IGS NEWS

NEWSLETTER OF THE INTERNATIONAL GEOTEXTILE SOCIETY
VOLUME 7 NO 3 NOVEMBER 1991

PRESIDENT'S REPORT

by

Dr. R. Kerry Rowe, President of the IGS

A very productive IGS Officers' and Council Meeting was held in Milan, Italy during the week of 7–12 October 1991. I am pleased to report on some of the progress made between this meeting and the previous meeting held in February.

Education Committee

The number of student members is continuing to grow and I was delighted to have an opportunity to meet with twelve new student members while I was in Italy (see separate article and photo on page 4). Following this meeting I was pleased to give a lecture to the students together with local members of the Italian Geotechnical Society.

The Education Committee is nearing completion of its task of preparing a list of reference documents on geotextiles and geosynthetics for use by the student members and I anticipate that this will be published very soon. The committee is then going to work on a collection of data from international groups which have information relative to geotextiles, geomembranes and related materials.

Conferences

Planning is proceeding well with respect to the 5th International Conference on Geotextiles, Geomembranes and Related Products, to be held in Singapore, September 1994. Although it is even farther away, the IGS Council has also begun planning for the 6th International Conference to be held in 1998 and the Conference Committee, under the leadership of Mr. François Goussé and Mr. Bernard Myles is putting the final touches to the guidelines for that conference.

Much closer to the present, the IGS ratified the official recommendation that Geosynthetics '93 (to be held in Vancouver, Canada, March–April 1993) be held under the auspices of the IGS and also authorized support for the 2nd International Conference on Reflective Cracking to be held in Liege, Belgium, March 1993.

If you know of a conference where IGS support would be appropriate, please let either myself or Mr. Goussé know.

Professor Floss has agreed to represent the IGS at K-Geo '92 Conference on Geosynthetics (to be held in Switzerland in May 1992) and will ensure that the IGS presence is evident at the conference. Professor Floss is also working toward the formation of a German Chapter of the IGS.

Chapters

A very useful discussion was held with the President and Secretary of the Italian Geotechnical Society and I am optimistic that we will be able to form an Italian Chapter (along the model of the UK Chapter) in the near future. A number of Indonesian members have also expressed the desire to form an IGS chapter and work is proceeding on the planning of that chapter. Preliminary discussions are currently being held with a number of other groups. I thank those IGS members who have contacted me enquiring about formation of chapters and I feel confident that over the next few years these contacts will lead to new chapters. I encourage all members in regions without a chapter to consider the formation of a chapter which can organize local meetings, discussions, etc. I very much hope that the chapters will also take an active role in encouraging student involvement.

Standards

Members are reminded that our Standards Committee has prepared an excellent inventory of geotextile test methods. For more information, please see the separate article on page 5 of this issue of IGS News. The committee is now working on a listing of geomembrane test methods to be published in the March 1992 issue of IGS News.

Corporate Members

The number of Corporate Members continues to grow at an encouraging rate.

On February 1991, I took over the task of chairing the Corporate Members Committee from Mr. Heinrich Schneider. Since that time we have held two very useful meetings (in Atlanta, USA and Milan, Italy). Arising from these meetings is a proposal to create a membership class of Associate Members. The Council strongly endorsed this proposal seeing it as a way of encouraging responsible use of geotextiles, geomembranes and related products while

also providing a mechanism for assisting our Corporate Members. The next issue of IGS News will contain more details concerning this proposal. In order to implement this proposal it is necessary to change the by-laws to include Associate Member as one of the categories of membership. A postal vote to change the by-laws will be held together with the election for Council Members in May of 1992.

The Corporate Members also endorsed an increase in promotion of the IGS and the generic promotion of geotextiles, geomembranes and related products which will be undertaken by the Promotions Committee.

Any members interested in the activities of the Promotions Committee are invited to contact the Chairman, Mr. David Price, c/o Polyfelt Ges.m.b.H., St. Peterstrasse 25, P.O.Box 675, A-4021 Linz, Austria.

Name of Society

At the last Council Meeting a committee was appointed to make recommendations for the name of the society. The committee is presently reviewing a proposal from the Past-President to consider the name: "IGS, the International Society for Geosynthetics and Related Products".

Elections

The term of office of our Council Members elected in 1988 expires on 30 June 1992. This issue of IGS News (see page 3) contains a Call for Candidates for the six vacant positions. I would strongly encourage any IGS members who feel that they have the time and energy to serve on the Council to put their names forward. Council Members are expected to attend at least one Council Meeting per year. It is very important that we have a Council which represents its members and we need enthusiastic people who are prepared to work for the IGS.

Letters to the Editor

In the Vol 6 No. 3 issue of IGS News a letter by Mr. Bob Denis was published in which he questioned the appropriateness of the title "International Geotextile Society" and proposed that the name of the society be changed to the "International Geosynthetics Society". In the Vol 7 No. 1 issue, both the president and past-president of IGS responded to the challenge offered by Mr. Denis and in Vol 7 No. 2, Dr. S.D. Ramaswamy offered his opinion on the subject. The debate continues with the following letter from Dr. J.S. Horvath.

The "G" in IGS

I would like to add my thoughts to the ongoing dialogue concerning the name of our organization. First of all, I believe that a name change is in order so that the breadth of the Society's mission is unambiguous. Simply changing the "G" to "Geosynthetics" makes the most sense, as it is consistent with current widespread usage. "Geosynthetics" can also be interpreted broadly to include any materials that are not found naturally in (and are, therefore, synthetic to) a soil mass. This would include assemblages of natural fibers, and thus address the concerns expressed by S.D. Ramaswamy in Vol 7 No. 2 of IGS News. A more-involved but rigorous alternative would be to follow the precedent set by other civil engineering-related organizations that have dealt with an expansion in scope of their mission subsequent to their formation. Consider the following two examples in the U.S: The Association of Drilled Shaft Contractors, well know by its acronym "ADSC", subsequently expanded its membership to include engineers and suppliers, and also expanded its contractor membership to include firms that install ground anchors. As a result, the organization is now named "ADSC/The International Association of Foundation Drilling". Similarly, the Association of Soil and Foundation Engineers (ASFE) formally became "ASFE/The Association of Engineering Firms Practicing in the Geosciences" when its member firms expanded their services to include geo-environmental work. In both cases, because the original association acronym was so well known it essentially became the actual name of the organization. If we were to follow this example, The International Geotextile Society might become "IGS/The International Society of Ground Modification" or something similar. In routine usage, the organization would probably still be referred to as simply "IGS" as it is now, but the formal name would clearly encompass all current methods of ground reinforcement, etc. In addition, it would allow the Society to broaden its mission to include other forms of ground modification, including, perhaps, some not yet developed, should it prove desirable in the future.

J.S. Horvath
IGS Member

NEWS OF MEMBERS

GeoSyntec Consultants (formerly GeoServices Inc. Consulting Engineers) is pleased to announce that **Dr. Richard Jewell** has joined the company effective January 1992. As part of the expansion of the services offered by the company, Dr. Jewell will open a European office of GeoSyntec Consultants in Brussels, Belgium in the spring of 1992. Formerly at Oxford University, Dr. Jewell is well known worldwide in the field of geosynthetics and soil reinforcement, and is an eminent IGS member: He is former Chairman of the United Kingdom's IGS Chapter, and was recipient of the IGS' Young Member Achievement Award in 1990.

Dr. Ian D. Peggs is pleased to announce that **Mr. E. Ray Steinle, Jr.** has become his partner in I-CORP INTERNATIONAL. Mr. Steinle is Director of Construction Services.

Call for Candidates for the IGS Council

The by-laws of IGS prescribe that half of the Council be elected every two years.

An election, by postal ballot, will therefore be held in May 1992 in order to elect members to the IGS Council for a four-year term, starting in July 1992.

The six members of the IGS Council whose term of office expires in June 1992 are:

Prof. Masami Fukuoka (Japan)

Dr. Jean-Pierre Giroud (USA)

Dr. P. Rankilor (UK)

Mr. Bernard Myles (UK)

Prof. R. Kerry Rowe (Canada)

Prof. Koos Van Harten (Netherlands)

Under IGS By-laws, Prof. M. Fukuoka, Dr. J-P. Giroud, Mr. B. Myles and Prof. K. Van Harten are not eligible for re-election and Dr. Rowe and Dr. Giroud are automatically members of Council in their capacity as President and Immediate Past-President respectively. Dr. Rankilor has indicated that he will not be running for re-election. Thus none of those elected in 1988 will be a candidate for election in 1992.

There are six Council members to be elected. To be eligible, an individual should be a member of IGS. If elected, candidates are expected to be able to travel and attend the IGS Council meetings which are held once or twice per year. The next IGS Council meeting will be held in Fukuoka, Japan, 9-10 November 1992. After this meeting there will be three other meetings for those members whose terms end in 1996 (Singapore, September 1994, and at least one in Europe and one in North America).

Signed letters of application together with a biographical note (not exceeding 12 lines) should reach the Secretariat of the IGS not later than 14 February 1992. Biographical notes which do not exceed 12 lines will be published in the March issue of IGS News.

Should you need some further information, please contact the Secretary of the IGS, Mr. W. Voskamp, or the President of the IGS, Dr. R.K. Rowe. Both their addresses can be found in the 1991 IGS Directory and on page 18 of this issue of IGS News.

IGS Council Meeting

11-12 October 1991 - ENEL CRIS, Milan - Italy

by

W. Voskamp, Secretary of the IGS

The IGS Council met on 11-12 October 1991 in Milan at the ENEL CRIS offices. The meeting was chaired by Dr. R. Kerry Rowe, President of the IGS, and was attended by 14 Council Members.

The 1991 Membership Directory will be published in November 1991. The membership count for this year is 1038 Individual Members, 39 Corporate Members and 72 Student Members.

It seems that the availability and the value of the "Inventory of Current Geotextile Test Methods and Standards" is rather unknown to the IGS members and non-members. Because of the importance of this book and the disks, prepared in 1990 by the IGS Standards Committee, greater promotion will be organized to bring it to the attention of a wider audience. A description of the inventory is given on page 5 of this issue of IGS News.

In 1992, elections will be held for six seats on the IGS Council. A call for candidates is given in the preceding article. The present Council Members Messrs. Fukuoka, Myles and Van Harten are not eligible because they have served two full terms, Mr. Rankilor has indicated that he will not run for another term.

The Treasurer presented a progress report for 1991 and the budget for 1992 was approved.

An action plan to develop new chapters was presented and discussed. Work has begun to form chapters in Italy, Australia and Indonesia.

The council approved the initiation of a new Corporate Associate Membership category, as an additional benefit to IGS Corporate Members. This new membership category was proposed by the Corporate Members Committee. The Council decided to organize a postal ballot on the formation of this category next year, together with the postal ballot for new Council Members.

A new promotional brochure for the IGS will be made by the Promotions Committee. It is expected to be available within three months from the Secretary of the IGS and members will be able to use the brochure to promote the IGS during seminars and other related professional gatherings.

The Education Committee has finished a list of reference material on geotextiles and geomembranes. This list will be published in the IGS News at a later date.

Dr. J-P. Giroud will act as interim chairman of the Publications Committee for one year following the resignation of Mr. van Harten.

The next Council meeting will be held on 9 - 10 November 1992 in Fukuoka, Japan, at the time of the 2nd Kyushu Conference.

IGS Education Committee Activity

by

Daniele Cazzuffi, Chairman of the IGS Education Committee

Anna Anzani, Technical Secretary

At the Ordinary General Assembly held in The Hague (May 1990), the IGS members voted overwhelmingly to create a student member category. The student membership of the IGS was launched in IGS News Vol 6 No.2, July 1990.

In September 1990, a letter was addressed to IGS members working in Universities, asking them to act as local contact members at their institutions. Other IGS members interested in education activities replied to another announcement in IGS News, regarding the formation of the open Education Committee. The first activity of the committee was to prepare a list of reference documents dealing with geotextiles, geomembranes and related products. The first draft of this list has been circulated among the IGS Education Committee members for review. This list is intended to be particularly useful for student members and will be published in the next issue of IGS News.

By June 1991, 75 students had become members of the IGS, including; 9 from Canada, 17 from USA, 37 from Japan, 2 from China, 4 from Singapore and 6 from India.

On 8 October 1991, taking advantage of the IGS Council meeting in Milan, Italy, an informal meeting of the IGS Education Committee was organized. The meeting was opened by a welcome and a description of the objectives and activities of the Committee by Prof. R. Kerry Rowe, President of the IGS, and by Mr. Daniele Cazzuffi, Chairman of the IGS Education Committee. This was followed by a brief presentation of thesis work by a number of final year students, Ph.D. students and professors carrying out research dealing with geosynthetics. It was a good occasion for the reciprocal exchange of knowledge in a number of areas where geosynthetics are tested and applied including earth reinforcements, drainage filters and waste disposal. We are delighted to report that at the end of the meeting 12 Italian students became new IGS Student Members and two professors became new Contact Members on the IGS Education Committee. The meeting was followed by a well-attended special lecture by Dr. Rowe titled "Geosynthetics in Soil Reinforcement: The Importance of Geotechnics" that was given to both the students and Members of the AGI (Italian Geotechnical Society).

Meeting with IGS Student Members in Milan, Italy October 1991
(left to right) Roberto Bellotti (ENEL-CRIS), Prof. Anna Maria Cividini (Politecnico Milano), Andrea Pettinaroli (Politecnico Milano), Claudio Di Prisco (Politecnico Milano), Anna Anzani (Politecnico Milano), Piergiorgio Recalcati (Politecnico Milano), Prof. R. Kerry Rowe (President of the IGS), Daniele Cazzuffi (ENEL-CRIS), Francesca Malpei (Istituto per l'Ambiente), Monica Avanzini (Politecnico Milano), Cesare Beretta (Politecnico Milano), Prof. Andrea Cancelli (Università Milano), Angelo Ricciuti (Università Napoli), Nicola Moraci (Università Padova), Rossella Monti (Politecnico Milano)

IGS Inventory of Current Geotextile Test Methods and Standards

by

Prof. J.M. Rigo, Ir Y. Mathieu, Ir K. Smolder and Ir E. Alexandre
– G.R.C.– L.M.C. – University of Liege – Belgium

Among the primary goals of the IGS there are two that are particularly important: The first is to disseminate information and the second is to improve understanding among all those involved with geotextiles, geomembranes and related products. We believe that the document that we have recently produced on behalf of the IGS titled "Geotextile Testing – Inventory of Current Geotextile Test Methods and Standards" has contributed to the fulfillment of these two goals.

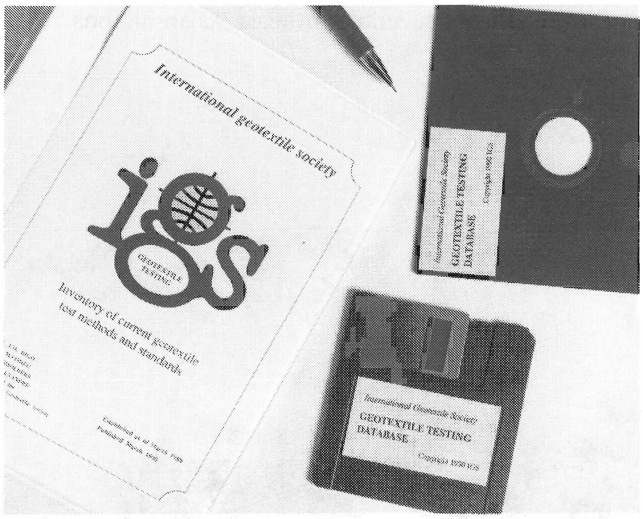
Geotextiles are commonly transported from country to country and continent to continent and geotextile engineering is clearly an international discipline. International standard testing methods are needed and the IGS does actively encourage the co-operation of organizations engaged in the development of test standards.

A first step toward the establishment of international standards is a good knowledge of the existing national standards. However, the great number of these test methods can lead to confusion. The IGS document will certainly play an essential role in the establishment of international standards on geotextiles by making basic information on existing standards readily available. We believe that this document will become an indispensable reference book for all those involved in research, design, testing and specifications.The IGS is proud to offer this contribution to international co-operation.

The production of this document is the result of five years of work which started in 1984 when the IGS Council decided to undertake the preparation of an inventory of test standards for geotextiles. A first edition was prepared by C. Van den Berg and B. Myles and was published in 1986. The present edition is more than an update. Due to the increased amount of information required to be documented (this volume describes no less than 293 different test methods) a more concise presentation of the test methods had to be adopted. In addition, the document has been thoroughly reviewed and reorganized.

To further facilitate access to the inventory, a computerized version of this work has also been prepared on IBM PC compatible 5¼ inch and 3½ inch floppy disks.

This document can be obtained by contacting the International Geotextile Society Secretariat, whose address is given on page 18 of this issue of IGS News. **Text document only**: *Price for IGS members US$60 plus postage. Price for nonmembers US$90 plus postage.* **Diskette version**: *Price for IGS members US$95 plus postage. Price for nonmembers US$120 plus postage.*



IGS Inventory of current geotextile test methods and standards

Professor R.M. Koerner to give The Mercer Lecture 1992

The Mercer Lecture has been established under the co-sponsorship of ISSMFE, IGS and Netlon Limited. Netlon Limited has agreed to fund the project for a period of ten years. The lecture within the broad theme of "Geosynthetics in Geotechnical Engineering" will be held every second year at three venues in America, Europe and Asia. The venues will change with each lecture.

The Mercer Lecture for 1992 will be given by Professor R.M. Koerner of the USA and will be presented at the following locations and dates:

1) 27 February 1992, New Orleans, USA (Grouting, Soil Improvement and Geosynthetics Specialty Conference – GSIG'92) .

2) 13 May 1992, London, England (Institution of Civil Engineers).

3) 2–4 June 1992 (the exact date has still to be confirmed), Kochi City, Japan (The Japanese Society of Soil Mechanics and Foundation Engineering Conference).

Activities of the Southeast Asia Chapter of IGS

by

R.S. Douglas, Secretary of SEAC–IGS

2nd Annual General Meeting

The second annual general meeting of the Southeast Asia Chapter (SEAC) of IGS was held on 27 September 1991 at Ladyhill Hotel in Singapore (see photograph below). In a unanimous vote Professor S.D. Ramaswamy and Professor B.B. Broms were re-elected as President and Advisor to SEAC respectively. In his report, the President of the SEAC, Professor Ramaswamy, highlighted the activities related to the 5th International Conference, particularly the meeting held earlier in the year with the International Advisors (see IGS News, July 1991) and the efforts of the SEAC to organize seminars and workshops on geotextiles and geomembranes for the local membership.

Logo of the 5th International Conference

While the International Advisors, Dr. J–P. Giroud and Mr. G. den Hoedt, were in Singapore in May 1991 for discussions with the local organizers of the 5th International Conference, the choice of logo for the conference was resolved after much debate. The logo chosen is the simple numeral 5 which bears a resemblance to a geotextile roll. The background colour chosen was red which is a common national colour of several Southeast Asian nations.

Professor Fukuoka in Singapore

Professor Masami Fukuoka, Chairman of JCIGS (the Japanese Chapter of the IGS) and a former president of ISSMFE, paid a visit to Singapore in September. He had discussions with a group of council members in connection with the SEAC and JCIGS activities. He extended JCIGS support and co–operation for the organization of the 5th International Conference. The SEAC council members have been encouraged by the strong support for the 5th Conference from the other IGS Chapters.

IGS members interested in more information on the Southeast Asia Chapter or the 5th International Conference may contact Mr. R.S. Douglas, SEAC–IGS Secretariat, 510 Thompson Road, #02–03 SLF Building, Singapore 1129, Tel: (65) 353 5511 or Fax: (65) 353 2424.

2nd annual meeting of the Southeast Asia Chapter of IGS, Singapore, September 1991
(left to right) Prof. B.B. Broms, Dr. Wong Kai Sin, Mr. Selwyn McManus, Mr. Michael Sim, Mr. A. Aziz, Dr. K.S. Rama Krishna, Mr. Yee Tack Weng, Prof. S.D. Ramaswamy, Mr. R. Radhakrishnan, Prof. G.P. Karunaratne, Mr. Thomas Cheah, Mr. R.S. Douglas, Dr. Peter Koenig, Prof. M.A. Aziz

Sardinia '91
Third International Landfill Symposium
Cagliari, 14–18 October 1991

Approximately 800 participants from around the world gathered in Cagliari in Sardinia at the Third International Symposium on Landfills organized jointly by the Universities of Cagliari (Environmental Sanitary Engineering Center), of Denmark and of Hamburg–Harburd.

A total of 104 papers presented in parallel sessions during the conference and 58 posters are now available in two hard cover volumes of proceedings totalling 1811 pages. The presentations were grouped into the following subjects: bio–gas management (production, quality, diffusion, environmental risk, treatment and utilization); quality and performance of geomembranes and geotextiles; choice of geomembranes and their quality control; landfill management and monitoring; landfill costs; after–care and landscaping; legal aspects and environmental impact. Two workshop sessions were also held that enabled discussion of the two important issues which emerged from the oral presentations; leachate management and lining systems. Finally, the state of the art was presented by experts from 20 different countries in Asia, Europe and North America.

It is interesting to note that the importance of geosynthetics as geomembrane materials in landfill design was touched on throughout the symposium even though it was often suggested that more than one low permeability layer should be used. The degree of guidance differs greatly between countries: One view is that the selection of the geomembrane must ensure that the groundwater is not be contaminated and the other view is that the clay layer thickness and the geomembrane must be specified. Clogging of geotextiles resulting from bacterial activities and leakage of geomembranes reported from site investigations was an important topic for many of the participants.

Many IGS members participated actively in this symposium and congratulations must be offered to the Executive Committee (Professors Raffaello Cossu, Thomas Christensen and Rainer Stegman) and the International Advisory Board for the scientific quality of the presentations.

reported by A.L. Rollin

International Symposium on
Geosynthetic–Reinforced Soil Retaining Walls
Denver, Colorado, August 1991

The International Symposium on Geosynthetic–Reinforced Soil Retaining Walls held in Denver, Colorado, on 8–9 August 1991 attracted more than one hundred researchers and practitioners from seven different countries. The Symposium featured the presentation and discussion of two geosynthetic–reinforced soil retaining walls ("Denver walls") and the presentation of major case histories from five different countries. The case studies were presented by Tony Allen (USA), Fumio Tatsuoka (Japan), Yves Matichard (France), Colin Jones (UK) and Richard Bathurst (Canada) and concluded with a panel discussion lead by Richard Jewell. Dr. Jonathan Wu of the Civil Engineering Department at the University of Colorado and Robert Barrett of the Colorado Department of Transportation served as co–chairmen of the Symposium.

Pre–symposium activities included a field trip through the Glenwood Canyon project, a field test of geosynthetic rockfall barrier walls and, the Summer Meeting of the Transportation Research Board (TRB) Geosynthetic Committee. These activities were organized by Robert Barrett.

The two 3.3m high geosynthetic–reinforced soil retaining walls were constructed with different soils. One wall was built with a cohesive backfill and the other with a granular backfill. Each wall was constructed with an articulated timber facing reinforced by 12 layers of a nonwoven polypropylene geotextile. The walls were constructed within a loading facility in the Civil Engineering Department at the University of Colorado in order to carefully control test conditions and to extensively instrument and measure wall performance. Great care was taken to obtain uniform backfill conditions in the walls. The side panels of the loading facility were made very rigid and were lubricated in order to achieve frictionless sidewall conditions and hence a plane strain condition during the tests.

Fifteen predictors submitted Class A predictions of the performance of the Denver walls in advance of the Symposium. The predictions included; strains induced in the reinforcement, lateral earth pressures on the facing and, the deformation of the wall facing. The predictions were requested for conditions at the end of construction, immediately after a 100 kPa surcharge pressure was applied and, after the 100 kPa surcharge had been applied for 100 hours. In addition, each predictor was asked to give his best estimate of the uniform surcharge pressure required to fail each wall and to describe the mode of failure. Among the 15 predictions, three used the limit equilibrium method or its derivatives, one employed a centrifuge model and 11 used the finite element method with a variety of constitutive models.

The Proceedings of the Symposium are to be published by A.A. Balkema Publishers in early 1992. The Symposium will include descriptions of the Denver walls, Class A predictions, post–symposium discussions and the case histories from USA, Japan, France, UK and Canada given by the invited speakers.

reported by J.T.H. Wu

Graphic Symbols for Geosynthetics

by

J-P. Giroud, Past-President of the IGS

With the growing use of geosynthetics, there is a need for standardization of the symbols used to represent them in construction drawings, engineering reports and technical papers. The IGS intends to propose graphic symbols as it has proposed mathematical symbols in the past[1]. I have prepared this paper, at the request of the IGS officers, to serve as a basis for discussion with a view to establish the "IGS List of Graphic Symbols for Geosynthetics" by mid-1992. All IGS members are invited to send their comments[2] by 31 January 1992. The comments will be analyzed and discussed in the nest issue of IGS News. Relevant comments and suggestions will be incorporated in the version submitted to the IGS Council for discussion and approval. The approved IGS graphic symbols will then be published in IGS News.

General principles used to establish the symbols

I believe that two sets of symbols should be used: symbols for products and symbols for functions. Symbols for products are the most important because they can be used in virtually all construction drawings and in a majority of engineering reports and technical papers. However, in the design of projects or the presentation of technical papers, it is useful in some cases to refer to the function played by the geosynthetic. This is why graphic symbols for functions are also proposed.

Graphic symbols should be easy to draw by hand or computer; to that end, the proposed symbols are as simple as possible. Also, the symbols should be easy to understand and remember; to that end, the proposed symbols suggest as much as possible the products or the functions they represent.

Symbols for products

The proposed graphic symbols for geosynthetic products are presented in **Figure 1**. The following comments can be made:

- A generic symbol is proposed for geomembranes (solid line, to portray relative impermeability). However, if necessary, it is possible to distinguish between smooth geomembranes (Symbol GMB) and textured (roughened) geomembranes (Symbols GMBtx1 and GMBtx2).
- A generic symbol is proposed for geotextiles (dashed line). However, if necessary, it is possible to distinguish between woven geotextiles (Symbol GTXwov, mixed lines to represent yarns in two perpendicular directions) and nonwoven geotextiles (Symbol GTXnow).
- A generic symbol is proposed for geocomposites used for drainage (Symbol GCD), but, if necessary, it is possible to distinguish between various types of geocomposites (Symbols GCDpla, GCDnow, GCDgmt and GCDgnt).
- Symbols for numerous geocomposites can be obtained by combining two or more symbols (e.g., Symbols GCOgmb.now, GCOgmb.gnt and GCOgtx).
- The symbols for the components of a geocomposite must be in contact, as it is the only way to distinguish a geocomposite from individual geosynthetics placed sequentially (**Figure 2**).

In a given drawing, two geosynthetics of the same type (e.g., two geomembranes) can be distinguished by varying the size of the symbol (e.g., boldness of line, boldness and/or length of dashes). Examples are given in **Figure 3**.

Symbols for functions

The proposed graphic symbols for geosynthetic functions are presented in **Figure 4**. The following comments can be made:

- Traditionally, five functions of geosynthetics are mentioned: fluid barrier (essentially for geomembranes), filtration, transmission, separation, and reinforcement. However, in the past decade, geosynthetic engineering has evolved, and functions such as "cushioning" and "friction layer" are increasingly used. Also, the use of small elements such as fibers, threads, or small grids mixed with soil leads to the "micro-reinforcement" function. Furthermore, erosion control is generally overlooked when functions are discused, although the geosynthetic (e.g., geomat or geocell structure) performs a function which is different from the traditional functions: it restrains the movement of soil particles. Therefore, symbols are proposed not only for the traditional functions, but also for other functions.
- Some of the proposed symbols for functions are identical to some of the proposed symbols for products. For example, the proposed symbol for fluid barrier is identical to the proposed generic symbol for geomembrane, which makes sense, since geomembranes are the only geosynthetic performing the fluid barrier function. Another example is the symbol for filtration: this symbol is identical to the proposed generic symbol for geotextiles, since this function is usually performed by geotextiles.
- The proposed symbol for transmission (Symbol TRM) is identical to the proposed symbol for the core of the generic drainage geocomposite (Symbol GCD).

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1. All IGS members can obtain a copy of "Symbols for Geotechnical Engineering, Geotextiles and Geomembranes" free of charge from the IGS Secretary.

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

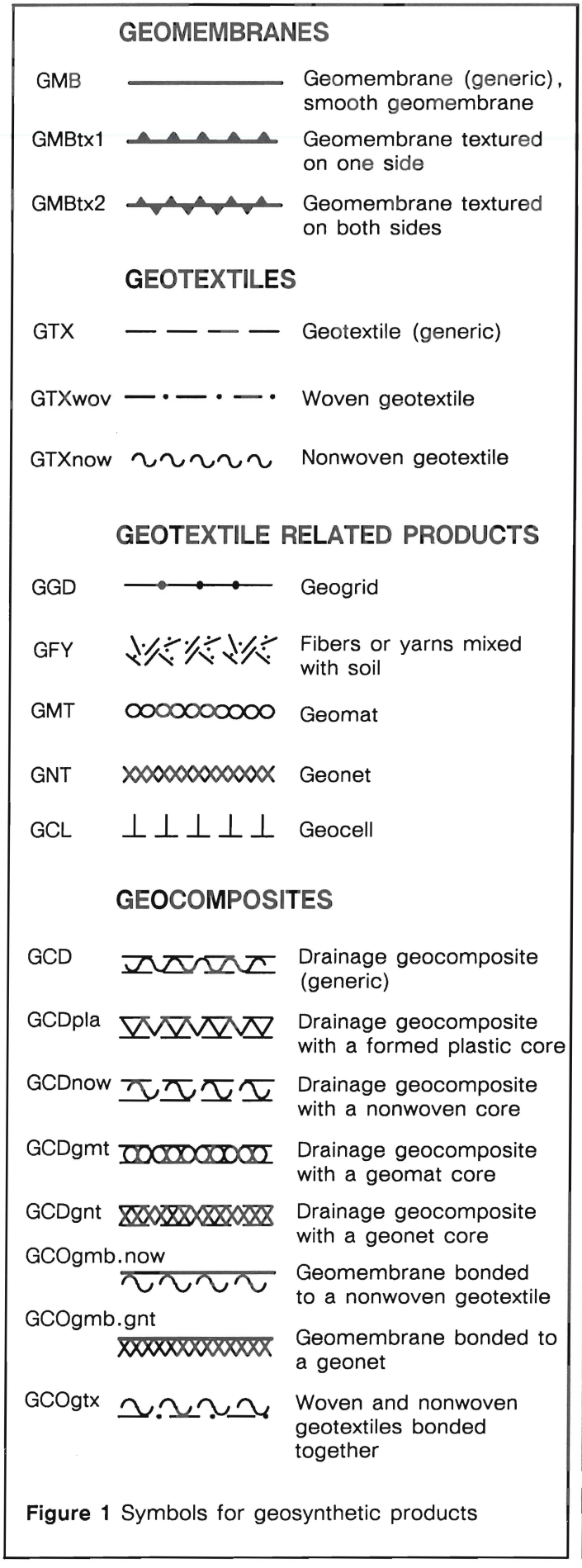


Figure 1 Symbols for geosynthetic products

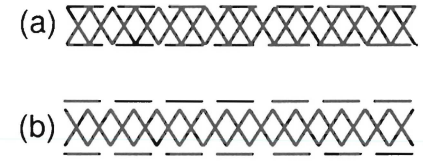


Figure 2 (a) Geocomposite composed of a geonet and two geotextiles; (b) Geonet underlain and overlain by two independent geotextiles

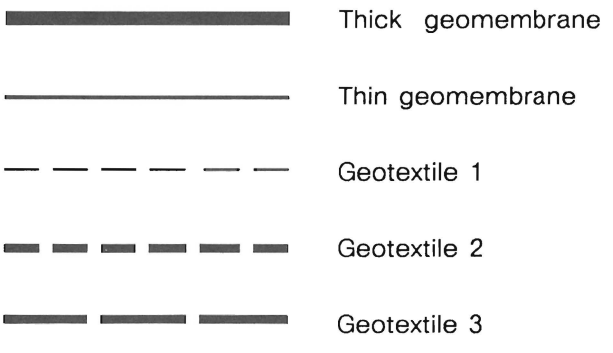


Figure 3 Differentiation between geosynthetics of the same type within the same drawing

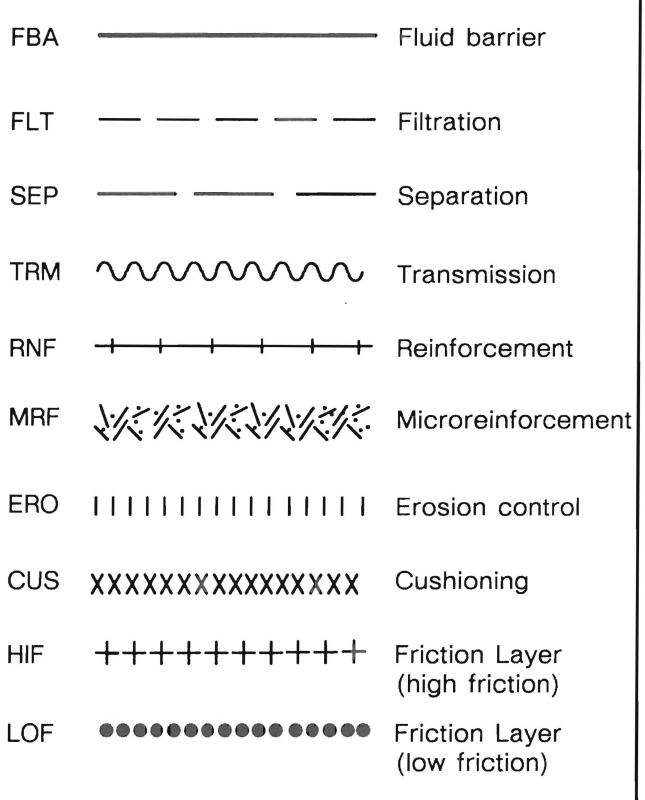


Figure 4 Symbols for geosynthetic functions

continued ...

Symbols for functions can be combined to illustrate cases where more than one function is performed by the same geosynthetic. Many combinations are possible, the only limitation being the clarity of the drawing. Examples are given in **Figure 5**.

Conclusion

The adoption of graphic symbols for geosynthetics would enhance the consistency of our discipline and demonstrate its international nature. This would certainly be a step forward for our discipline and all IGS members are invited to participate by their comments or suggestions.

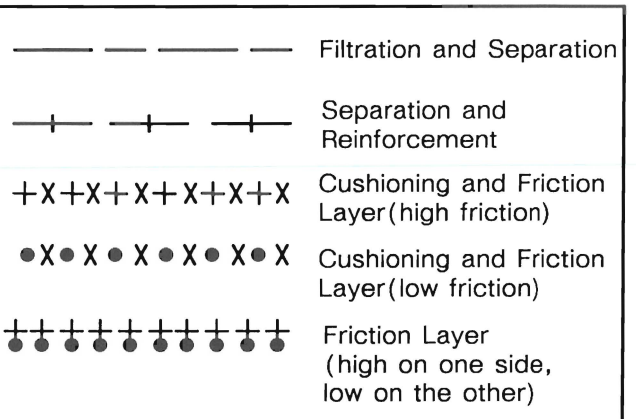


Figure 5 Combination of symbols for functions

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 selection 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.

S.A. TEXSOL

by

Etienne Leflaive

Le Christ de Saclay, 91892 Orsay-Cedex, France

The Texsol Company (Société d'Application du Texsol) was established in 1984 to design and build structures with the Texsol material patented by the Roads and Bridges National Laboratory of France (LCPC).

Since its beginning Texsol has been a contracting company devoted exclusively to geotextile engineering.

The Texsol material that is produced on site is an intimate mix of soil (usually sand) and synthetic continuous thread.

The main use of Texsol up to now has been the construction of cost competitive retaining walls particularly structures used for motorway widening. These walls are usually vegetated. Wall heights as great as 20 m have been constructed. The total volume of Texsol placed to date is 200,000 m^3 - of this, 50,000 m^3 was used in 1990. Taking 1 m as the typical average thickness of a Texsol wall, 1 m^3 of Texsol corresponds to 1 m^2 of retaining structure.

Other uses of Texsol are currently in the research-development stage such as applications related to protection of liquid gas tanks, military structures and foundations on soft soils. Texsol is also used for re-vegetation of construction sites and reclaimed land.

Texsol has licensees in Japan, Korea, Netherlands and Italy and will soon expand this network to other European and Asian countries.

Texsol believes that the development of innovative techniques using geotextile engineering will be enhanced by encouraging designers and public agency engineers to become members of IGS and to participate in its activities.

S.A. Texsol has been a corporate member of IGS since 1989.

Texsol wall under construction

IGS Welcomes New Corporate Members

TENAX Group

The TENAX Group is an international company, dealing with plastic material and, more specifically, is a manufacturer of extruded plastic nets, grids and other geosynthetics. The technological know-how, gained during more than 30 years of experience and international activity, has made the Group one of the leaders in the manufacture and application of geosynthetics. The group has three plants (two in Italy; Rieti and Vigano' and one in the USA: Jessup, Maryland) that process about 50 tons of raw polymer a day into a variety of products. Plant and offices comprise about 40,000 m^2. The TENAX Group considers its success to be due to its policy of quality, competiveness and innovation.

reported by
P. Rimoldi

GEOTECHNICS HOLLAND B.V.

Geotechnics Holland BV was established in 1978 and is an associated company with the contracting company Cofra BV. The later was established in 1923, and has been active in the field of contracting, sub-contracting and execution of projects in the Netherlands and abroad. Geotechnics Holland BV is a manufacturer and supplier of a variety of geosynthetic products including prefabricated drainage wicks, geotextile filters, HDPE sheet pile, tubular drainage materials and HDPE geomembranes. The product line has been sold in over 40 countries. Both co-operative companies are specialists in the delivery and installation of equipment and products for civil and hydraulic engineering, land reclamation, drainage and soil stabilization, environmental protection and waste disposal technology. The companies have been important players in the execution of large (off-shore) projects, such as the Delta Works Eastern Scheldt storm surge barrier; Ports of Rotterdam; Public Works and Highways for the City of Amsterdam; the Channel Tunnel linking France and the United Kingdom.

reported by
B. Eijzenga

Call for Papers
GEOSYNTHETICS '93
The North American Regional Conference on Geosynthetics

Vancouver, British Columbia, Canada, 30 March - 1 April 1993

The North American Geosynthetics Society (NAGS) and the Industrial Fabrics Association International (IFAI) under the auspices of the International Geotextile Society (IGS) announce a "Call for Papers" for Geosynthetics '93. The conference, which will be held in Vancouver, British Columbia, Canada, 30 March - 1 April 1993, will focus on current applications for geosynthetics as well as the latest technical advancements affecting the industry.

Guidelines for submitting abstracts include:

- One typewritten page including the title of the proposed paper, names of authors, and the abstract itself in 300 words or less.
- Company or organization names, addresses, telephone and fax numbers for each author.
- A maximum of one additional page of supporting data and typical results, if the information will assist in evaluating the abstract.

Awards of Excellence Program

In addition, all selected papers submitted by the 29 May 1992 deadline will be considered as an entry in the Awards of Excellence Program, a program designed to recognize innovation, creativity, and outstanding contributions in engineering, design, testing, technology, research and development with geosynthetics. Monetary awards will be given to a research institute of each award winner's choice, for the purpose of fostering the advancement of geosynthetics.

Deadlines

The original deadline for abstracts was 15 December 1991 but has been extended to 15 January 1992. Authors will be notified by 15 February 1992 of their acceptance or rejection. Full texts of the paper will be due no later than 29 May 1992.

Abstracts should be mailed to:

Geosynthetics'93 Technical Committee
c/o Industrial Fabrics Association International
345 Cedar St, Suite 800
St. Paul, MN 55101, U.S.A.

For abstract entry form and more information contact Joseph A. Dieltz at the above address or telephone: 1 (612) 222 2508 or fax: 1 (612) 222 8215.

Geosynthetics in Dams

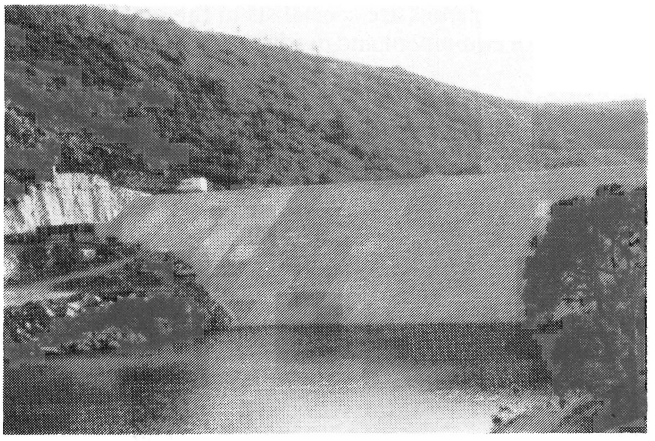
Dr. Giroud, Technical Director of GeoSyntec Consultants and Past-President of the IGS, was the keynote lecturer at the annual conference of the Association of State Dam Safety Officials (ASDSO) on 1 October 1991 in San Diego, California. The ASDSO includes representatives of state and federal agencies dealing with the maintenance and the repair of dams in the United States. Formed in 1984, the ASDSO has now 500 participants from federal, state and local governments, engineering consulting firms, and academe from virtually every state in the United States, and from several other countries. The purpose of the ASDSO is to provide a forum for the exchange of ideas and experiences on dam safety issues.

Speaking before more than 400 participants, Dr. Giroud made a comprehensive presentation of the subject, "Geosynthetics in Dams", using more than 200 slides, some illustrating concepts and others showing dams incorporating geosynthetics in Europe, Africa, Asia and North America. In the first part of his presentation, Dr. Giroud discussed the use of geomembranes for the waterproofing of new dams, such as rockfill dams and roller compacted concrete (RCC) dams. He presented several case histories, including the highest dam constructed with a geomembrane: Figari Dam, 35 m high, completed in 1991 in France. Dr. Giroud indicated that, in contrast with the present state of practice in geosynthetic lining systems for waste containment facilities, a wide variety of geomembranes are used in dams: elastomeric, crystalline or noncrystalline thermoplastic, and bituminous, unreinforced or reinforced with woven or nonwoven fabrics.

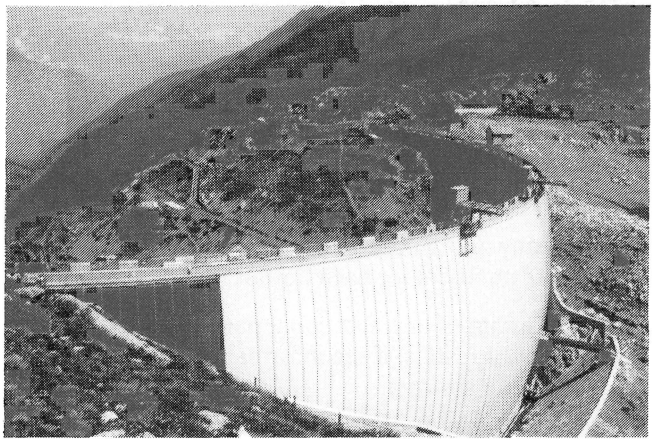
The lecturer also discussed the use of geomembranes to repair old concrete dams. He discussed in particular the technique developed in Italy, which consists of mechanically attaching geomembranes on the vertical face of concrete dams. He presented impressive slides showing the installation of geomembranes on vertical dam faces up to 70 m high and he stressed the dual function: (i) the geomembrane minimizes seepage through the dam; and (ii) the thick geotextile placed between the geomembrane and concrete allows the drainage of water that has accumulated over the years in the concrete, thereby progressively eliminating a major cause of concrete deterioration. He noted that the geomembranes used so far on these rehabilitation projects are geomembranes made of plasticized PVC and he indicated that some have already been exposed on dam faces for more than 15 years without significant damage: "Experience shows - contrary to a general belief in North America - that PVC geomembranes that are properly formulated can withstand outdoor exposure for many years", Giroud concluded.

Next, the presentation focused on uses of geotextile filters for filtration and drainage systems in earth and rockfill dams, as well as for the upstream slope protection of earth dams. In particular, the lecturer indicated that a major cause of geotextile filter clogging is improper placement. "It is essential for a geotextile filter to be placed - and to remain - in close contact with the soil", Giroud said, and he went on to give recommendations to achieve this requirement. Some of the case histories of earth and rockfill dams incorporating geotextiles for filtration and drainage presented by Dr. Giroud were quite impressive: the first earth dam using a geotextile in its internal drainage system was constructed in 1970 and has been performing well since then, that is for 21 years; and an 80 m high earth and rockfill dam in South Africa using geotextile filters in contact with the clay core has been performing well for more than 10 years. Dr. Giroud also presented the use of geotextile and geogrid reinforcement for the initial construction or the heightening of dams. He indicated that significant savings can be made by decreasing the embankment volume through the use of reinforcement.

A lecture on dams should, of course, address durability. The lecturer reminded the audience that significant experience has been gained with the satisfactory performance of geosynthetics in a large number of dams and gave the longest experience in the following categories: 32 years for a geomembrane (protected from atmospheric conditions) used for a rockfill dam upstream face, 21 years for a geotextile filter inside an earth dam and for a geotextile filter in the upstream slope protection of an earth dam, and 15 years for a geomembrane placed vertically on the face of a concrete dam and directly exposed to atmospheric conditions. The comments on durability were followed by a strong warning against over-conservatism: "The art of designing and constructing dams has progressed because engineers have met many technical challenges over the years. Today, geosynthetics are perceived as a new challenge.



Figari Dam (France), 35m high rockfill dam, the highest dam initially constructed with a geomembrane (courtesy of C. Tisserand)



Publino Dam (Italy), 42m high concrete dam, repaired in 1989 with a geomembrane (courtesy of A. Scuero)

This new challenge has inspired some conservative engineers to make recommendations to limit the use of geosynthetics in dams." Dr. Giroud indicated that one of these recommendations was not to use geosynthetics as the only line of defense against failure and made the following comment: "This sounds like a warning against geosynthetics. I disagree, because this recommendation is applicable to all materials and systems. I am sure that no designer of a dam would use a clay core or a concrete facing as the only line of defense against failure in an embankment dam. In other words, a statement on how dangerous some designs can be would be more appropriate than a statement implying that geosynthetics are dangerous in general".

Dr. Giroud then mentioned that another conservative recommendation was to use geosynthetics only in places where they are easily accessible for repair. He then made the following comment: "I also disagree with this recommendation. By systematically placing geosynthetics in areas where they are easily accessible, we may over-expose them to deterioration mechanisms. Would we recommend the same thing for clay? Based on the fact that clay may need repair, would we recommend that clay always be placed on the face of dams? Certainly not, because there, clay would be subjected to erosion and desiccation, and would then certainly need repair. Geosynthetics, like clay, are to be located wherever needed on the basis of a rational design and an objective evaluation of the materials' properties. Designers of dams are accustomed to deal with materials, such as unsaturated clays, that have complex properties. Properties of geosynthetics are simpler. Therefore, how can we be averse to using geosynthetics in dams when we dare using such a complex material as clay?".

Dr. Giroud concluded his lecture as follows: "In conclusion, my strong recommendation is not to limit the use of geosynthetics in dams, but to learn about properties of geosynthetics. This is the approach that all engineers should adopt to lead the way toward a rational use of geosynthetics in dams."

Re-Vegetation Method using Continuous Fibers

by

S. Yokotsuka, Kumagai Gumi Co., Ltd.

Most conventional re-vegetation methods use mainly herbaceous plants for restoring vegetation. However, these plants often die within a couple of years after seeding because of deterioration of the artificial soil itself. Though the introduction of woody plants to the artificial soil,especially by seeding, is indispensable for permanent vegetation, it has been considered very difficult to do with conventional methods. In addition, in conventional methods, whether planting succeeds or not depends on the ground condition, such as the degree of weathering, cracks and so on. Moreover, harmful ingredients, such as cements and resins may be included during planting for the purpose of preventing erosion of the artificial soil. The technique reported here enables the rapid reproduction of the same topsoil as in the natural environment by mixing continuous fibers with sprayed soil. With this method, it is possible to produce woody plants by seeding in accordance with a vegetation plan and to meet various needs such as the requirement for permanent vegetation and the restoration of vegetation harmonious with the natural environment.

Other advantages of the method include the following:

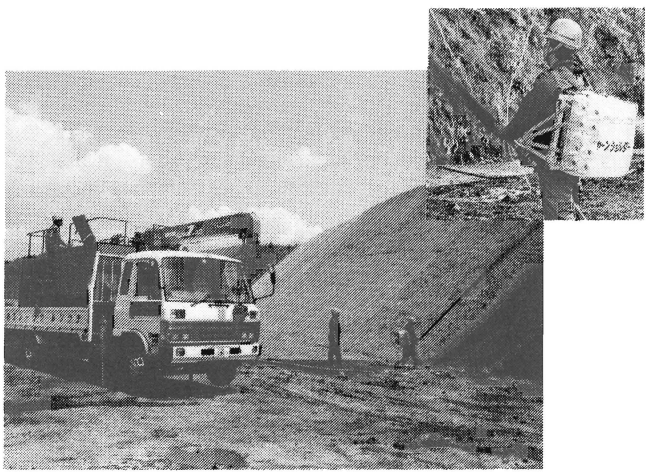
1) The method uses continuous fibers that are mixed tri-dimensionally with sprayed soil to make fiber-reinforced soil (Texsol). The soil can be sprayed onto steep slopes to any thickness and is erosion resistant.

2) With this method, it is possible to change cohesive soil into a more porous soil that can retain water and fertilizer and thereby encourage the germination and growth of woody plants.

3) In this method, ingredients such as cement or resins that may be harmful to vegetation growth are not included.

4) Highly mechanized construction methods improve safety and maximize production rates.

The re-vegetation method reported here recently won the prestigious Technical Development Prize by the Japan Society of Civil Engineers. This is the first time that the prize has been awarded in the field of geotextile technology.



Spray application of re-vegetation technique with continuous fibers

2nd International Seminar on Geotextiles and Geomembranes

Prague, Czechoslovakia, 1 – 2 October 1991

by

Prof. Ladislav Lamboj, Prof. Ivan Vanicek and Dr. Ing Jan Zálesky

The 2nd International Seminar on Geotextiles and Geomembranes was held at the Geotechnical Department of the Czech Technical University in Prague.

The purpose of the seminar was to: (1) review current engineering practice with geotextiles and geomembranes, (2) disseminate information on geotextile and geomembrane products and, (3) discuss the establishment of a Czechoslovak Geotextile and Geomembrane Society. The format for items (1) and (2) was a series of invited lectures which are summarized below:

I. Vanicek (Czechoslovakia): Contemporary trends in the utilization of geotextiles and geomembranes and an overview of functions including separation and filtration, geomembranes, reinforcement and the use of layered construction.

L. Svobod and **V. Krojci** (Czechoslovakia): Split-film fibres and their utilization in geotextiles. Information about new products called Fibril and Fibroil based on polyolefin and polyethylene film fibres and the modification of their properties during manufacture.

J. Alenowicz (Poland): A case study in which nonwoven geotextiles were used to minimize reflection cracking. The speaker reported experience with the use of geotextiles in reinforcing asphalt liners to prevent cracking during pavement construction.

I. Herle (Czechoslovakia): Reinforced embankments. The problems associated with the use of geotextiles in embankment engineering were discussed from the point of view of reinforcement including the distribution of shear stresses in the reinforced zone. Stability analysis was reviewed and the speaker expressed his preference for Janbu's method.

J. Zálesky (Czechoslovakia): Laboratory tests. Experience with laboratory permeability testing of nonwoven geotextiles was presented including permittivity and transmissivity testing under external loading. Procedures to correct test results due to resistance to water flow in test equipment were reviewed.

I. Kudrnacová (Czechoslovakia): Testing of nonwoven geotextiles for filtration purposes. Methods to determine pore-size distribution and stability of filtration layers were described. The influence of soil type surrounding the geotextiles was discussed.

F. Saathoff and **G. Heerten** (Germany): The application of geotextiles in coastal construction. German standards and experiences with shore protection were described and discussed.

D. Cazzuffi (Italy): The use of geosynthetics in dams: -the Italian experience. The speaker reported on experience gained from several projects involving dam reconstruction. The talk focused on protection against leakage using geomembranes.

J. Riße (Germany): A contribution to the topic of influence of test conditions on the properties of geogrids. The results of several tests on geogrids were presented and the calculation of the influence of reinforcement using the finite element method were presented.

B. Sames (Czechoslovakia): Practical experience of a consulting engineer in the design of waste landfills constructed with flexible geomembranes. A case study in north-western Bohemia was given.

F. Saathoff and **G. Heerten** (Germany): The application of geotextiles in landfill construction. Typical composite liners used in landfill engineering were described. German standards were reviewed.

J. Bartoeek (Czechoslovakia): Geomembranes in Czechoslovakia. Differences between clay liners and geomembranes were discussed as they relate to landfill construction.

L. Niespodzinska and **E. Dembicki** (Poland): Experiments with coastline protection using geosynthetics. A field study of the use of geotextiles and related products to manufacture sand-infilled tubes was discussed.

D. Cazzuffi (Italy): The use of geotextiles and related products for the bank protection of rivers, canals and inland waterways. Many examples of the use of geotextiles and related products were given and their performance compared particularly with relation to environmental considerations and durability aspects.

M. Brousek and **J. Karhánek** (Czechoslovakia): Geotextiles and geomembranes in tunnel construction.

The lectures were given in English and summaries of the presentations are available by writing to Prof. L. Lamboj at the following address:

Geotechnical Department
Czech Technical University in Prague
Thákurova 7, 166 29 Prague 6, Czechoslovakia

Geosynthetics Case Studies Book for North America

by R.J. Bathurst (Editor, IGS News)

At a meeting earlier this year between NAGS President R.D. Holtz and Dr. G.P. Raymond, Chairman of the Canadian Geotechnical Society Subcommittee on Geosynthetics, it was decided to pursue the publication of a book on geosynthetics case studies in North America.

An original call for papers was issued in the September 1990 issue of Geotechnical News. This article gives further details and important dates for those who have not already submitted a contribution to the case studies volume.

The book will comprise *two-page* executive summaries of case histories describing completed civil engineering projects in which a geosynthetic or geosynthetics were an important component. Case studies that are a synthesis of previously published papers in conference proceedings and journals are particularly welcome. Indeed, it is hoped that the case studies book will serve as a valuable reference to previously published work. It is planned to publish a minimum of 100 case studies that give a balanced review of the state of practice in North America for all geosynthetics applications in civil engineering works. This book will be a timely continuation of the ISSMFE case studies book which is about to be published and contains projects reflecting the international state of practice in geosynthetics up to about 1987.

Format: No abstracts are required. Authors are asked to submit a camera-ready document prepared according to the format below. All headings should be capitalized; no inset to start paragraphs and; a full blank line between paragraphs and headings. The text should be typed single spaced at 5 characters per centimeter (12 characters per inch).

Content: The case study should state clearly the purpose of the structure, engineering considerations and generic features of the geosynthetics. Within the limited space allowed the authors should describe construction aspects and performance of the completed structure. The authors should also include a list of reference papers or reports that are available to the reader who wishes to pursue further details of the project.

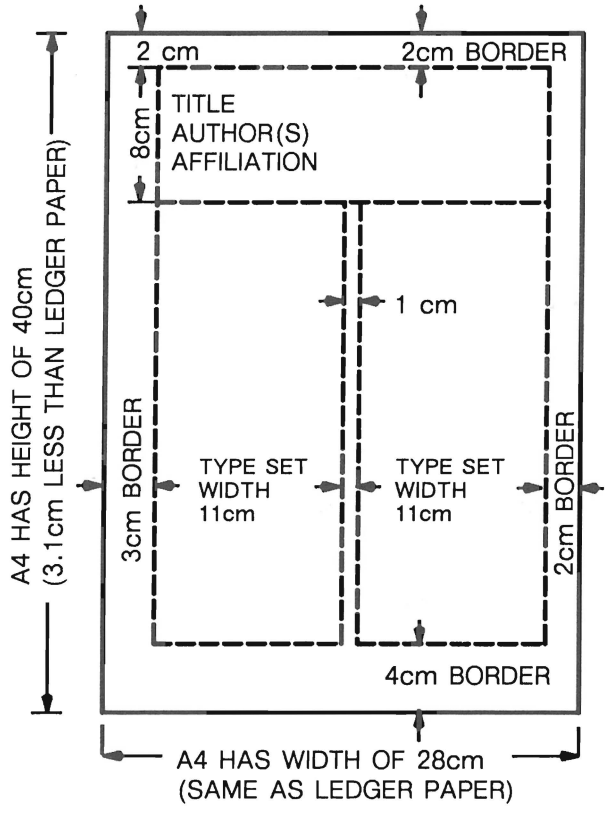
Project Eligibility: Members of NAGS, engineers, manufacturers/distributors of geosynthetics and researchers from Canada, United States and Mexico are eligible. However, the case studies *are restricted to projects in Canada, United States and Mexico.* To avoid duplication, case studies accepted in the forthcoming ISSMFE book will not be considered.

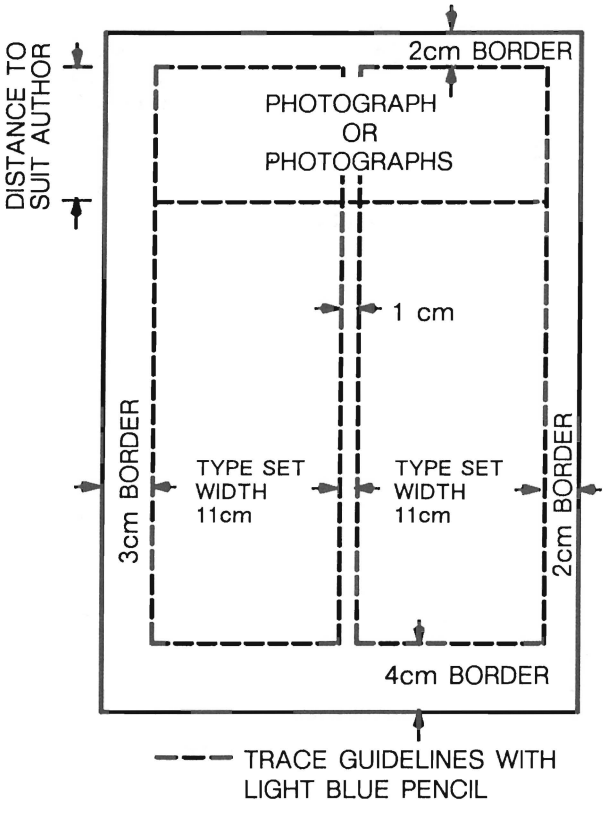
Due Date: Case studies are due March 31, 1992. The papers will be reviewed by a committee of NAGS members. Authors will be notified June 30, 1992 if their contribution has been excepted. The case studies book will be published in late 1992.

Contact: Enquiries and submissions can be made to:

Dr.R.J.Bathurst
c/o Civil Engineering Department
Royal Military College of Canada
Kingston, Ontario, Canada, K7L 5L0

Tel: 1 (613) 541-6479 Fax: 1 (613) 545-3481





Geotextiles & Geomembranes: An Official Journal of the IGS

In 1991–92 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 1991 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

The Editor, T.S. Ingold, the Editorial Chairman, J-P. Giroud 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.

Call for Contributions
Special Issue of Geotextiles & Geomembranes
Available computer programmes for geosynthetics applications

During the recent 4th IGS International Conference exhibition and poster sessions it was clear that research teams and contractors actively work at the development of computer programmes that can assist the engineer during the design and analysis of engineering solutions that involve a geosynthetics component. Many of these programmes are now available to the public.

The international journal "Geotextiles & Geomembranes" proposes to prepare a special issue devoted to a description of available computer programmes for the design and analysis of applications that use geosynthetics in civil engineering works. The proposed special issue will provide the geosynthetics community with a review of these emerging design tools. Accepted papers will contain, as a minimum, the following information:

- a general description of the programme structure;
- a description of the theories on which it is based;
- the geosynthetics applications that are covered;
- programme limitations; and
- where the programme may be obtained.

Abstract submissions not exceeding 300 words should be sent to:

Prof. J.M. Rigo, GRC - LMC
Liege University - Civil Engineering Institute
Quai Banning, 6
B - 4000 LIEGE (Belgium)

The deadline for abstracts is 25 January 1992

reported by J.M. Rigo

The 5th Italian Conference on Geosynthetics in Earth Structures

by

Daniele Cazzuffi, Associate Editor of IGS News (Europe)

More than 160 professionals attended the 5th Italian Conference on Geosynthetics held in Bologna on 23 October 1991. Organized by Associazione Ingegneri e Architetti della Provincia de Bologna and the Bologna Fiere, the Conference was mainly dedicated to the geotechnical design of structures, incorporating geosynthetics, with special reference to existing standards and guidelines, prepared by various international committees.

After an opening by Ing. G. Tasselli, President of the Italian Society of Engineers and Architects, the Conference was introduced by Prof. A. Di Tommaso, Chairman of the Italian Group of RILEM (Réunion Internationale des Laboratoires d'Essais sur les Matériaux et les Constructions). The particular relationship between geotechnical engineering and geosynthetics was outlined in the speech made by Ing. Sandro Martinetti, the new President of the

Italian Geotechnical Society (that in Italian corresponds to AGI not to IGS!), who also read a letter of congratulations from IGS President, Dr. R.Kerry Rowe.

The General Report was presented by Prof. R. Jappelli and Ing. D. Cazzuffi, who thoroughly reviewed the international guidelines presently available, in the light of recent developments in geotechnical engineering (e.g. limit state design). The general report was followed by seven communications. Each speaker presented a different geosynthetic function with particular reference to related international guidelines. The invited speakers were Prof. R. Lancellotta (drainage), Prof. A. Mazzucato and Prof. A. Musso (filters), Prof. L. Picarelli (reinforcement), Ing. M. Ciarla (protection), Ing. P. Sembenelli (waterproofing) and Ing. M. Manassero (confinement).

In total, 12 different international guidelines were considered in the general report and in the various presentations: these documents were prepared by technical committees created by different associations, such as the ISSMFE (International Society of Soil Mechanics and Foundation Engineering), ICOLD (International Commission on Large Dams), ICID (International Commission Irrigation and Drainage), PIANC (Permanent International Association of Navigation Congresses), PIARC (Permanent International Association of Road Congresses) and OECD (Organization for Economic Cooperation and Development).

As in the previous Italian conference, the "lunch break" included a guided tour of the exhibits dealing with geotextiles, geomembranes and related products at the International Exhibition of Building Industrialization (SAIE).

The proceedings of the 4th Italian Conference on Geosynthetics were distributed during the conference (see IGS News, March 1991). They are published in an issue of the Italian technical journal "L'Ingegnere" (No. 9/12–1990) and each contribution contains an English abstract. The editors of this 120 page document are Daniele Cazzuffi and Sergio Di Maio. The publication is dedicated to the Italian contributions presented at the 4th International Conference on Geotextiles, Geomembranes and Related Products (The Hague, 1990): the 12 Italian articles (7 full papers and 5 communications) were reviewed in the general report written by Prof. R. Jappelli. The first list of Italian references in the field of geosynthetics (about 200 articles) is published as an appendix in the proceedings.

The Proceedings of the 4th Italian Conference on Geosynthetics in Earth Structures are now available at a cost of $(US)50.00 + postage $(US)10.00 from:

Associazione Ingegneri e Architetti
della Provincia di Bologna
Strada Maggiore, 13–40125 BOLOGNA, Italy

Fax: 39 51 230001

The Case for an Additional Function

by

John S. Horvath

Design–by–function has become the accepted approach to the rational implementation of geosynthetics technology in engineered construction. If we reflect on the current state of practice, there are five basic functions (drainage, filtration, liquid barrier, reinforcement, separation) that can be provided alone or in combination by a range of product categories (geotextiles, geomembranes, etc.). In each case, the geosynthetic (used here in the broad context of including natural fibers) is a relatively thin material. The writer recommends that the geosynthetics community formally recognize the existence of relatively thick products that belong in a new product category and have multi–functional capabilities that go beyond the basic five functions. To the list of geotextiles, geomembranes, geogrids, etc. should be added the category of "geoinclusions" (previously called "geoboard" by some authors), as the primary function of this product is to act as a relatively compressible inclusion within a soil mass. Such an inclusion allows "controlled yielding" of a soil mass which is a phrase first coined by Alan McGown and co–workers at the University of Strathclyde.

In the same way that reinforcement of soil masses can be traced back to ancient civilizations, the concept of using a compressible inclusion is not new. For decades, engineers have used bales of straw or other organic materials above pipes or culverts to induce vertical arching and a concomitant reduction in vertical load on the pipe. What is new is the use of a synthetic material with controllable properties and installed in a wider variety of applications. The material used to date for geoinclusions is low–density expanded polystyrene (EPS). By judicious selection of materials, other functions, some existing and some new, can be built into a geoinclusion. These include the traditional functions of filtration and drainage, achieved by incorporating a drainage composite into the geoinclusion panels. New functions of thermal insulation and attenuation of noise and small–amplitude vibration are also possible.

While the compressible function of geoinclusions has been studied primarily in numerical and small–scale model testing, a limited number of field case histories have been documented where both horizontal and vertical stress reduction was achieved.

Engineers are cautioned not to confuse the relatively new usage of low–density / high–compressibility EPS for geoinclusions with the more–established usage of blocks of high–density/low–compressibility EPS (and other foamed/ expanded plastics) as lightweight fill. This application has been used primarily in Europe to date, although there has been increasing usage in Japan. It is important to note that a relatively small variation in EPS density will produce a significant variation in product strength and compressibility. In addition, EPS is not Styrofoam®, the latter is a tradename for a plastic that uses a significantly different process

and chemical agents to achieve the foamed (expanded) consistency.

Finally, space does not permit a listing of publications that are available on the topic of controlled yielding. However, the writer invites IGS News readers to contact him at the following address for a list of important papers:

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Calendar of Events

ASCE Specialty Conference
Grouting, Soil Improvement & Geosynthetics
New Orleans, U.S.A. 25–28 February 1992

Contact: Dr. I. Juran
Dept. of Civil & Environmental Engineering
Polytechnic University, 333 Jay Street
Brooklyn, New York 11201, U.S.A.

Tel: 1 (718) 260 3220, 3739

International Symposium on Soil Improvement and Pile Foundations, Nanjing, China 25–27 March 1992

Contact: Mr. Zhu Cun-Fu
Nanjing Civil and Architectural Engineering Society
#288 Changjiang Hou Jie
Nanjing 210018 P.R. China

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

Contact: Professor Hidetoshi Ochiai
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

Geosynthetics'93
Vancouver, British Columbia, Canada
30 March – 1 April 1992

Abstracts: 15 January 1992
Contact: Secretary General NAGS
345 Cedar St., Suite 800
St. Paul, MN 55101
USA

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 wish the support of the IGS.

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Dates indicate earliest year of continuous membership.

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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.

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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.

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