

President's Report

by

Professor R. Kerry Rowe

Growth and Outreach

At the outset of my term as President of the IGS, I indicated that the program for the following four years could be summarized in terms of two words: growth and outreach. I am delighted to report that, as we just passed the halfway mark of the term of office of the present officers, we have made considerable progress with respect to these goals and that substantial future progress is likely. At the Officers' Meeting held on 16 June 1992 in Louisville, Kentucky (USA), the IGS Officers formally approved the By-laws and formation of our two newest chapters: the Dutch and Indonesian Chapters. The formation of these two Chapters has brought approximately 150 new members to the IGS. In addition to this, a number of very dedicated members of the IGS are working hard towards developing five new Chapters: two in Europe, two in Asia, and one in South America. The key requirement in forming a Chapter is the presence of one or more local individuals with the energy and enthusiasm to work with the IGS Officers in developing the Chapter. There are still many areas of the world where an IGS Chapter would make a great deal of sense and where we seek an individual to promote the work of the IGS. If you are interested in helping the IGS form a Chapter in your local area, please do not hesitate to let either myself or IGS Vice-President Floss know.

Another important part of growth and outreach is the organization of local or regional activities to increase the technical knowledge of both IGS members and nonmembers alike. I am delighted to report that our Chapters have been very active in this regard. In order to illustrate the IGS commitment and support for these activities, it has been my objective to visit as many Chapters as possible, and to represent the IGS at key Chapter or regional meetings to the extent that my personal schedule permits. In this regard, it was my pleasure to meet with many IGS members and potential members during a recent (March) visit to Hong Kong and China. It was my pleasure to give a presentation to a well attended lecture in Hong Kong, as well as to give a keynote address to the International Sym-

posium on Soil Improvement held in Nanjing, China. I must say I was particularly impressed with the level of activity with respect to geotextiles, geomembranes and related products in these two areas. The following months will see a visit of the IGS President to the U.K. Chapter (including the presentation of a keynote address at Geofad '92 in Cambridge, 23 September 1992 (see page 13); to the Chinese Chapter to bring greetings and present a lecture at their conference from 30 October – 4 November 1992; to bring greetings from the IGS and present a keynote lecture at the International Symposium on Earth Reinforcement Practice (IS Kyushu '92) from 11–13 November 1992 (see page 12); to meet with members and corporate members and to present an address at the seminar organized by the Japanese Chapter of the IGS in Tokyo on 16 November 1992; to bring greetings and present a lecture at a two-day seminar being organized by the Indo-



IGS President R. Kerry Rowe presenting keynote paper at the International Symposium on Soil Improvement, Nanjing, China, March 1992

nesian Chapter on 23–24 November 1992; and, although details have not yet been finalized, possibly to visit the Southeast Asian Chapter in Singapore on the 25–26 of November 1992. It is a very great pleasure to see such a high level of activity being demonstrated by our IGS members and IGS Chapters. Of course, activity is not limited to those Chapters and conferences listed above. For example, our Indian Chapter has been very active, as reported in the current and last issue of IGS News, and our north American Chapter is very busy planning Geosynthetics '93 to be held in Vancouver, Canada 30 March – 1 April 1993. I am also very pleased to see activity in areas where we do not yet have formal Chapters. For example, there is to be a seminar on geosynthetics to be held in Brasilia 9–11 November 1992. It is hoped that this seminar will provide impetus to the formation of an IGS Chapter in that region, and we wish Professor Ennio Marques Palmeira every success in the organization of this seminar.

A number of IGS members from different parts of Europe have contacted the IGS Officers requesting that there be a European regional conference on geosynthetics held every four years. The IGS Officers, at their meeting on 16 June 1992, expressed a high level of support for the concept of a European regional conference and authorized IGS Vice–President, Professor R. Floss, to hold discussions with the interested IGS Chapters, potential Chapters and related organizations in Europe, with the objective of establishing a set of basic principles for the organization of a European regional conference together with a potential venue and date for the first European regional conference.

A key activity in the life of the IGS is the International Conference held every four years. The organizers of the 5th International Conference to be held in Singapore 5–9 September 1994 are very hard at work in the preparation of this conference, and although it is more than two years away, much work has already been done. It is my understanding that the first brochure will be published in the relatively near future (see page 13). From what I have seen of the work of the organizing committee and the reports from IGS Past–President J–P. Giroud (who represents the IGS on the organizing committee) I believe that we can expect an outstanding conference in Singapore in 1994. Please mark it on your calendar now!

New Council Members

I am delighted to report that we had six outstanding candidates for the six vacant positions on the IGS Council (see opposite page). I am pleased to advise you that the IGS Secretary has declared these six candidates elected since no additional nominations were received following the Call for additional Nominations in the March 1992 issue of the IGS News. Our six new council members, whose terms of office commence on 1 July 1992 bring a wealth of experience to the Council and we look forward to their

Peter E. Stevenson has joined Industrial Textile Associates (ITA), South Carolina, USA as Senior Associate. ITA is a consulting firm specializing in market/product development and market research related to technical textiles. Stevenson is Treasurer and Chairman of the By–laws Committee of the International Geotextile Society.

hard work and dedication to the IGS on behalf of our members.

Directory

One of the important benefits of IGS membership is the Membership Directory. As the IGS has grown, so too has the challenge of producing a high quality and accurate Directory. The 1991 Directory represented a change in format as we attempted to find a more convenient and cost effective format. Of course we learned a few things from this exercise and you can anticipate that the next directory will be even better still. However, apart from format, one of the problems the IGS Secretary and Treasurer have faced in preparing this Directory is to prepare an accurate list of members under very short time constraints during the year in which we are still collecting members. The IGS Officers agreed at their recent meeting that in the future the Directory will be compiled after closure of the membership books for a given year, with publication of the Directory in January of the following year. We plan to implement this change immediately and so you will not actually receive a Directory around November of 1992 as you might have expected. Rather, you can expect to receive your IGS Directory in February 1993. This 1993 Directory will contain a full list of members of the IGS in 1992. The officers believe that this slight delay in publication will allow for an improvement in the quality of the Directory. Once this change is implemented, you can expect to receive your IGS Directory around February of each year.

A Word of Thanks

As noted earlier, we are welcoming six new IGS Council Members. At this point it is also appropriate to express a very sincere word of appreciation to Professor M. Fukuoka, Mr. B. Myles, Dr. P. Rankilor, and Professor K. van Harten who are the retiring Council Members. All these individuals have worked extremely hard on behalf of the IGS during their period on the Council and we owe them all a very great vote of thanks. Their contributions to the Council will be sorely missed. It is noted in passing that the term as elected Council Members of myself and Past–President J–P. Giroud also terminate on 30 June 1992, however we both continue on Council in our capacities as President and Past–President respectively until our term of office as Officers is completed.

As we pass the halfway mark for the term of office of our present Officers, I would very much like to express my appreciation, and indeed the appreciation of the IGS members, to IGS Secretary Mr. W. Voskamp and IGS Treasurer Mr. P. Stevenson for the outstanding job that they are doing in administering this Society. I would also like to express my very great appreciation to IGS Vice–President Professor R. Floss and IGS Past–President Dr. J–P. Giroud for their support, advice and extremely hard work on behalf of the IGS.

NEWS OF MEMBERS

Joseph A. Dieltz has joined Industrial Fabrics Association International (IFAI) St. Paul, Minn., USA as Division Staff Director. Mr. Dieltz replaces Laurie Honnigford as General Secretary of the North American Geosynthetics Society (NAGS). He is also Secretary General of Geosynthetics'93 and in this capacity is responsible for planning aspects of the conference.

NEW IGS COUNCIL MEMBERS

The term of office of the following six IGS members who were elected as Council Members in 1988, will expire in June 1992:

- Prof. Masami Fukuoka (Japan)
- Dr. Peter Rankilor (United Kingdom)
- Mr. Bernard Myles (United Kingdom)
- Prof. Koos van Harten (The Netherlands)
- Dr. Jean-Pierre Giroud (USA)
- Prof. R. Kerry Rowe (Canada)

The last two are presently officers of the IGS and therefore remain members of the Council in that capacity.

A call for candidates to be elected to the six vacant positions for the period 1992–1996 was published in the November issue of the IGS News.

In the IGS News of March 1992 a list of six candidates who had individually forwarded their personal nominations to the IGS Secretary was published. A call for additional candidates was made with the deadline for the submission of candidacy set as 21 April 1992. It was also announced that in the event that there were no more candidates, the present six candidates for six vacant positions would be declared elected by acclamation.

No additional candidates put their names forward and hence the following have been declared elected by acclamation:

Professor Masami Fukuoka Honoured by Japanese Society of Civil Engineering

On May 28, 1992 distinguished IGS member Professor Masami Fukuoka was presented by the Japanese Society of Civil Engineering (JSCE) with an award for his outstanding contribution to the civil engineering profession. The award is given to a maximum of two JSCE members annually and Professor Fukuoka is the first geotechnical engineer to receive the award. The JSCE includes 35,000 members. During its deliberations the JSCE took into consideration the valuable contributions of Professor Fukuoka to the success of the Japan Chapter of IGS and his activities as an IGS Council Member.

Professor Fukuoka was born in March 1917 and graduated from the University of Tokyo in 1941. From 1941–1967 he was employed as a soil mechanics engineer with the Public Works Research Institute, Ministry of Construction. A wide range of experience was gained during these years solving geotechnical problems related to landslides, land subsidence, earthquakes, floods, river dykes, roads, bridge foundations, dams and earth tunnels. Professor Fukuoka was promoted to Director of the Public Works Research Institute in 1967 and served in this capacity until 1970. During 1970–71 he was a consultant for the Japan Highway Public Corporation. In 1971 he be-

- Dr. Toshinobu Akagi (Japan)
Professor of Civil Engineering, Toyo University, Associate Editor of IGS News, and Liaison Secretary of Japan Chapter of IGS.
- Dr. Richard J. Bathurst (Canada)
Professor of Civil Engineering, Royal Military College of Canada, and Editor of IGS News.
- Mr. Barry R. Christopher (USA)
Vice-President Technical Services for Polyfelt Inc. and Vice-President of the North American Geosynthetics Society.
- Dr. Richard A. Jewell (Belgium)
In charge of the European operations of GeoSyntec Consultants and past-Chairman of the United Kingdom Chapter of the IGS.
- Dr. Colin J.F.P. Jones (United Kingdom)
Professor of Geotechnical Engineering and Postgraduate Sub Dean at the University of Newcastle and Chairman of the United Kingdom Chapter of the IGS.
- Mr. Chris Lawson (United Kingdom)
Technical and Marketing Manager for Exxon Chemical Geopolymers Ltd.

We are very pleased to welcome these highly respected and very hard working members of the IGS to the IGS Council effective 1 July 1992. They will now have the opportunity to extend their IGS activities by representing the membership in the IGS Council. The IGS Officers look forward to working with the new Council in the coming years.

Wim Voskamp, IGS Secretary



Professor Masami Fukuoka accepts Distinguished Service Award of the Japanese Society of Civil Engineering from Professor Y. Iwasa, President of the JSCE, 28 May 1992

came a Professor at the University of Tokyo remaining until 1977 when he accepted a Professorship at the Science University of Tokyo where he is currently located.

Professor Fukuoka's service to the geotechnical community has included: President, Japanese Society of Soil Mechanics and Foundation Engineering 1976–77; President, International Society for Soil Mechanics and Foundation Engineering 1977–81; and, IGS Council Member 1983–1992. Professor Fukuoka is currently Chairman of the Japan Chapter of the IGS and President of the Public Works Research Institute, Ministry of Construction.

Professor Fukuoka has acted as consultant on a number of large projects including: the Honshu–Shikoku bridge link; Kansai International Airport, Haneda International Airport; and the Tokyo Bay Crossing. He has

been asked to advise on the aftermath of a number of natural disasters including the Niigata earthquake in Japan and earthquakes in California, Rumania and Italy.

The JSCE award is one of several awards given to Professor Fukuoka. He has also received recognition from the Ministry of Construction and the Ministry of Science and Technology for his engineering achievements. Professor Fukuoka is also an Honorary member of the Japan Road Association, the Japanese Society of Soil Mechanics and Foundation Engineering and the International Geotextile Society.

The IGS extends its sincere congratulations to a distinguished IGS member on the occasion of this significant engineering award.

R.J.Bathurst, Editor IGS News

GEO WHAT ?

Terms and Definitions Worldwide (continued)

by
Professor J.M. Rigo
GRC–LMC – Liège University, Belgium
Chairman of the IGS Standards Committee

(Editors Note: This article completes the report published in IGS News Vol 8 No 1 March 1992)

In the last issue of IGS News I pointed out that terms and definitions used in geosynthetics may be understood differently by different individuals in our discipline.

The first article was devoted to terms and definitions related to materials. This concluding report focuses on terms and their definitions as they relate to function.

Drainage

ISO – The collecting and carrying of precipitation, ground water, and/or fluids in the plane of a geotextile.

ASTM –

CEN – The collecting and transmitting of precipitation, ground water and/or other fluids in the plane of a geotextile–related product.

Filtration

ISO – The restraining of soil or other particles subjected to hydrodynamic forces while allowing the passage of fluids.

ASTM –

CEN – The restraining of soil or other particles subjected to hydrodynamic forces while allowing the passage of fluids into or across a geotextile or a geotextile–related product.

Protection

ISO – The limiting or preventing with a geotextile of local damage to a geotechnical system.

ASTM –

CEN – The limiting or preventing with a geotextile or a geotextile–related product of local damage to a geotechnical system.

Reinforcement

ISO – The use of the tensile properties of a geotextile to improve the mechanical properties of a soil layer.

ASTM –

CEN – The use of the tensile properties of a geotextile or a geotextile–related product to improve the mechanical properties of a soil or other construction materials.

Separation

ISO – The preventing from intermixing of adjacent dissimilar soils and/or fill materials.

ASTM –

CEN – The preventing from intermixing of adjacent dissimilar soils and/or fill materials by a geotextile or a geotextile–related product.

Conclusions

We all realize that there is a renewed interest in these terms and definitions and how these terms are to be used in practice. However, confusion still exists, and newly developed geosynthetics may not fit into the existing or proposed definitions at all. New terms will have to be developed in the very near future in order to keep up with emerging geosynthetic materials and applications.

GEOSYNTHETICS: TERMS AND DEFINITIONS

W.A. Gevers, G. den Hoedt and W. Voskamp
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Introduction

We refer to the recent article "Geo What? Terms and Definitions Worldwide" in IGS News Vol 8 No 1, March 1992. We all realize there is a renewed interest for these terms and definitions, as there is an increasing confusion on what is meant and how the terms are used in practice. Furthermore, it is clear that major groups of geosynthetics don't fit into the existing or proposed definitions at all. As a manufacturer of a wide range of products, with many years of international experience, we wish to contribute to this very useful discussion. We have reviewed and commented on the existing ISO and proposed CEN nomenclatures, which we complemented with a few "new" terms and definitions. Our proposal includes rational categories for all products in such a way, that, in our opinion, all generic groups of "geoproducts" satisfy a best fit criterion.

Comments on draft International Standard ISO/DIS 10318 "Geotextiles—vocabulary" and draft European Standard "Geotextiles and geotextile—related products, terms and their definitions"

Content

The draft standards include definitions for the groups of products given in Table 1. The corresponding ISO and CEN definitions are very close. CEN has added the term "geomesh", but does not mention "geoknit" and "geononwoven". **Note:** ASTM defines only the terms "geosynthetic" and "geotextile".

Use

ISO: the products are "... used in geotechnical and civil engineering applications".

CEN: the products are "... used in contact with soil and/or other construction materials in civil engineering and geotechnical applications". This "use" is omitted in some definitions.

The ISO wording is shorter and seems to cover all applications. **Note:** ASTM defines geotextiles to be "... used with foundation soil, rock, earth, or any other geotechnical engineering related material, as an integral part of man-made product, structure or system". This wording is long and complicated, and less clear than the ISO definition.

Natural Polymers

ISO includes "polymeric" materials, whereas CEN extends it to "polymeric (synthetic or natural)". Although natural, polymeric products have only a small share of the geotextiles world, there are sufficient arguments to include them in the relevant definitions.

Geoknit, Geononwoven and Geowoven

Separate definition of these terms seems unnecessary when a geotextile is defined as "a permeable, polymeric, woven, nonwoven or knitted material..." (ISO).

Geonet and Geomesh

Geonet

ISO: a polymeric, planar structure, used in geotechnical applications, whose openings are much larger than the constituents and in which the mesh is linked by knots.

The CEN definition is very similar.

In practice, it appears that experts as well as users use the term geonet for the fine "nets" or "meshes" used in drainage and leakage control. These products often have openings and constituents of the same order of size, with maximum openings of about 1 cm². Their constituent elements are not linked by knots, as defined in the textile industry, but are thermally bonded. The definition of a geonet and how the product is used in practice deviate widely and this leads to confusion. CEN, therefore, has added the term "geomesh": "a geonet whose constituent elements are chemically or thermally bonded". This new definition doesn't improve the situation and only increases the international confusion. As the term geonet is already used widely for a very specific type of drainage net, it is time to adapt the definition to international practice.

Missing Product Groups

A few groups of geosynthetics do not fit into the existing or proposed definitions at all. These groups include amongst others:

- cusped products (dimple products).
- three-dimensional mats used in erosion control.
- honeycomb or cell structures.
- geosynthetics related products such as yarn-reinforced soil, anchor straps, geotextile mattresses, bags and containers.

Table 1 ISO and CEN Product Groups

ISO
geotextile
knitted geotextile: geoknit
nonwoven geotextile: geononwoven
woven geotextile: geowoven
geogrid
geonet

geocomposite

CEN
geotextile
knitted geotextile (:--)
nonwoven geotextile (:--)
woven geotextile: geowoven
geogrid
geonet
geomesh
geocomposite

The ISO and CEN definitions have to be modified and/or complemented with new definitions to unequivocally cover the wide variety of existing (and future) geosynthetics.

Geosynthetics: Proposed terms and definitions

GEOSYNTHETICS: Polymeric material, synthetic or natural, permeable or relatively impermeable, used in geotechnical and civil engineering applications.

Conclusion

We have made a great effort to discuss, compare, weigh and compromise between possible definitions. We look forward to hearing the reaction of specifiers, users and colleague manufacturers. With the increasing use of a growing variety of geosynthetics all over the world, the point has been reached where we have to agree on one series of clear and concise definitions.

Table 2

TERMS AND DEFINITIONS	PRINCIPAL FIELDS OF APPLICATION	TYPICAL EXAMPLES OF PRODUCTS
<p>GEOTEXTILE Planar, permeable polymeric (synthetic or natural) textile material, which may be woven, nonwoven or knitted, used in geotechnical and civil engineering applications.</p>	<p>Separation Filtration Reinforcement Protection Drainage Erosion control</p>	<p>Nonwovens: [as there are a great number of products available from many producers we do not list specific names]</p> <p>Wovens: [as there are a great number of products available from many producers we do not list specific names]</p>
<p>GEOGRID Planar, polymeric structure consisting of a regular, open network of integrally connected tensile elements and whose openings are much larger than its constituents, used for reinforcement in geotechnical and civil engineering applications.</p>	<p>Reinforcement</p>	<p>Fortrac (Akzo Industrial Systems/Huesker) Hatelit (Huesker) Paragrid (Exxon Chemicals) Raugrid (Rehau) Tenax TT (Tenax) Tensar SR (Netlon) Miragrid (Mirafi) Matrex (Reinforced Earth Company)</p>
<p>GEONET Planar, polymeric structure consisting of a regular, dense network of integrally connected overlapping ribs, used for liquid and vapor transmission in geotechnical and civil engineering applications.</p>	<p>Drainage Leakage control Gas venting</p>	<p>Conwed XB (Conwed Plastics) Gundnet (Gundle Lining Systems) Poly Net (National Seal Company) Tenax CE (Tenax) Tensar NS (Netlon)</p>
<p>GEOMEMBRANE Relatively impermeable, polymeric sheet used as liquid and vapor barrier in geotechnical and civil engineering applications.</p>	<p>Liquid and/or vapor barrier containment</p>	<p>Gundline (Gundle Lining Systems) Sarnafil (Sarna) SLT (SLT Lining Technology) [and other HDPE, LDPE, VLDPE, HDT or other polymer geomembranes]</p>
<p>GEOMATTING Three-dimensional, permeable, polymeric matting, made of a bonded monofilament structure used to hold soil particles, roots and small plants in erosion control and civil engineering.</p>	<p>Erosion control</p>	<p>Enkamat (Akzo Industrial Systems) Erolan (Naue Fasertechnik) Italgrimp (Italdreni) Miramat (Mirafi) Multi Mat (Tenax) Tensarmat (Netlon/Tensar) Fibergrids (Synthetic Industries)</p>
<p>GEOCELL Three-dimensional, polymeric honeycomb or web structure, made of strips of geotextile, geogrid or geomembrane linked alternately, used in geotechnical and civil engineering applications.</p>	<p>Erosion control Soil containment</p>	<p>Armater (Armater) Geoweb (Presto) Tenweb (Tenax)</p>

Table 2 (continued)

TERMS AND DEFINITIONS	PRINCIPAL FIELDS OF APPLICATION	TYPICAL EXAMPLES OF PRODUCTS
<p>GEOSPACER Three-dimensional, polymeric spacer layer, made of a cusped sheet, monofilaments or any other structure, used in geotechnical and civil engineering.</p>	<p>Drainage Leakage control Protection Gas venting</p>	<p>Dörken Delta MS (Dörken) Enkadrain LCL (Akzo Industrial Systems) Platon (Isola)</p> <p><u>Cores</u> of geocomposite drains: Cordrain (Nylex) Enkadrain (Akzo Industrial Systems) Hitek (Burcan) Hydraway (Monsanto) Miradrain (Mirafi) Secudrain (Naue Fasertechnik) Tigerdrain (Exxon Chemicals)</p>
<p>GEOCOMPOSITE Manufactured, assembled material using at least one geosynthetic product among the components.</p>	<p>Drainage</p> <p>Liquid and vapor barrier</p>	<p>Amerdrain (American Wick Drain) Cordrain (Nylex) Dörken Delta MS drain (Dörken) Drainfelt (Polyfelt) Enkadrain (Akzo Industrial Systems) Filtram (Exxon Chemicals) Hitek (Burcan) Hydraway (Monsanto) Miradrain (Mirafi) Secudrain (Naue Fasertechnik) Tenax TNT (Tenax) Tammeldrain (Don & Low) Mebradrain (Geotechnics)</p> <p>Bentofix (Naue Fasertechnik) Colétanche (Colas) Enviromat (Claymax) Gunseal (Gundle Lining Technology) Hypofors (Hypofors) Nicotarp (Nicolon) Terranap (Siplast)</p>
<p>RELATED PRODUCTS All products related to geosynthetics and which are not included in the following groups: geotextiles, geogrids, geonets, geomembranes, geomattings, geocells and geocomposites, and which include a variety of polymeric (synthetic or natural) materials in the form of single, composite or assembled strands, filaments, mats, tubes, pipes and other shapes used in geotechnical and civil engineering applications.</p>	<p>Reinforcement</p> <p>Erosion control</p> <p>Reinforcement</p> <p>Erosion control</p>	<p>Bidim Rock (Bidim Geosynthetics)</p> <p>Enkamat S (Akzo Industrial Systems)</p> <p>Paralink (Exxon Chemicals) Texsol (Texsol) Textomur (Landolt) Manufactured bags, tubes, mattresses, etc.: concrete mattresses (Huesker, Nicolon) Fabriform (Contech) Geocontainer (Nicolon)</p> <p>Curlex Blankets (American Excelcior Company) Grünfix (MST Dränbedarf) Hold-Gro (Gulfstate Paper)</p>

Note: In this table we have purposely mentioned names of specific products and manufacturers. This is done to illustrate the generic differences between product groups. This list does not purport to be complete but contains examples of products that are known to us (in Europe). We apologize in the likely event that we have omitted some products.

Visit by CEN/TC189 to Transport and Road Research Laboratory

The European Committee for the development of test procedures for geotextiles and geotextile-related products, CEN/TC189, held a meeting in the United Kingdom 16–18 March 1992 at the Hilton Hotel, Bracknell. There were two landmarks on this occasion:

First, members of the equivalent ISO Committee, ISO/TC38/SC21, attended as observers for the plenary session of this meeting, and it was agreed that ISO would be asked to nominate observers to attend future meetings of the appropriate CEN Working Groups.

The second landmark was that the agreement reached in the Netherlands last year for the establishment of a joint Working Group with CEN TC254 (Flexible sheets for waterproofing) on geomembranes has been approved by the CEN authorities. A start was made on assessing the additional test procedures for these products.

The opportunity was taken for delegates to both CEN and ISO to visit the nearby Transport and Road Research Laboratory at Crowthorne, on 17 March. The visitors were welcomed by the Chief Executive, John Wootton. The Laboratory has since become an executive agency within the Department of Transport, which means that in the future it will have to compete with private companies for some of the work that it was previously given automatically by the Department and also for other sources of income. It has changed its name to the Transport Research Laboratory (TRL), and "will aim to provide its customers with impartial, cost-effective and authoritative advice,

research, research management and consultancy services in the roads and transport field and those allied to it".

The Laboratory has been carrying out research into geotextiles for many years, both directly and through research contracts. This has included the development of test procedures, pilot- and full-scale studies of various applications, advice on specification, and the development of design methods. Among the items presented and discussed during the visit were:

- The use of geomembranes and geotextiles in Africa to control the entry of water into earthworks built of expansive clays.
- Studies of geotextile reinforcement in unpaved roads.
- Trials of the use of geotextiles in controlling reflective cracking in pavements.
- Analytical and site studies of the use of geotextiles in reinforcement of slopes and retaining structures.
- The development of a method for assessing damage to geotextiles during installation, for highway applications.
- The design and long-term performance of geotextiles in highway drainage applications.

The ISO Committee held a meeting at the Laboratory on the day of the visit, to which CEN members were invited as observers.

reported by D.M. Farrar

Geotextiles and Geotextile-Related Products CEN/TC189 Meeting, Berlin, Germany 9–11 June 1992

Sixty-one delegates from 13 European countries participated recently in CEN/TC189 working groups (Geotextiles and geotextile-related products) held in Berlin, Germany.

CEN/TC189 comprises the following five working groups and chairmen:

WG-1	Requirements, design	(Ph. Delmas)
WG-2	Terms, definitions, sampling	(B. Thamm)
WG-3	Mechanical testing	(D. Cazzuffi)
WG-4	Hydraulic testing	(B. Myles)
WG-5	Durability	(J. Greenwood)

TC189 is also working toward a standard that will allow products to be stamped with the CE Mark and is supported financially by the European Commission in this

task. The CE Mark will designate products that meet minimum performance standards. These products will circulate freely through Europe.

For the first time, non-European ISO observers from Canada and the United States participated in the CEN meeting. The co-operation was in response to the need to implement the Vienna agreement between CEN/TC189 and ISO/TC38/SC21 committees. The ISO nominees participating at the meeting were Prof. A. Rollin (Canada), John Kerr (Canada) and Dan Campbell (USA). Dr. Ian Peggs (USA) also participated in the CEN/TC189/WG-5 committee work.

*reported by
J.M. Rigo and A. Rollin*

Recent Activities of the UK Chapter of the IGS

The UK Chapter of IGS is part of the British Geotechnical Society. This approach permits the widest possible publicity for IGS activities. On average, seven technical meetings are held in different parts of the United Kingdom each year together with a one day symposium. This year the symposium will be held at Churchill College, Cambridge (Geofad '92, see page 13).

Last year the UK Chapter of IGS introduced the first issue of a newsletter entitled "Down to Earth". This newsletter will become an annual event.

reported by Colin J.F.P. Jones

Graphic Symbols for Geosynthetics

In IGS News (Vol 7 No 3), Dr. J-P. Giroud proposed a standardized set of symbols to represent generic geosynthetic products and functions in construction drawings, engineering reports and technical papers. Dr. Giroud has requested that a final draft of the document be deferred to the next issue of IGS News in order to allow any interested IGS members an opportunity to review the tentative symbol set. The deadline for comments has therefore been ex-

tended to 30 September 1992.

Readers are invited to send their comments to:

Dr. J-P. Giroud
GeoSyntec Consultants
1200 South Federal Highway, Suite 202
Boynton Beach, Florida 33435, USA
Fax: 1 (407) 736 4998

Corporate Profiles

The IGS Council has decided that in each issue of the IGS News up to three Corporate Members will be allocated space to allow them to introduce their company or association and present their achievements. The criteria for selec-

tion of corporate profiles were described in IGS News, Vol. 4, No.2, p. 7. Alternatively, you can get details by writing to the Editor. There is no charge for having a corporate profile published; it is a benefit of corporate membership.

Shimizu Corporation

by

Takehiko Ono

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Minato-ku, Tokyo 105-07, Japan**

Shimizu Corporation was established in 1804 and has recently become one of the largest general contractors in the world. Shimizu consists of a headquarters, 11 branches, a technical research institute, 109 offices, 30 overseas offices and 61 overseas associated companies.

Shimizu Corporation has been an IGS Corporate Member since 1990.

Using experience gained from over 180 years in the construction business, and making use of both hardware- and software-related capabilities, Shimizu is constantly expanding the scope of its activities. Shimizu is particularly proud of its achievements in construction and development engineering.

The relationship between Shimizu and geosynthetics began 5 years ago with the development of a geogrid product called NESTEM. This material is manufactured from bundles of high tensile strength fiberglass soaked in a vinyl ester resin (FRP). The material is light weight with high tensile strength, high stiffness, low creep, and great durability characteristics. In addition, it is easy to place and facilitates rapid construction. NESTEM geogrid has been used with great success in soil reinforcement applications including embankment reinforcement, retaining walls and road bed stabilization.



Example of a steepened slope using NESTEM geogrid

The Tensar Corporation

by

R.G. Carroll Jr.

Morrow, Georgia 30260, USA

The Tensar Corporation (TTC) began in 1984. TTC was the first US company to market, as well as the first to manufacture, geogrids used for soil reinforcement in North America. International research by both TTC and Netlon Ltd. (original parent company and Tensar geogrid inventor) has contributed to the "state-of-the-art" in geogrid reinforcement technology which is now standard practice for designers and users worldwide. Today, TTC remains a geosynthetics industry leader through its continued development of geogrid reinforcement technology in earthwork construction.

Tensar geogrids are used primarily for: (1) soil reinforcement in earth slopes and behind retaining wall structures and (2) granular base reinforcement over soft deformable subgrades and in pavement structures. The geogrids manufactured for these applications have a relatively thick and stiff unitized rib structure with very high tensile strength at low strain levels. As a result, the geogrid interacts through direct rib contact with natural particles placed and compacted above and below it, to resist strains in the mass caused by both dead and live loads. The result is a strengthened soil/particle structure with enhanced resistance to deformation, slumping, landsliding, or rutting.

Earth slopes can be built to steeper grades than the conventional unreinforced 3:1 angle when geogrids are used as soil reinforcement. Strength, location, and length of the geogrid depends on site and design requirements. The geogrid reinforced soil slope provides grade change with design safety, more useful land, and in many cases, eliminates the need for retaining wall structures. The result is typically a significant reduction in the total project costs.

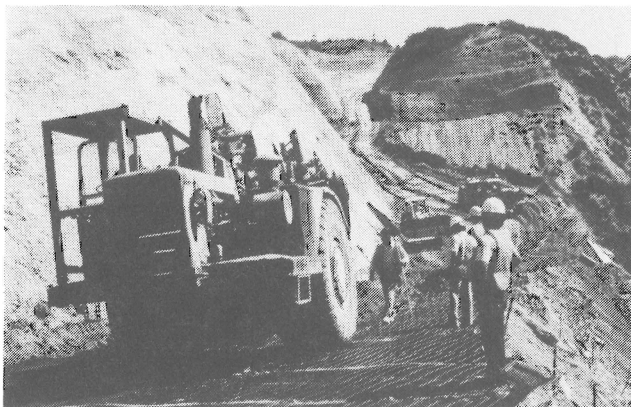
When retaining walls are required, they can be built without the massiveness of thick concrete wall structures. Multiple layers of various strength geogrids allow the use of soil backfill and non-structural facing elements (e.g. concrete panels or concrete modular blocks) to build the

look, stability, and design safety required at considerable savings over conventional practice.

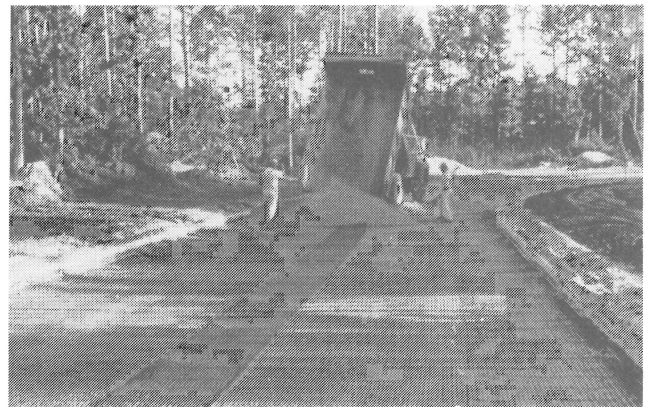
Compacted density and bearing capacity is required of all subgrades that must support the live loads on a road or the dead loads from an earth embankment or superstructure. When soft subgrade conditions are encountered the weak soil is typically excavated and replaced with stable granular or soil material. Geotextiles have been used successfully for more than a decade for subgrade stabilization in soft soils. Their principal design function is separation to prevent the intermixing of subgrade soil and compacted fill. Although Tensar geogrids have relatively large apertures, they can provide separation between compacted fill and soft subgrade soil through confinement of the granular soil and segregation of base and soil layers in some instances.

Flexible pavement cracking and deformation or rutting are typical problems requiring highway maintenance. These are also problems that can be combatted by using Tensar geogrids to reinforce the granular base within the pavement. In flexible pavements the allowable strains are very small (i.e. 1-2%). The geometry, rigidity and high tensile modulus of Tensar geogrids assist the granular base to resist deformation. Most importantly, the geogrid-granular base interaction occurs at very low strains. The result can be a pavement that supports more traffic loading conditions using the same base thickness required in an unreinforced design or a pavement that requires less granular thickness to support the same loading conditions of an unreinforced pavement design. The "installed cost" of the geogrid-reinforced options can typically provide the same or lower cost, depending on the design option selected.

The Tensar Corporation has been an IGS Corporate Member since 1989.



Example slope reinforcement in California with Tensar uniaxial geogrids



Example base reinforcement in Georgia USA with Tensar biaxial geogrids

The Reinforced Earth Company

by

Kim Lucas

The Reinforced Earth Company

8614 Westwood Center Drive, Suite 1100, Vienna, VA 22182, USA

Established in 1971, The Reinforced Earth Company, McLean, Virginia, introduced the Reinforced Earth construction technology in the United States. This patented construction system is widely used by governments and private industry for a variety of applications ranging from bridge abutments and highway embankment retaining walls to bulk material storage facilities and seawalls. The company maintains offices in ten cities and operates several precast concrete plants nationwide.

Since its establishment in the United States, The Reinforced Earth Company has added several additional products to its line. These include: Fanwall and Durisol – sound walls and security barriers, TechWall – and Matrex geogrids and geotextiles.

The Reinforced Earth Company is the exclusive United States distributor of Matrex products which are manufactured by Nicolon Corporation of Norcross, Georgia. These geogrids and high strength geotextiles are made from highly-oriented, high tenacity polyester yarns, and offer high ultimate strength, low creep, and excellent pull-out resistance. The Matrex materials are used for reinforcements in temporary walls, foundation support for Reinforced Earth walls, slope steepening, reinforcing embankments built over soft soils, and for waste management applications such as geomembrane support and stabilization.

An example of a recent application where Matrex high strength geogrids were combined with Reinforced Earth is a project in Waukesha County, Wisconsin, where the Wisconsin Department of Transport wanted to widen Route 16 near Florence Lake. Since foundation soils were quite soft, Matrex 240 was combined with stone columns to increase slope stability. The use of geogrid below the Reinforced Earth wall allowed the wall to achieve the desired factor of safety for overall global stability.

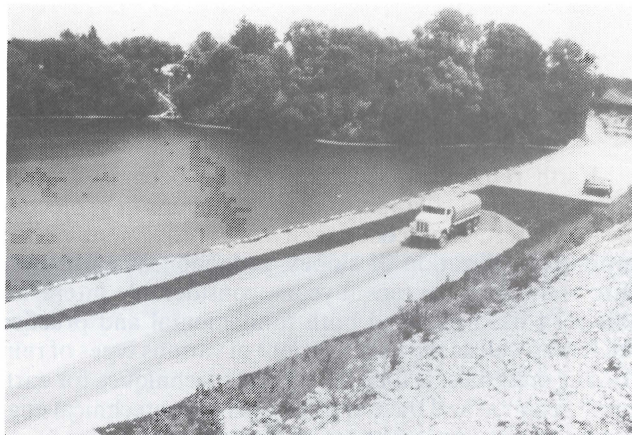
The Reinforced Earth Company has been a Corporate Member of the IGS since 1990.

Geotextiles & Geomembranes: An Official Journal of the IGS

In 1992 the Journal continues with 6 issues per year in order to provide a more frequent service to subscribers and more timely publication for the authors. The subscription price for 1992 has been set at Pounds 160 (U.K.). The reduced subscription offer to individual IGS members represents a 40% discount off the full price, i.e. Pounds 96 (U.K.).

Reduced subscriptions are available directly from the publisher:

Subscription Department
Elsevier Applied Science Publishers
Crown House, Linton Road,
Barking, Essex IG11 8JU
United Kingdom



Matrex 240 geogrid used to stabilize foundation at Route 16 widening in Wisconsin USA



11m high Reinforced Earth wall placed over stabilized base at Route 16 project (just prior to completion)

The Editor, T.S. Ingold, the Editorial Chairman, J-P. Giroud, the IGS Editorial Board Representative and the IGS President, R. Kerry Rowe, all hope that IGS members will use Geotextiles & Geomembranes as an outlet for their technical papers and thus contribute toward the continuing success of this high quality publication which now has subscribers in over 40 countries worldwide. Papers should contain work not published in full elsewhere and should be sent to:

Dr. T.S. Ingold
Mulberry Lodge
St. Peters Close, St. Albans
Hertfordshire AL1 3ES
United Kingdom

Instructions to authors are also available from Dr. T.S. Ingold.

INTERNATIONAL SYMPOSIUM ON EARTH REINFORCEMENT PRACTICE (IS Kyushu '92)

November 11–13, 1992, Garden Palace Hotel, Fukuoka, Japan
by
Professor Hidetoshi Ochiai

Introduction

Earth reinforcing techniques have become a useful and economical solution to many problems in geotechnical engineering practice, such as improvement of soft ground, stabilization of slopes, reduction of earth pressure and others. In recent years, considerable interest in this area has promoted both fundamental and practical studies as well as the development of various types of reinforcing materials. It follows that new techniques for earth reinforcement and their applications to geotechnical engineering practice are developing rapidly.

“IS Kyushu '92” is the short name for the International Symposium on Earth Reinforcement Practice which will be held on 11–13 November 1992 in Fukuoka, Kyushu, Japan. This symposium is a continuation and expansion of a previous international symposium entitled Theory and Practice of Earth Reinforcement which was held in 1988 at the same location. The aim of these symposiums is to discuss various problems and topics on earth reinforcement for the benefit of collecting and exchanging knowledge concerning recently developed techniques and to spread this knowledge to all the countries of the world for further development. For this purpose, six internationally distinguished scholars in this area will be invited to IS Kyushu '92 as special and keynote lecturers: Professor Toyotoshi Yamanouchi, Professor Jean–Pierre Gourc, Dr. Richard A. Jewell, Professor Dov Leshchinsky, Professor R. Kerry Rowe and Professor Fumio Tatsuoka.

One hundred and twenty five (125) papers will be presented during the symposium, partly in technical sessions, partly in poster sessions.

Symposium Schedule

The three day program will include one Special lecture and five technical sessions within which Keynote lectures will be presented at the beginning of each session. Oral and poster presentations will be held during the Symposium.

The lecturers and their tentative lecture titles are as follows:

Special Lecture

- Prof. Toyotoshi Yamanouchi
(Kyushu Sango University)
Development of Soil Reinforcement

Keynote Lectures

- Prof. Jean–Pierre Gourc
(Universite Joseph Fourier)
Geosynthetics in Embankment Structures
- Dr. Richard A. Jewell (Geosyntec Consultants)
Links between Modelling, Testing and the Design of Reinforced Soil
- Prof. Dov Leshchinsky (University of Delaware)
Reinforced Soil Foundations
- Prof. R. Kerry Rowe (University of Western Ontario)
A Review of the Behaviour of Reinforced Soil Walls and Some Design Methodologies
- Prof. Fumio Tatsuoka (University of Tokyo)
The Role of Facing Structures in Soil–Reinforcement for Embankments and Excavations

Technical Sessions

1. Testing and Materials – 36 papers
2. Embankments – 22 papers
3. Wall Structures – 22 papers
4. Slopes and Excavations – 23 papers
5. Deep and Shallow Foundations – 22 papers

Registration Fee

- Early registration fee: 40000 yen (per person)
(received before August 31)
Full registration fee: 45000 yen (per person)
(received after August 31)

The fee includes the proceedings, banquet and drinks at tea times.

All payments sent from outside Japan must be in the form of a “bank demand draft” in Japanese yen to the order of “IS Kyushu '92”, payable at: The Bank of Tokyo, Ltd., 2–8, Hakata–ekimae 3–chome, Hakata–ku, Fukuoka 812, Japan (**other banks and branches, or personal cheques will not be accepted**).

Further Information

All correspondence relating to IS Kyushu '92 should be addressed to:

Prof. Hidetoshi Ochiai
Chairman and Secretariat of IS Kyushu '92
Department of Civil Engineering (Suiko)
Kyushu University
Hakozaki, Fukuoka 812
JAPAN

Tel: +81–92–641–1101 ext. 5212 & 5232
Fax: +81–92–641–5195

Country Representatives needed for Fifth International Conference on Geotextiles, Geomembranes and Related Products 5–9 September 1994, Singapore

The Organizing Committee of the 5th International Conference on Geotextiles, Geomembranes and Related Products is expanding in size as the event draws closer. The 14 member team is working in co-ordination with the two IGS Advisors (Dr. J-P. Giroud and Mr. G. den Hoedt). The committee reports that Bulletin No. 1 is going to print in July 1992. Substantial effort has been put into the preparation of Bulletin No. 1 and the committee expects a good response.

To help reach out to potential delegates and authors worldwide, volunteers are being sought to be their Country Representative (CR). The primary role of the CR will be to provide mailing lists and publicity media for their area. Whilst IGS chapters will be approached first, individuals interested in assisting the organizing committee as a CR should contact the Secretariat at Tel: (65) 353551 Fax: (65) 3532424 or by writing to the following address:

Conference Secretariat
SEAC-IGS
Thomson Road,
P.O.Box 0177
Singapore 9157

Mailing lists are currently being computerized. The first batch of mailings will go to all IGS members. Addresses as in the latest issue of the IGS Directory will be utilized. Members who have recently changed their mailing address should provide details of their new address by contacting the IGS Treasurer, Peter Stevenson, as soon as possible at the following address:

Mr. P. Stevenson
226 Sitton Road
EASLEY, SC 29642, USA
Tel: 1 (803) 855 0504 Fax: 1 (803) 859 1698

reported by R.S.Douglas

GEOFAD 92 – Geotextiles in Filtration and Drainage

The one day symposium GEOFAD 92 is being held at Churchill College, Cambridge on Wednesday 23 September 1992. A "Keynote Address" by Dr. R. Kerry Rowe, the President of the International Geotextile Society (University of Western Ontario, Canada) will set the theme for papers by leading U.K. and European Engineers. The papers to be published in the proceedings will cover the "State-of-the-Art" in the design, specification, testing, durability and uses of geotextiles in filtration and drainage. In the last session speakers from all sides of the industry (manufacturing, design and client) will present their views on how the construction industry may develop with geotextile filters. The developments in standardization in Europe, both in the methods of testing and classification, which will affect all parts of the construction industry, will be described and the current programme of work in CEN summarized.

The symposium is aimed at all engineers, new graduates and mature decision makers from all sides of the industry. The proceedings will be published by Thomas Telford, a bound copy of the proceeding, including the reported discussions, will be sent to all delegates as part of the registration fee.

To register for the symposium contact Steve Corbet at G. Maunsell and Partners, Newlands House, The Newlands, Witham, Essex CM8 2UW, tel. 0376 513531, fax 0376 520585. Delegate registration fee: £70 (non-IGS members), £60 (IGS members), overnight rooms are available at the College for 22 September; bed & breakfast is £38.

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The IGS News is published 3 times per year. Material for publication should be submitted to the Editor or one of the Associate Editors by 16 February, 16 June, 16 October for the March, July and November issues respectively. Short articles and/or good quality photos (with a caption) are always **very welcome**.

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The IGS Council

Elected in 1990: A. Arman (USA); D. Cazzuffi (Italy); J. Perfetti (France); S.D. Ramaswamy (Singapore); J—M. Rigo (Belgium). Elected in 1992: T. Akagi (Japan); R.J. Bathurst (Canada); B.R. Christopher (USA); R.A. Jewell (Belgium); C.J.F.P. Jones (UK); C. Lawson (UK). Co—opted in 1991: D. Price (Austria); D. Fayoux (Belgium); F. Goussé (France). The IGS Council also includes the five IGS Officers elected for the period 1990—94.

List of Corporate Members of the IGS

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Asahi Chemical Industry Co. Ltd. — Japan (1984)
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Bridgestone — Japan (1992)
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Du Pont De Nemours Int. S.A. —Switzerland(1984)
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Fritz Landolt Ag — Switzerland (1985)
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Geotechnics Holland BV— Netherlands (1991)
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Synthetic Industries Inc. — USA (1991)
Taisei Corporation — Japan (1992)
Taiyo Kogyo Corporation — Japan (1992)
Tenax S.P.A. — Italy (1991)
The Tensar Corporation — USA (1989)
The Reinforced Earth Co. — USA (1989)
The Zenitaka Corporation — Japan (1992)
Tokyu Construction Co. — Japan (1984)
Uco N.V. — Belgium (1985)
Zeon Kasei Co., Ltd. — Japan (1992)

Dates indicate earliest year of continuous membership.

Calendar of Events

GEOFAD '92 – Geotextiles in Filtration and Drainage
Cambridge, U.K., 23 September 1992 – see page 13

**GEO-FILTERS '92 International Conference on
Filters and Filtration Phenomena in Geotechnical
Engineering**, Karlsruhe, Germany, 20–22 October 1992

Contact: Dr. M.H. Heibaum
Bundesanstalt für Wasserbau
P.O. Box 210253
D-7500 Karlsruhe, Germany

Third Geosynthetics Symposium of China
Yizheng, Jiangsu Province, 30 October–4 November 1992

Contact: Mr. Ni Chengming
Yizheng Amoco Fabrics Company Ltd.
Yizheng, Jiangsu Province 211451 P.R. China
Fax: 25 716098/711445

**International Symposium on Recent Case Histories of
Permanent Geosynthetic–Reinforced Soil Retaining Wall**
Tokyo, Japan, 6–7 November, 1992

Contact: Prof. Fumio Tatsuoka
The Institute of Industrial Science
University of Tokyo
22–1, Roppongi 7–chome, Minato–ku
Tokyo 106, Japan

Tel: (033) 402 6231 ext: 2570
Fax: (033) 479 0261

**International Symposium on Earth Reinforcement
Practice (IS Kyushu'92)**
Kyushu, Japan, 11–13 November 1992

Contact: Secretariat of IS Kyushu'92
Department of Civil Engineering (Suiko)
Kyushu University
Hakozaki, Fukuoka 812, Japan

Tel: (092) 641 1101 ext: 5212 or 5232
Fax: (092) 641 5195

Designing with Geosynthetics, Two–Day Short Courses
R.M.Koerner/G.R.Koerner
5–6 November 1992, San Diego, California
12–13 November 1992, Chicago, Illinois
19–20 November 1992, Atlanta, Georgia
23–24 November 1992, Philadelphia, Pennsylvania

Contact: Marilyn Ashley or Paula Koerner
Geosynthetic Research Institute
Drexel University
Philadelphia, PA 19104 USA

Tel: (215) 895 2343 Fax: (215) 895 1437

**Clayey Barriers for Mitigation of Contaminant Impact:
Evaluation and Design – R.K.Rowe/R.M. Quigley**
Short Course and Workshop
London, Canada, 10–11 December 1992

Contact: Dr. R.M. Quigley, Director
Geotechnical Research Centre
Faculty of Engineering Science
The University of Western Ontario
London, Ontario N6A 5B9

Tel: (519) 661–3344 Fax: (519) 661–3942

**Geossintéticos 92 – Seminário Sobre Aplicações de
Geossintéticos em Geotecnia**
Brasilia, Brazil, 9–11 November 1992

Contact: Prof. E.M. Palmeira
Departamento de Engenharia Civil – FT
Universidade de Brasilia
70910 Brasilia, DF, Brazil

Tel: 061 348 2711 or 061 272 0732
Fax: 061 272 1053

**Second International Conference on Reflective
Cracking in Pavements:
State of the Art and Design Recommendations**
Liège, Belgium, 10–12 March 1993

Contact: Prof. J.M. Rigo
Civil Engineering Institute
L.M.C., University of Liège
Quai Banning, 6
B-4000 Liège, Belgium
Tel: 32 41 669203 Fax: 32 41 523395

Geosynthetics'93 Vancouver, British Columbia, Canada
30 March – 1 April 1993

Contact: Secretary General NAGS
345 Cedar St., Suite 800
St. Paul, MN 55101 USA

Sardinia'93 4th International Landfill Symposium
S. Margherita di Pula (Cagliari), Sardinia, Italy
11–15 October 1993

Abstracts: 1 September 1992
Contact: Prof. Ing. Raffaello Cossu
CISA
Environmental Sanitary Engineering Centre
Via Marengo 34, 09123 Cagliari, Italy

Tel: 39 70 271652/281237
Fax: 39 70 271371

**5th International Conference on Geotextiles,
Geomembranes and Related Products**
Singapore, 5–9 September 1994

Contact: Prof. S.D. Ramaswamy
National University of Singapore
Dept. of Civil engineering
Kent Ridge Crescent, Singapore 0511

Note: Highlighted items are organized under the auspices
of the IGS or with the support of the IGS.

OBJECTIVES OF IGS (*)



The International Geotextile Society was formed with the following objectives:

- (1) to collect, evaluate and disseminate knowledge on all matters relevant to geotextiles, geomembranes, and related products;
- (2) to improve communication and understanding regarding geotextiles, geomembranes and related products, as well as their applications;
- (3) to promote advancement of the state of the art of geotextiles, geomembranes and related products, as well as their applications;
- (4) to encourage through its members the harmonization of test methods, equipment and criteria for geotextiles, geomembranes and related products.

WHY BECOME A MEMBER OF THE IGS?

First, to contribute to the development of our profession.

Becoming a member of the International Geotextile Society:

- Helps support the aims of the IGS, especially the development of geotextiles, geomembranes, and related products.
- Contributes to the advancement of the art and science of geotextiles, geomembranes, and related products, as well as their applications.
- Provides a forum for designers, manufacturers, and users, where new ideas can be exchanged and contacts improved.

Second, to enjoy the benefits.

The following benefits are available now to all IGS members:

- A directory of members, the IGS DIRECTORY, published every year, with addresses, telephone, telex and fax numbers.
- Newsletter, IGS NEWS, published three times a year.
- Reduced purchase price on all documents published by the IGS.
- Reduced registration fee and preferential treatment at all conferences organized under the auspices of the IGS.
- Reduced subscription fee for the journal "Geotextiles and Geomembranes".
- A central system for ordering selected publications.
- Possibility of being granted an IGS award.

MEMBERSHIP APPLICATION

Membership of the Society is open to Individuals or Corporations "...engaged in, or associated with, the research, development, teaching, design, manufacture or use of geotextiles, geomembranes and related products or systems and their applications, or otherwise interested in such matters". The annual fee for membership is (US) \$40 for Individual Members and (US) \$1000 for Corporate Members. Individuals or Corporations who voluntarily contribute a minimum of (US) \$200 annually to the Society, in excess of their membership dues, will be mentioned in the IGS Directory in a separate list as benefactors.

Send this completed form to:

Mr. P.E. Stevenson, Treasurer
226 Sitton Road
Easley, SC 29642
U.S.A.

Telephone: 1 (803) 855-0504
Fax: 1 (803) 859-1698

In this area, write a short description of your activities as you wish it to appear under your address in the next IGS Directory (e.g. "Consulting Engineer", or "Salesperson for XYZ Geotextile Company"). If the name of your company already appears in the above address, you need not repeat it in this area.

In this area, write your address as you wish it to appear in the next IGS Directory (your professional address is recommended but your personal address is acceptable provided the telephone, telex and fax numbers are also your personal numbers). *If the address below is your personal address please check this box:*

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First Name _____ LASTNAME _____

Company, Division, Function (if applicable) _____

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Telephone _____ Telex _____ Fax _____

Eligibility (i.e. connection with geotextiles, geomembranes, or related products):

* A copy of the By-laws is available upon request.

Membership fee: Individual (US) \$40.00 Corporate (US) \$1000.00 Benefactor's contribution (at least (US) \$200.00): _____

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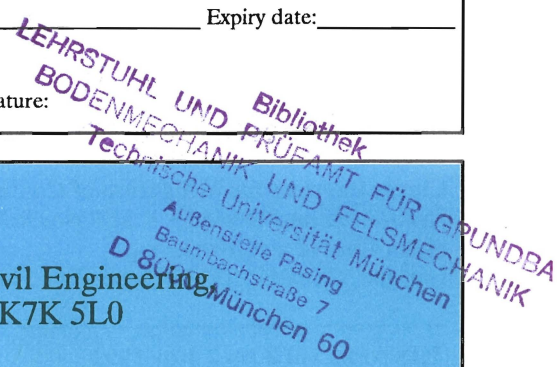
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