News in which he recalls many interesting details of the formation of the IGS (many humorous). In June of 1984 there were 20 individual members of the society but membership increased to 102 individual members and 12 corporate members in 1985. On our tenth anniversary in 1994 we had grown to 1476 individual members, 50 corporate members and 12 IGS chapters. Today, 5 years later with a new name for the society, we can proudly record 1724 individual members from 58 countries, 150 student members, 78 corporate members, and 16 IGS chapters. The highly technical

nature of our geosynthetics profession is demonstrated by our two very successful journals: *Geotextiles and Geomembranes* and *Geosynthetics International*. In addition we can reflect back on six very successful international conferences on geosynthetics held under the auspices of the IGS. The last conference, held in Atlanta, Georgia in March of this year (6IGC), was attended by more than 1800 persons. The French Chapter of the IGS is now planning the 7IGC to be held in Nice, France in 2002. The organizing committee has accepted the challenge to make this conference the best yet.

The IGS has benefited from strong leadership in the past 15 years (IGS Presidents Professor Ch. Schaerer 1983-1986, Dr. J.P. Giroud 1986-1990, Dr. R.K. Rowe 1990-1994, Professor C.J.F.P. Jones 1994-1998 (see photograph)). I was honored to become your President in March of this year. My task has been made easier by the strong health of the society as well as the experience and dedication of the other officers of the IGS (Mr. Peter Stevenson, Mr. Wim Voskamp, Mr. Daniele Cazzuffi and Professor C.J.F.P. Jones) and the IGS Council members.

Most importantly, the success of the IGS has been largely the result of the activities of the IGS chapters who have uniformly carried out many activities at the local and regional level that bring value to our members. The contribution of our corporate members to the success of the society also cannot be over-emphasized. Without our corporate members many of our IGS activities including this newsletter would not be possible.

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of the behavior of polymeric reinforcement, and the work is now being used as a benchmark for development and testing of new analytical techniques in design by agencies, including the Washington State Department of Transportation.

From a consideration of material properties, the independent measurements of force and strain allow a definitive evaluation of the post-construction, in-soil creep. It is one of the few structures in the world that is instrumented to provide such data. These field data are compared with laboratory isochronous load-strain data from the manufacturer. Comparison shows an excellent agreement between the laboratory data on test specimens and the field behavior of the reinforcement in the sloped wall. An interpretation of the long-term (50,000 hours) data set, published by the writer, provides guidance for selection of an allowable tensile strength in design with reference to both current North American and European design practice.

Allied research has addressed soil/geosynthetic interaction. In the absence of specific test data for seismic design of reinforced soil structures, it is generally suggested that the interaction factor for dynamic loading be taken as 80% of

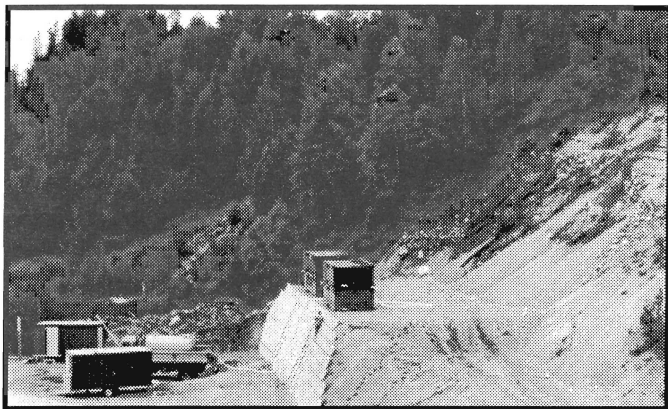


Figure 1. Surcharge loading of the structure.

that for static loading in any calculation of load transfer in the geosynthetic reinforcement. A unique set of pullout data are presented by Raju and Fannin (1997), from both displacement-control and load-control tests using a servo-controlled electro-hydraulic system, for three different types of geogrid. A new approach to interpretation of the test data was proposed, defining a load ratio which distinguishes between a stable and an unstable response of the geosynthetic reinforcement in loading. The work proves the design assumption of 80%, which is somewhat arbitrary, to be appropriate for construction practice.

References

Fannin, R.J. (1994). Field observations on the load-strain-time behavior of geogrid reinforcement. *Canadian Geotechnical Journal*, v31, no. 4, pp. 564-569.

Raju, D.M. and Fannin, R.J. (1997). Montonic and cyclic pullout resistance of geogrids. *Geotechnique* v47, no. 2, pp. 331-337.

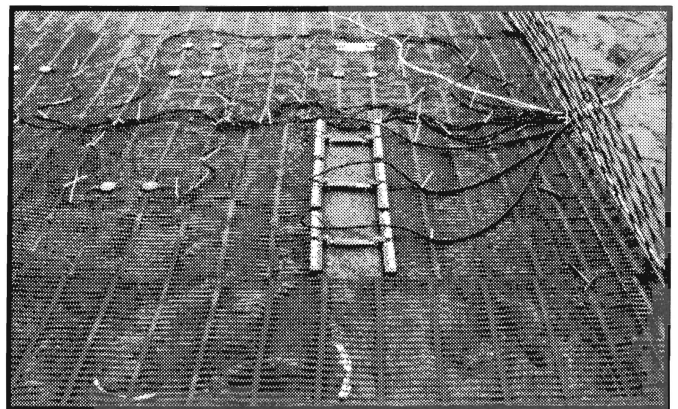


Figure 2. Instrumentation array for monitoring reinforcement force, strain and temperature.

The Future of Geosynthetics in Japan ***by Professor Toshinobu Akagi, IGS Council Member***

The Japanese Chapter of the International Geosynthetics Society has conducted surveys on the quantities of geosynthetics used in Japan in the years 1991, 1993, and 1995. The results show the current state of civil engineering use of geosynthetics in Japan. The results indicate that the geosynthetic products (excluding expanded polystyrene) used in Japan totaled roughly 80 million m² in 1991, 91 million m² in 1993 and 91 million m² in 1995. Woven and nonwoven geotextiles added together comprised the majority of the geosynthetics, amounting to 75.9%, 66.4%, and 63.8% of the total, respectively, in the three years investigated. Also importantly, the quantities of these geotextiles appear to fluctuate over a wide range from year to year, significantly influencing the grand total. Except for these two major categories of geotextiles, however, the surveys uncovered a remarkable growth in such items as knitted geotextiles, geonets, geogrids, prefabricated band-shaped drains, geomembranes, and geocomposites. For

instance, the use of geomembranes totaled 9.7, 14.0, and 16.2 million m² in 1991, 1993, and 1995 respectively.

Questionnaires were distributed in each survey to 90 manufacturers and distributors in Japan dealing with geosynthetics for civil engineering uses. 63, 73, and 79 replies were obtained, respectively during the survey years 1991, 1993, and 1995. Admittedly there may have been some minor errors in each survey. A recent review suggests that the first two surveys are likely to have overestimated quantities by perhaps several percent, while it is believed that the statistics obtained by the most recent survey are reasonably accurate and reliable. It is believed, therefore, that the use of geosynthetics is growing steadily in Japan. The 1997 survey is currently underway and will be completed early next year.

The use of geosynthetics for pavement reinforcement

Themes

The conference themes will cover almost all areas of engineering practice where geosynthetics are used: drainage and filtration, soil reinforcement, environmental geotechnics, laboratory and field tests, and pavements. Special sessions are devoted to case histories of geosynthetic use, illustrating aspects of geosynthetics use not covered in the other sessions.

Information and Correspondence

Information on the conference can be obtained by writ-

ing, calling or emailing the conference organizers at any of the following:

Comissao Organizadora-Geossinteticos '99
Prof. Mauricio Ehrlich
Associacao Brasileira de Macanica dos Solos NRRJ
Av. Rio Branco, 124/22 andar
20040-011 Rio de Janeiro RJ Brazil
Phone/fax: 0055210321
email: abmsrj@domain.com.br
http://www.abms-rj.civ.puc-rio.br,

1998 Professor Training Course for Geosynthetics

The National Science Foundation and the Industrial Fabrics Association International have recently conducted the fifth Professor Training Course for Geosynthetics at Auburn University. Twenty-nine invited university professors attended the five-day, expenses-paid course. The attendees received detailed training to assist in teaching and designing with geosynthetics. The professors were able to take the teaching materials, generic samples, and the knowledge gained back to their own university classrooms.

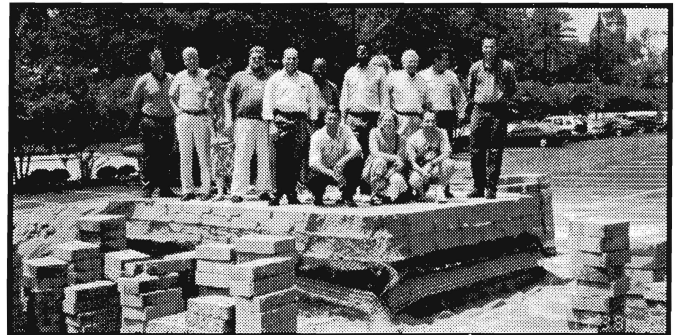
The course provided professors with instructional materials to assist in teaching civil engineering students about geosynthetics. The course notes were arranged topically so that each professor could build upon his existing class notes on a specific area. Each instructor prepared an extensive outline, notes, and references specifically designed for this course. The attendees also received many other course materials. Other materials were design manuals, generic product samples, computer programs, videos and over 100 slides.

Seven instructors, highly knowledgeable in their fields, were invited to address the attendees. Dr. R. Bathurst, Dr. S. Adanur, Dr. R.D. Holtz, Dr. J. Bowders, Dr. D. Elton, Mr. R. Berg, and Dr. R. Koerner provided excellent instruction and notes. A course highlight included demonstrations of geotextile manufacture and testing, conducted in the Auburn Textile Engineering geosynthetics laboratory. Drs. Adanur and Broughton conducted the tour. The attendees were shown several geosynthetics tests and weaving and nonwoven technology, as the participants examined several types of looms.

A mechanically stabilized wall was built adjacent to the meeting site (see picture). The wall was constructed using blocks and geosynthetics. To demonstrate the stability of the system, the attendees took the blocks off the wall and stood on the resulting structure to demonstrate its strength.

Prime sponsors were the National Science Foundation Division of Undergraduate Education and the IFAI Geosynthetic Materials Association. Other sponsors were the Erosion Control and Technology Council (ECTC), the North American Geosynthetics Society (NAGS) and the Geosynthetic Institute. Dr. Elton organized the course, arranged funding and selected many of the materials distributed to the attendees. Ms. Elaine Ridgway, Program Developer with the Auburn University, made the course truly enjoyable for all participants.

*reported by D.J. Elton
Editor, IGS, News*



Professor Training Course attendees on demonstration wall.

Catherine Maisonneuve Seminar Held

On 30 October 1998, the LIRIGM (University of Grenoble - France) organized a meeting on geomembrane durability, dedicated to Catherine Maisonneuve, a Ph.D. student of the laboratory who died last summer in an accident. She was a mechanical engineer and worked on geomembrane durability issues.

About a hundred people were present from different French public research laboratories, companies manufacturing geomembranes or consulting offices. Researchers and consultants from Belgium, Canada and Italy were also present.

This meeting was organized under the auspices of the International Geosynthetics Society and the Comité Français des Geosynthétiques.

The objective was to present Catherine Maisonneuve's study along with other international research on geomembrane durability. The program included:

- opening of the session by J.P. Gourc, LIRIGM manager.
- presentation of Catherine Maisonneuve's research by Patrick Pierson. A new accelerated aging test was pre-

been on the basis of mean (or typical) values. This report makes a similar comparison. As noted previously, the statistical variation is also presented and is seen to be quite high. Using plus/minus one standard deviation, it was found that gravity wall costs vary four times, bin/crib and MSE metal walls by three times, and MSE geosynthetic walls by two times. The data was subdivided according to FHWA Region, which gave interesting insight. Regions 1, 3, 4, and 7 have wall costs higher than the national average, whereas Regions 5, 6, 8, and 10 have costs lower than the national average. Retaining wall costs on highways of the Bureau of Federal

Lands are generally higher than the national average and for high wall cost significantly so.

A copy of the complete report is available from:
Geosynthetic Institute
475 Kedron Ave
Folsom, PA 19033 USA
Tel.: 1 (610) 522 8440 Fax: 1 (610) 522 8441

reported by
Dr. R.M. Koerner
Director, GSI

IGS Southeast Asian Chapter Report

It is my great pleasure to make this year's chapter report, as we have completed volume 4 of the 5th International Conference on Geotextiles, Geomembranes and Related Products held in Singapore in 1994. Now we are in a position to put behind us the past success and work towards another few years of active and productive chapter activities.

Firstly, I would like to report that while the economic situation in Southeast Asia is in one of the most difficult periods, the chapter sees great potential in bringing more applications of geosynthetics to this region in the near future, after the economic situation improves. This chapter has played and will continue to do its part to promote research and application of geosynthetics in this region.

Chapter membership has increased over the last two years – from 15 to 48 resulting from recruitment efforts. Discussions are progressing regarding the tangible benefits to be given to the members of this chapter.

The long awaited Volume 4 - Post Conference proceedings of 5IGC - was finally completed just before the beginning of the 6th conference. This volume contains the special lecture by J. P. Giroud, keynote lectures, general report, and panel discussions that took place at each and every technical session during the conference. It took us three and a half years to complete this volume as it involved substantial work after the conference in translating and confirming the audio version to an edited and printed form. We thank Professor G. P. Karunaratne who undertook and saw to this very difficult task.

This may become the last post-conference volume of international conferences by IGS, but it will definitely be one of the publications that researchers and practitioners will not want to miss. The special lectures and keynote lectures are indeed milestones for several geosynthetics applications in civil engineering.

General reports and panel discussions, as well as the discussion sessions on individual presented papers recorded some of the finest details of discussion and exchanges of ideas seen in peer reviewed journals and conference papers. I believe that those who contributed to this volume and those who benefit from it will ascertain its value! All registered participants of the 5th IGC will receive a copy of Volume 4 in the mail.

The chapter now promotes educational activities. The following are just some of the main activities planned in the near future.

1. Short course/workshop on Geosynthetics. The chapter sees its role in educating the general civil and environmental engineering profession in this region, in terms of potential application of geosynthetics. The chapter has organized seminars in the last few years. However, now it would like to see the support of the industry and offer a series of workshop/short courses.

These workshops will be one to two days and will involve main lectures by academia or internationally recognized practitioners. Local companies will present case histories on geosynthetics projects in the region. The first workshop will be held on 22 May 1999. We

have received overwhelming response from industry. The themes of this first workshop will be on reinforcement and ground improvement. The second part of this series will be held sometime in July to September 1999. We are seeking suitable speakers. Furthermore, the chapter will bring these workshops to other parts of Southeast Asia, e.g. Malaysia, Thailand, and Vietnam.

2. Geosynthetics Asia 2000. The chapter has submitted to the Asian Activities Committee its intention to organize the Second Asian regional conference on geosynthetics. The tentative dates are 23 – 27 May 2000. The chapter would like to hold the conference in Malaysia, rather than Singapore in line with its effort to develop the interest of IGS in other Asian countries. The venue of this conference is tentatively Kuala Lumpur, Malaysia. The conference will be jointly organized by the chapter and the Institute of Engineers, Malaysia (IEM). Several sessions of discussions with IEM have been conducted, and a very positive response has been received.

3. Newsletter. The chapter newsletter will be revived. With three to four issues a year, the newsletter will feature regional projects involving geosynthetics as well as some areas of potential applications of geosynthetics. Furthermore, the exchange of ideas on local geosynthetics specifications and testing will be covered. Information on activities of the IGS and Southeast Asian Chapter will be highlighted.

reported by
Dr. Soon-Hoe Chew
President, SEAC-IGC

Geotextiles and Geomembranes

an Official Journal of the IGS

Geotextiles and Geomembranes is now back on schedule with the posting of Volume 16, No. 5 in October and Volume 16, No. 6 on 30 November 1998. Preparation is well underway for Volume 17 which will include two special issues; one on Filtration and one on GCL's (papers are due by end of January 1999).

As Editor I would like to thank the Editorial Board members and reviewers for their very hard work over the past year. They have provided detailed, constructive reviews in a very timely manner. Thanks to their hard work we have been able to get G&G back on schedule with Volume 16 (the first Volume under my editorship). I would also like to thank the authors whose papers were published in Volume 16 for their excellent submissions. The Journal strives to provide the authors with quick, constructive reviews and we appreciate the author's hard work in addressing these comments and quick return of revised papers.

All technical contributions and inquiries should be directed to:

Professor R. Kerry Rowe
Department of Civil and Environmental Engineering
The University of Western Ontario
London Ontario N6A 5B9, Canada
Fax: 1 (519) 661-3942
email: r.k.rowe@uwo.ca

Authors should submit four copies of any paper for review by at least two reviewers. No original figures should be included initially.

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submitted by R. Kerry Rowe
Editor

Geotextiles and Geomembranes

Contents of Recent Issues

Editor's note: complete contents of this journal are published in the IGS News as space permits.

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Variational Displacement Method for Geosynthetically Reinforced Slope Stability Analysis: I. Local Stability, P. Lemonnier, A.H. Soubra, R. Kastner (France)

Variational Displacement Method for Geosynthetically Reinforced Slope Stability Analysis II. Global Stability, P. Lemonnier, A.H. Soubra, R. Kastner (France)

Shear Strength Properties of Geomembrane/Geotextile Interfaces, D. R.V. Jones, N. Dixon (UK)

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Field Performance of Weak Subgrade Stabilization with Multilayer Geogrids, A. Zhao, G.S. Williams, J.A. Waxse (USA)

Performance Evaluation of the Walnut Creek Soft Armor Lining System, P.M. Nihill, D.N. Austin, J.D. Walker (USA)

Long-Term Performance of Nonwoven Geotextile Filters in Five Coastal and Bank Protection Projects, G. Mannsbart, B.R. Christopher (USA)

Tanque Verde Retaining Wall Structure: Revisited After 11+ Years, M. H. Wayne, D. Bright, R.R. Berg, K. Fishman (USA)

A Performance Summary of Reinforced Soil Structures in the Greater

Los Angeles Area after the Northridge Earthquake, D. Sandri (USA)

Long-Term Performance of a Hazardous Waste Landfill, V.G. Giardino, J.L. Guglielmetti (USA)

Application of HDPE at a Sewage Treatment Plant, M.W. Adams (USA)

Preliminary Results of Composite Liner Field Performance Study, M.A. Othman, R. Bonaparte, B.A. Gross (USA)

Current Status of the Cincinnati GCL Test Plots, R.M. Koerner, D.A. Carson, D.E. Daniel, R. Bonaparte (USA)

Assessment of HDPE Geomembrane Performance in a Municipal Waste

The Role of Geosynthetics on USA Highways, J.A. DiMaggio, M.M. Cribbs (USA)

Geomembrane Application for an RCC Dam, B.L. Whitfield (USA)

Three-Dimensional Woven Geotextiles for Containment Dike Construction, D.N. Austin, M.S. Theisen (USA)

Application of Mechanically Stabilized Earth and Segmental Block Walls, M.H. Wayne, B. Miller (USA)

Failure Loads on Geosynthetic Reinforced Soil Structures, Z. Aigen (USA)

Geotextiles Used as Flexible Forms, R.M. Koerner, G.R. Koerner (USA)

Remediation of Existing Canal Linings, A. Comer, M. Kube, K. Sayer (USA)

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West Virginia Department of Transportation's Use of a Free-Draining

Base and the Role of Geotextiles as Long-Term Separators, S.J. DeBerardino, J.S. Baldwin (USA)

Enhanced Performance of Asphalt Pavements Using Geocomposites, R. A. Austin, A.J.T. Gilchrist (UK)

Application of Geosynthetics in the Construction of an Overrun Area at La Guardia Airport, R.E. Sandiford, S. Law, G. Roscoe (USA)

Geosynthetic Containment Beneath Stockholm-Arlanda Airport, J. Bystrom, L.K. Overmann, L.O. Ericsson (USA and Sweden)

Evaluation and Standardization of Rolled Erosion Control Products, S. R. Allen (USA)

Geosynthetic Use in Trenchless Pipe Remediation and Rehabilitation, G. R. Koerner, R.M. Koerner (USA)

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Use of a Geotextile Separator to Minimize Intrusion of Clay into a Coarse Stone Layer, R.K. Rowe, K. Badv (Canada)

Stability of Geosynthetic-Reinforced Soil Above a Cavity, M.C. Wang, Y. X. Feng, M. Jao (USA)

The Development of Pore Water Pressure at the Subgrade-Subbase Interface of a Highway Pavement and its Effect on Pumping of Fines, I. Alobaidi, D.J. Hoare (UK)

Design of Geosynthetic Reinforced Embankments on Soft Soil, J.N. Mandal, A.A. Joshi (India)

Centrifuge Modeling of Geosynthetic Reinforced Embankments on Soft Ground, J.N. Mandal, A.A. Joshi (India)

Volume 14 (1) 1996

The Pull-Out Resistance of Geogrids in Reinforced Soil, H. Ochiai, J. Otani, S. Hayashic, T. Hirai (Japan)

Design of Reinforced Fill Systems to Support Footings Overlying Cavities, S.W. Agaiby, C.J.F.P. Jones (UK)

Centrifuge Modeling of an Embankment on Soft Clay Reinforced with a Geogrid, J.S. Sharma, M.D. Bolton (UK)

Behavioural Study of a Reinforced Analogical Soil Under External Loads, A. Benrabah, J. Gielly, F. Masrouri (France)

Editor's note: complete contents of this journal are published on the IGS web page, <http://igs.rmc.ca>

Geosynthetics International ***an Official Journal of the IGS***

Geosynthetics International has established itself as a premier peer-reviewed journal on geosynthetics. The journal publishes technical papers, technical notes, discussions, and book reviews on all topics relating to geosynthetic materials (including natural fiber products), research, behavior, performance analysis, testing, design, construction methods, case histories and field experience.

The Editor of *Geosynthetics International* (Dr. T.S. Ingold), Co-Editor (Prof. R.J. Bathurst), and Chairman of the Editorial Board (Dr. J.P. Giroud) have more than 30 years of combined experience with the publication of technical journals. They are assisted by a first-rate editorial board composed of international experts that are appointed to four year terms and who represent a broad range of geosynthetics expertise. Rapid publication of papers provides subscribers with current papers covering geosynthetics research, design, construction methods and important case studies. Only papers peer-reviewed by experts are published. The journal

has published over 750 pages of technical papers, technical notes, and discussions in each volume of the last two years. Special issues devoted to specific, state-of-the-art topics have included "Design of Geomembrane Applications" and "Liquid Migration Control Using Geosynthetic Liner Systems". A third special issue titled "Geosynthetics in Earthquake Engineering" was published in April 1998.

Geosynthetics International is dedicated to the mission of the IGS which is to promote the scientific and engineering development of geotextiles, geomembranes, related products, and associated technologies. *Geosynthetics International* offers a reduced subscription rate to individual IGS members. Individual IGS members can subscribe for US \$129 per 6 issues. *Geosynthetics International* is offered to university and college libraries at US\$139 per 6 issues. The standard rate of US\$225 applies to all others.

Papers should be work not published in full elsewhere

In-Isolation Strain Measurement of Geosynthetics in Wide-Width Strip Tension Test, S.W. Perkins and J.A. Lapeyre (USA)

Polymer Geogrids for Bridging Mining Voids, R.J. Bridle and C.G. Jenner (UK)

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Designing to Residual Strength of Geosynthetics Instead of Stress Rupture, J.H. Greenwood (UK)

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Role of Specimen Geometry, Soil Height and Sleeve Length on the Pull-Out Behavior of Geogrids, M.L. Lopes and M. Ladeira (Portugal)

Limit Analysis of Geosynthetic-Reinforced Soil Slopes, A. Zhao (USA)

Water Diffusion Through Geomembranes Under Hydraulic Pressure, C. Eloy-Giorni, T. Pelte, P. Pierson and R. Margrita (France)

Shear Behavior of Reinforced Geosynthetic Clay Liners, T.D. Stark and H.T. Eid (USA)

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An Interface Pullout Formula for Tensile Sheet Reinforcement, S. Sobhi and J.T.H. Wu (USA)

Stability Analysis of Reinforced and Unreinforced Embankments on Soft Ground, P.V. Long, D.T. Bergado and A.S. Balasubramaniam (Thailand)

Puncture Protection of Geomembranes Part I: Theory, R.F. Wilson-Fahmy, D. Narejo and R.M. Koerner (USA)

Puncture Protection of Geomembranes Part II: Experimental, D. Narejo, R.M. Koerner and R.F. Wilson-Fahmy (USA)

Puncture Protection of Geomembranes Part III: Examples, R.M. Koerner, R.F. Wilson-Fahmy and D. Narejo (USA)

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Bearing Capacity of Geosynthetic Clay Liners for Cover Soils of Varying Particle Size, P.J. Fox, D.J. De Battista and S.H. Chen (USA)

Soil Stabilization by Ambient Pore Pressure and Geomembrane Containment, A.W. Elgamal and K. Adalier (USA)

Response of a Woven and a Non-woven Geotextile to Monotonic and Cyclic Simple Tension, A.K. Ashmawy and P.L. Bourdeau (USA)

Geomembrane Response in the Wide Width Tension Test, S.M. Merry and J.D. Bray (USA)

Full Scale Highway Load Test of Flexible Pavement Systems With Geogrid Reinforce Base Courses, J.G. Collin, T.C. Kinney and X. Fu (USA)

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Geotextile Characterization and Pore-Size Distribution: Part III. Comparison of Methods and Application to Design, S.K. Bhatia, J.L. Smith and B.R. Christopher (USA)

Comparisons of Predicted and Observed Failure Mechanisms in Model Reinforced Soil Walls, E.M. Palmeira and R.C. Gomes (Brazil)

A New Unit-Cell to Study the Deformation Mechanism of Super Soft Clay Overlaid by Geogrid and Sand, A. Fakher and C.J.F.P. Jones (UK)

A Method for Measuring Geomembrane Surface Roughness, J.E. Dove and J.D. Frost (USA)

Geotextile Reinforced Lime Treated Cohesive Soil Retaining Walls, A. Porbaha (Japan)

Combined Allowable Strength Reduction Factor for Geosynthetic Creep and Installation Damage, T.M. Allen and R.J. Bathurst (USA and Canada)

IGS News Editors

Dr. D.J. Elton, Editor
Civil Engineering Department
Auburn University, AL 36849, USA
Tel.: 1 (334) 844 6285
Fax: 1 (334) 844 6290
email: elton@eng.auburn.edu

Dr. T. Akagi, Associate Editor (Asia)
Toyo University
Department of Civil Engineering
2100 Kujirai Nakanodai
KAWAGOE-SHI, SAITAMA 350

JAPAN
Tel.: 81 (492) 311211
Fax: 81 (492) 311722
email: akagi@krc.rng.toyo.ac.jp

Dr. J-P. Gourc, Associate Editor (Europe)
Grenoble University
IRIGM-Lgm
B.P. 538041 Grenoble Cedex 9
FRANCE
Tel.: 33 76 51 49 46 Fax: 33 76 51

49 00
email: gourc@ujf-grenoble.fr

The IGS News is published three times per year. Material for publication should be submitted to the Editor or one of the Associate Editors by 16 Feb, 16 Jun, 16 Oct for the Mar, Jul and Nov issues respectively. Short articles and/or good quality photos (with a caption) are always very welcome.

The IGS Council

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Department of Civil Engineering
Royal Military College of Canada
P.O. Box 17000, STN Forces
Kingston, Ontario K7K 7B4, Canada
Tel.: 1 (613) 541 6000 ext. 6479
Fax: 1 (613)-545 8336
email: bathurst-r@rmc.ca

Vice President:

Ing. Daniele A. Cazzuffi
ENEL Ricerca Polo Idraulico e
Strutturale
Via G. Pozzobonelli 6

20162 Milano, Italy
Tel.: 39 02 7224 3545
Fax: 39 02 7224 3550
email: cazzuffi@cris.enel.it

Immediate Past President:
Prof. Colin J.F.P. Jones
Department of Civil Engineering
The University of Newcastle upon
Tyne
Newcastle upon Tyne
United Kingdom NE1 7RU
Tel.: (091) 222 7117
Fax: (091) 222 6613

email: c.j.f.p.jones@newcastle.ac.uk

Treasurer: Mr. Wim Voskamp
Maasoord 27 3448 BM Woerden
The Netherlands
Fax: (31) 348 430961
email: Voskamp@wxs.nl

Secretary: Mr. Peter E. Stevenson
226 Sitton Rd.
Easley, SC 29642-8393, USA
Tel.: 1 (864) 855 0504
Fax: 1 (864) 859 1698
email: igspete@aol.com

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note: date is earliest year of continuous membership