

NEWSLETTER OF THE INTERNATIONAL GEOSYNTHETICS SOCIETY

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

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Announcing the New and Re-Elected IGS Council Members

A total of 21 candidates ran for eight positions on the IGS Council for the 2000-2004 term. Pictured below are the eight successful candidates. A complete list of the current IGS Council Members can be found on page 15. Biographies of the successful candidates can

be found in the July 2000 issue of *IGS News*, or on the IGS WWW site.

I would like to take this opportunity to welcome our newly elected Council Members and congratulate those who have been re-elected. In addition, V. Feodorov (Romania) and M. Sadlier

(Australia) were co-opted. You have all shown a strong commitment to the Society and our discipline in the past, and I look forward to working with you all toward continued success of the IGS.

*reported by Richard J. Bathurst
IGS President*



Hong Kong

Dr. John W. Cowland



USA

Ms. Danette R. Fettig



Japan

Prof. Masashi Kamon



Canada

Prof. Jean Lafleur (re-elected)



Korea

Dr. Eun-Soo Lee



Portugal

Prof. Maria-Lurdes da Costa Lopes



United Kingdom

Mr. Bernard Myles



United Kingdom

Mr. Jim Paul (re-elected)

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IGS Council Meeting Minutes (15 October 2000, *EuroGeo2*)

The IGS Council met on 15 October 2000 in Bologna, Italy in conjunction with the *EuroGeo2* Conference and Exhibition hosted by the Italian Chapter of the IGS.

IGS President R.J. Bathurst called the meeting to order at 0900 and introduced the new and re-elected Council Members: J. Cowland, D. Fettig, M. Kamon, J. Lafleur (re-elected), E.S Lee, M. Lopes, B. Myles, and J. Paul (re-elected). The first order of business was the co-option of two Members, V. Feodorov and M. Sadlier. Co-option is a tool the Council employs to achieve specific goals, and it is hoped that Mr. Feodorov will assist the IGS in establishing chapters in Eastern Europe and Mr. Sadlier will achieve the same goal in Australia and the South Pacific.

After approving the minutes from the 1999 Council Meeting in Boston, Massachusetts, USA, Council Members were assigned to the various IGS Committees. The new Committee Members are identified in the following section. The Membership should be aware that service on Open Committees is available to any Member. The interested party need only advise the Chair of his or her interest and then perform tasks on behalf of the Committee.

Open Committees

G Chapter Committee

Chair: D. Cazzuffi, Members: C. Jones, V. Feodorov, E.S. Lee, and M. Sadlier

G Education Committee

Chair: J. Paul, Members: J. Collin, S. Corbet, C. Jones, J. Lafleur, and M. Lopes

G Standards Committee

Chair: P. Rimoldi, Members: J. Cowland, P. Delmas, B. Myles, and P. Stevenson

G Asian Activities Committee

Chair: M. Kamon, Secretary: J. Cowland, Member: E.S. Lee

G European Activities Committee

Chair: G. Heerten

G Publications Committee

Chair: D. Cazzuffi, Member: D. Fettig

G South American Activities Committee

Chair: E. Palmeira

Closed Committees

G Corporate Members Committee

Chair: R.J. Bathurst

G Technical Committee

Chair: S. Corbet, Members: P. Delmas, B. Myles, and F. Tatsuoka

G Financial Committee

Members: P. Barker, J. Kassner, and B. Myles

G Investment Advisory Committee

Members: G. Heerten and S. Warner

The Secretary's report began with membership statistics. Membership of the Society was reported as 1,701 individuals of whom all, but 216, are Chapter Members, 2 Benefactors, and 86 Corporate Members. Another item of the report addressed electronic publishing of IGS documents. Much discussion led to the conclusion that *IGS News* would be posted on the IGS website for Membership downloading. *IGS News* will also continue to be published in hard copy; however, it is hoped that the Membership will shift to electronic distribution thereby saving the IGS substantial costs for printing and mailing.

Next, the very successful Student Award Program was discussed, resulting in several changes being made to the Program. Council Member M. Lopes was appointed Student Mentor, a position intended to be the student award winners advocate at future conferences and exhibitions (seven student winners were recognised at *EuroGeo2* in Bologna, Italy). The structure of the Program was amended for future meetings. Specifically, students are to be provided: a copy of the conference proceedings, free attendance to sessions, and a student meeting or session during the conference.

The Secretary's report continued with the nomination (and approval by Council) of C. Lawson and T. Akagi for the IGS Service Award. Mr. Lawson and

Prof. Akagi join Dr. D. Elton as recipients of this recognition of special effort on behalf of the IGS.

The Treasurer's report will be published in detail in a separate article. The Society is financially healthy and is actively putting its financial resources to work to bring benefits to the Membership.

The Chapter Committee reports that several new chapters are possible. Belgium has submitted bylaws for approval; Turkey, Slovakia, and Portugal are working to form their Chapters by 1 December 2000 in order to be included in the *2001 IGS Directory*. Other potential chapters are under development in Australia, Malaysia, Scandinavia, and Thailand.

The Education Committee reports that the Lecture Program is nearing completion. At present, efforts are underway to insure all lectures (20) are presented in a consistent format. The geosynthetics teaching lectures will be produced on two CD-Roms for use by the Membership and educators. The IGS now has three videos on geosynthetics: "Geosynthetics in Landfills", by J.P. Giroud; "Geosynthetics in Transportation", by R.M. Koerner; and "Geosynthetics in Reinforced Soil Structures", by T.S. Ingold. Prof. J.P. Gourc has developed a fourth CD, which is under review for the IGS Audiovisual Materials Program.

The European Activities Committee proposed (and it was approved by Council) that *EuroGeo3* be held in Munich, Germany in 2004 and hosted by the German IGS Chapter.

The Standards Committee agreed to the plan for assembling a directory of standards organisations around the world to be posted on the IGS web site. The purpose is to provide the Membership with quick and direct access to standards authorities.

The next IGS Council Meeting will be held during November 2001 in Fukuoka, Japan in conjunction with the *International Symposium on Earth Reinforcement, IS Kyushu 2001*.

reported by Peter Stevenson
IGS Secretary



Conference Venue and Date

Geosynthetics Conference 2001 will be held on 12 to 14 February 2001 at the Oregon Convention Center in Portland, Oregon, USA:

777 NE Martin Luther King Jr. Blvd.
Portland, Oregon 97232, USA
Tel: 1/503 235 7575
Fax: 1/503 235 7417

Organisers

The Conference is organised by the Industrial Fabrics Association International (IFAI), the North American Geosynthetics Society (NAGS), and the Geosynthetic Materials Association (GMA) under the auspices of the IGS.

Theme

The theme for the Conference is "Economics, Performance and Constructibility Advantages of Geosynthetics". Today's full range of products offers innovative, economical, and technical solutions to complex geotechnical engineering problems, along with improved construction techniques. This theme was developed specifically to increase awareness and to provide demonstrated innovations and cost-saving information on geosynthetics as construction alternatives.

Portland, Oregon, USA

Served by more than 20 carriers with direct flights from 120 worldwide cities, Portland is an ideal location for *Geosynthetics Conference 2001*. In addition, the city is home to an exceptional conference center, numerous accessible hotels, as well as award-winning restaurants and other cultural opportunities.

Keynote Presentations

- D *Mr. John Horsley*, Executive Director, American Association of State Highway and Transportation Officials, will present his perspective of the transportation industry in the 21st century on Monday, 12 February, 9:00 a.m.
- D *Mr. Bill Buechner*, Director of Economic and Regulatory Affairs, American Road & Transportation Builders Association, will report on "Transportation Construction for 2001 and Beyond", Tuesday, 13 February, 9:00 a.m.
- D *Mr. Sam Allen*, TRI, will moderate a panel comprised of various industry publication editors. The panel will discuss what they see as the key issues for the 21st century, on Wednesday, 14 February, 9:00 a.m.
- D *Mr. Marty Reif*, Consultant with CH2M-Hill, will discuss changes in the consulting engineering field in the 21st century on Wednesday, 14 February, 1:00 p.m.

Awards of Excellence Program

Technical papers submitted to *Geosynthetics Conference 2001* are evaluated for the NAGS "Awards of Excellence", designed to recognise innovation, creativity, and outstanding contributions in the geosynthetics industry. Winners will be announced at the NAGS Awards of Excellence Reception and Banquet on Wednesday, 14 February, 5:00 to 8:00 p.m.

Why attend *Geosynthetics Conference 2001*?

- D Learn how to solve problems and save money using geosynthetics.

- D Participate in peer-reviewed technical sessions featuring economics, performance, and constructibility advantages of geosynthetics.
- D The Conference will showcase today's full range of geosynthetic products. Attendees will observe firsthand innovative, economical, and technical solutions to complex engineering problems.
- D Professional Development Hours (PDH) awarded to participants.
- D Reduced registration rates for government employees.
- D Complimentary "exhibits-only" passes. (Participants must be registered by 29 January 2001 to receive a complimentary show floor pass.)

Attendee Profile

The Conference will attract more than 1,700 participants representing all disciplines within the engineering and manufacturing community, including engineers, contractors, buyers, users, government agencies, consulting firms, manufacturers, suppliers, distributors, and academia. Attendees will learn how to solve problems and save money using geosynthetics as construction alternatives.

Exhibitor Profile

More than 100 exhibitors covering 1,860 m² of exhibit space are expected to display their latest innovative products and services. A diverse representation of the industry has made this trade show the largest and most respected in the geosynthetics industry. Representatives include manufacturers and distributors of geosynthetics, polymer producers, fabricators and installers, seaming and sealing equipment manufacturers, testing services and equipment suppliers, government agencies, and consulting and engineering service firms.

NAGS Technical Tours

Tour of Canal Linings in Bend, Oregon and Prineville, Oregon, Thursday, 15 February 2001, 8:00 a.m. to 8:00 p.m.

This demonstration project supports the Upper Deschutes River Basin Water Conservation Project (UDRBWCP) study, a cooperative effort between the Bureau of Reclamation, the Oregon Water Resources Department, and several local irrigation districts. The UDRBWCP study seeks to effectively improve water use in the basin to enhance and stabilise Deschutes River flows and to reduce irrigation water shortages. Improved flows will protect and enhance recreation and fish and wildlife.

Reclamation has constructed 27 alternative canal-lining test sections to assess durability and effectiveness over severe rocky subgrades. The lining materials include combinations of geosynthetics, shotcrete, roller compacted concrete, grout-filled mattresses, soil, elastomeric coatings, and sprayed-in-place forms. These test sections are predominantly located in Oregon.

Tour of Bonneville Lock and Dam, Thursday, 15 February 2001, 8:00 a.m. to 4:00 p.m.

In 1930, Congress authorised the Bonneville Dam to be built at the Columbia Gorge National Scenic Area 40 miles east of Portland, Oregon. The U.S. Army Corps of Engineers operates and maintains Bonneville Lock and Dam for hydropower production, fish and wildlife protection, recreation, and navigation. Since 1938, Bonneville Dam has supplied the region with inexpensive electrical power.

Pre-Conference Short Courses

All pre-Conference short course participants will be awarded seven Professional Development Hours. The short courses will take place Sunday, 11 February 2001, 9:00 a.m. to 5:00 p.m.

Geosynthetics in Forest Engineering— Design Principles and Best Practices

Instructor:

G Jonathan Fannin, Ph.D., P.Eng.,
University of British Columbia, Vancouver, British Columbia, USA

Geosynthetic stabilisation of soils involves four basic functions: reinforcement, separation, filtration, and drainage. The extent to which some or all of these functions are mobilised is governed by the construction application and site conditions. This course describes the selection, specification, and installation of geosynthetics in engineering projects. Specifically, it addresses the use of geotextiles and geogrids.

Objectives of the course are twofold. The first is to assist users in exercising their professional judgement and experience in developing site-specific recommendations for construction. (Ten construction case reports are used to highlight important points.) The second objective is to promote the use of best practices in construction. Examples are drawn from the selected case reports and will include unpaved roads, cut-slope and fill-slope stabilisation, subsurface drainage, riprap revetments, and reinforced soil bridge abutments. Guidance is developed with reference to standard specification documents, in particular AASHTO M288, together with relevant foundation engineering manuals.

Geosynthetics for Installers/Contractors

Instructors:

G Sam Allen, Division Manager, TRI/Environmental, Austin, Texas, USA

G Joel Sprague, P.E., TRI/Environmental, Austin, Texas, USA

Many of the most economically advantageous applications for geosynthetics are found in common private sector construction projects. Commercial contractors and installers interested in the technical and economical advantages associated with the use of geosynthetics will find this course to be a valuable op-

portunity to increase their practical geosynthetics knowledge. "Geosynthetics for the Installer/Contractor" will include a basic introduction to geosynthetics, with special emphasis on application basics, technical and economical advantages, and installation guidelines.

The course curriculum will highlight descriptions of geosynthetic applications with rationale and installation guidelines, as well as address the use of geosynthetics in road structures, subsurface drainage, erosion control, soil structures, and liquid containment systems. There will be extensive discussions of reinforcement geosynthetics used in embankments over soft foundations, subgrade stabilisation, base reinforcement, asphalt reinforcement, slopes, walls, and soil veneers.

Each student will be provided the Geosynthetic Materials Association's Geosynthetics Handbook in addition to the course notes. The Handbook covers many of the short-course elements as well as related manufacturer and specification information.

Pavement Systems Design with Geosynthetics

Instructors:

G Barry R. Christopher, Ph.D., P.E.,
Christopher Consultants, Roswell, Georgia, USA

G Ryan R. Berg, P.E., Ryan R. Berg
and Associates, Inc., Woodbury, Minnesota, USA

G Steve Perkins, Ph.D., P.E., Montana
State University, Bozeman, Montana, USA

Pavement system construction and design can be significantly improved through the appropriate use of geosynthetics. Use of the appropriate geosynthetics for the specific application and project conditions can be directly translated into significant cost benefits through improved/expedited construction, extended life of the pavement section, and/or reduction in other pavement component requirements.

The course is designed to meet the needs of civil engineers and others who are involved in the design, construction, and maintenance of permanent pavement systems. The instructors will discuss some of the theoretical aspects of road design using geosynthetics. The focus of the course will be on the practical issues involved with problematic soils, drainage, overall pavement design improvements, and maintenance issues. The training is broad based and should benefit those having little, as well as those who have extensive, previous design and geosynthetics experience.

The instructors will demonstrate how to improve pavement system designs with geosynthetics. Each geosynthetic function will be discussed and related to design concepts and performance properties including recommended design practices. Improved performance will be demonstrated through life-cycle cost-benefit analyses and documented case histories. Selection, specification, and construction procedures will be covered. An overview of geosynthetics in maintenance and rehabilitation applications such as pothole repair and asphalt overlays will also be presented.

Interface Friction/Direct Shear Testing and Slope Issues

Instructor:

G Sam Allen, Division Manager, TRI/Environmental, Austin, Texas, USA

Understanding the specification of interface friction testing and how to interpret and use generated test results have become crucial elements of engineers' jobs. The stability of landfills and leach pads is becoming more important with each new project failure and the increasingly difficult terrain of some sites. Engineers, working with slope stability design issues for the first time, together with geomembrane and geosynthetic clay liner (GCL) manufacturers, have long complained of the difficulty in achieving good, reliable interface strength parameters.

This course will focus on the designer's use of interface strength data including sources of interface strength, peak

versus residual strength, normal stress and failure envelopes, friction angle, adhesion, and slope stability calculations. Included will be detailed forensic analysis of an example slope failure. In addition, the short course will provide a detailed explanation of ASTM D 5321, including detailed discussion of test parameters. Procedural implications of specimen anchorage, normal stress application, machine friction and calibration, rate of shear, and reporting mechanisms will be evaluated. In addition, limitations of the D 5321 test will be explored, with explanation of alternative tests. Special emphasis will be placed on specifying a meaningful shear test that will best serve the user.

Design and Construction of Segmental Retaining Walls

Instructor:

G James G. Collin, Ph.D., P.E., The Collin Group, Ltd., Bethesda, Maryland, USA

This course will focus on the design and construction of segmental retaining walls (SRWs). Participants will learn how to design SRWs using the *National Concrete Masonry Association (NCMA) Design Manual for Segmental Retaining Walls*. Items that will be covered with respect to design of SRWs include: evaluation of the long-term performance of geosynthetic reinforcement; calculation of the required connection strength between segmental concrete units and geosynthetic reinforcement; facing stability and how to design facing stability into an SRW system; internal stability including pullout and rupture of the reinforcement; and external stability including sliding, overturning, and bearing capacity. In addition to the design of SRWs, the short course will focus on the construction of SRWs and important construction procedures.

Technical Sessions

The following is a tentative list of the Technical Sessions that will be held at the Conference:

D Case History I: Erosion Control

D Case History II: Reinforcement

D Case History III: Waste

D Case History IV: Miscellaneous

D Filtration & Drainage

D Material Science & Durability I

D Material Science & Durability II

D Material Science & Durability III

D Material Testing I: Filtration & Drainage

D Material Testing II: GCLs

D Material Testing III: Geomembranes

D Pavements & Railway Systems I

D Pavements & Railway Systems II

D Walls, Slopes & Embankments I

D Walls, Slopes & Embankments II

D Walls, Slopes & Embankments III

D Waste & Liquid Containment I: Final Cover

D Waste & Liquid Containment II: CQA & Seismic

D Waste & Liquid Containment III: Linings

Technical Program and General Conference Information

Danette R. Fettig 1/651 225 6942, E-mail: drfettig@ifai.com

Janet Schneider 1/651 225 6959, E-mail: geo2001@ifai.com or jmschneider@ifai.com

Exhibit Booth Reservations & Sponsorship Opportunities

Chris Kohn 1/651 225 6961, E-mail: crkohn@ifai.com

Bob Smith 1/651 225 6914, E-mail: bhsmith@ifai.com

Registration, Housing, and Meeting Information

Terri Rogers 1/651 225 6945, E-mail: tarogers@ifai.com

Jill Rutledge 1/651 225 6981, E-mail: jmrutledge@ifai.com

Program Advertising

Sarah Hyland 1/651 225 6950, E-mail: schyland@ifai.com

NSF Geomembrane State-of-Practice Paper and Vision Paper Development Workshop (June/July 2000)

The National Science Foundation (NSF) and Auburn University sponsored a workshop on *Geomembrane State-of-Practice Paper and Vision Paper Development*. The Workshop was held for two full days at the Auburn University campus in Auburn, Alabama, USA, on 30 June to 1 July 2000. Ian Peggs (I-Corp International, Inc.) and David Elton (Auburn University) organised the Workshop.

The purpose of the Workshop included reviewing the state-of-practice geomembrane usage in solid waste disposal and liquid impoundment and developing a vision for the future direction of the technology. Two reports will be prepared from the review results.

The following 12 professionals, from the solid waste disposal industry, participated in the meeting, which was moderated by David Elton of Auburn University: Sam Allen (TRI Environmental), Glenn Darilek (Leak Location Services), J.P. Giroud (GeoSyntec Consultants), Robert Haddox (Environmental Protection Systems), Ian Peggs (I-Corp International, Inc.), Robert Phaneuf (New York State Department of Environmental Control), Mark Sieracke (Serrot, Inc.), Richard Thiel (Thiel Engineering), John Workman (Waste Management, Inc.), and Ed Zimmer (GSE Lining Technology, Inc.).

The participants were selected for their expertise in the many facets of the geomembrane solid waste disposal industry — construction, ownership, material properties, liner manufacturing, inspection, testing, design, and govern-



Group photo (left to right): M. Sieracke, J.P. Giroud, S. Allen, D. Elton (organiser), E. Zimmer, R. Haddox, R. Thiel, G. Darilek, I. Peggs (organiser), J. Workman, and R. Phaneuf.

ment regulation. The participation and varying perspectives of the individuals from all of these areas generated very interesting discussions and resulted in a productive meeting.

Workshop topics were selected by the participants and the organisers. The topics included many items related to geomembrane seaming, leak detection and repair, significance of small leaks, puncture protection, use of geomembranes in bioreactors, avoiding destructive seam testing, wrinkles, multiaxial testing, and several other topics. Much of the discussion involved the regulatory consequences resulting from changes in construction procedures and testing protocols.

The Workshop organisers will prepare two reports from the meeting: one on the State of Practice and one on research needs in this important area. The first report will assist others in learning current practices. The second is expected to provide guidelines for the NSF in establishing priorities for research and work in the area of geomembranes in waste disposal.

If you have any questions, please contact Dr. David Elton, E-mail: elton@eng.auburn.edu, or postal address: Civil Engineering Dept., Auburn University, Auburn, Alabama, USA 36849.

*reported by Dr. David Elton
Past-Editor, IGS News*

ASCE Geo-Institute Activities at GeoDenver 2000



August 2000

Boulder, Colorado, USA

The American Society of Civil Engineers (ASCE) Geo-Institute held the *GeoDenver 2000 Conference* in

Denver, Colorado, USA on 3 to 8 August 2000. Over 1,000 geotechnical practitioners, educators, and government em-

ployees attended the technical sessions at the Conference. Seven sessions were held on geosynthetics. *GeoDenver 2000*

was the most recent in a series of very successful Geo-Institute meetings. Geosynthetic sessions were organised in cooperation with the North American Geosynthetics Society (NAGS), the IGS, and the Geosynthetics and Earth Reinforcement Committee (TC9) of the International Society for Soil Mechanics and Geotechnical Engineering (ISSMGE).

The Conference commenced with several geotechnical short courses, including one instructed by R. Barrett, A. Ruckman, J.T.H. Wu, D. Leshchinsky, J.G. Zornberg, and M. Adams on geosynthetic-reinforced soil structures that was well attended. For this short course, participants were shown the rudiments of wall design and several innovative applications. The following day, partici-

pants took an all-day field trip to several ski resorts and small towns in the Rockies to view examples of innovative mechanically stabilised backfill walls and bridge abutments. Yenter Companies sponsored the tour, which was guided by R. Barrett.

There were 84 technical sessions held at the Conference on a wide range of geotechnical topics, including seven on geosynthetics. There were two sessions on advances in geoenvironmental engineering, one moderated by J. Fannin and D. Elton and the other moderated by J.G. Zornberg, B.R. Christopher, and J.K. Mitchell. D. Leshchinsky and J. Otani moderated a session on advances in reinforcement with geosynthetics. There were two sessions on monitoring, one moderated by D. Sandri and J. Paul-

son and the other by J.G. Zornberg, B.R. Christopher, and R.D. Holtz. J. Bowders moderated a session on geosynthetics in hydraulic systems.

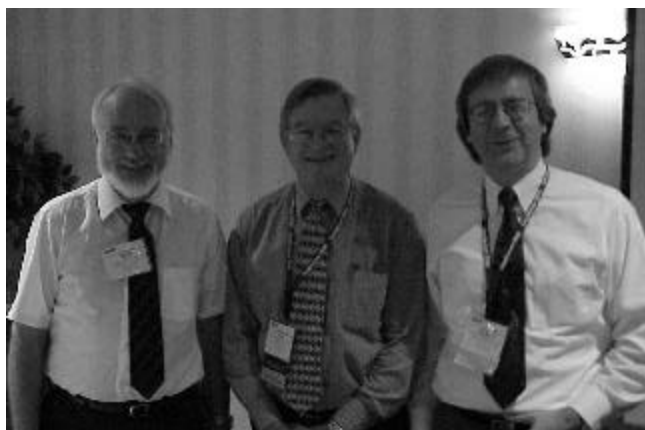
Highlights of the program included keynote lectures by R.M. Koerner on landfill failures and R.J. Bathurst on geosynthetic-reinforced walls.

A total of 27 technical papers have been compiled in *Geotechnical Special Publication 103*, "Advances in Transportation and Geoenvironmental Systems Using Geosynthetics", which was edited by J.G. Zornberg and B.R. Christopher and is available from the ASCE.

The final session was a panel discussion, moderated by J. Fannin and J.G. Zornberg, on the future of geosynthet-



R. Barrett (left) leads the mechanically stabilised backfill wall field trip: houses moved with the help of mechanically stabilised backfill walls (left photo); and a negative battered mechanically stabilised backfill wall (right photo).



R.D. Holtz, J.K. Mitchell, and B.R. Christopher (missing: R.M. Koerner) at the geosynthetics panel discussion.



Geosynthetics session organisers J.G. Zornberg and B.R. Christopher chat with Geo-Institute Geosynthetics Committee Chair J. Bowders.

ics. R.D. Holtz, J.K. Mitchell, R.M. Koerner, and B.R. Christopher formed the panel and each individual presented their ideas on a particular aspect of the future of geosynthetics. Landfills, education, soil reinforcement, hydraulic considerations, and the need for more testing were highlighted. These presentations spurred considerable audience participation, particularly on the efficacy of geosynthetics software and on the need for monitoring wells around double-lined landfills. It was generally agreed upon that greater geosynthetics education is required.

The Geo-Institute Geosynthetics Committee held a meeting that was

Chaired by J. Bowders. Over 20 professionals attended and participated in the Committee's planning process, which included the development of future technical sessions at conferences and preliminary plans for geosynthetics education activities. The next Committee meeting will take place at the *GRI-14 Conference* to be held in Las Vegas, Nevada, USA, 15 to 16 December 2000. For information on this meeting, contact J. Bowders (Tel: 1/573 882 8351, E-mail: bowders@missouri.edu).

The Geosynthetics and Earth Reinforcement Committee (TC9) of the ISSMGE also held a meeting during the Conference, under the coordination of

its Secretary, J. Otani. Activities discussed during the meeting included ongoing compilation of case histories, comparison of international guidelines for reinforced soil design, and geosynthetics education.

The next Geo-Institute conference, *Geo-Odyssey*, will be held 10 to 13 June 2001 at Virginia Polytechnic Institute and State University in Blacksburg, Virginia, USA. Details are available at <http://www.conted.vt.edu/geo2001.htm>.

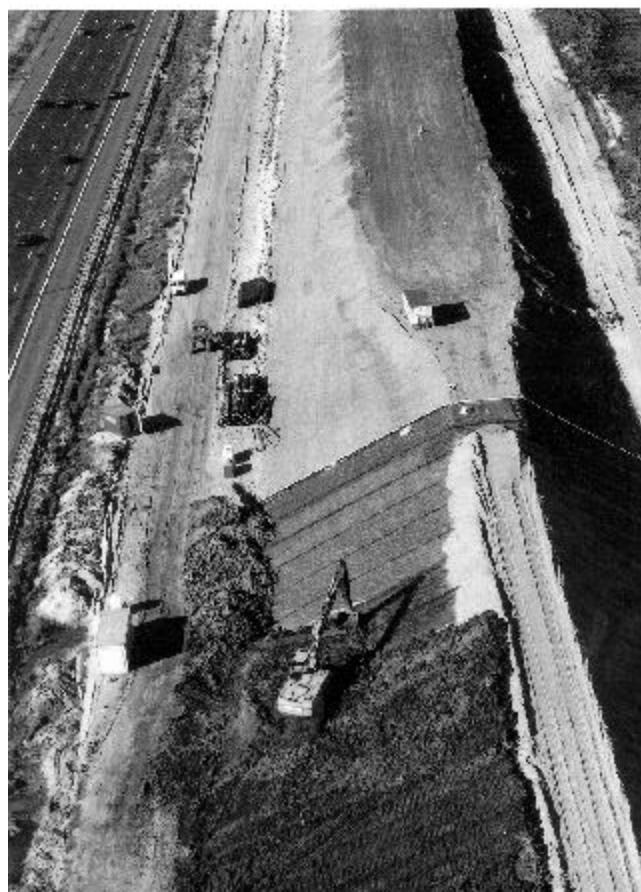
reported by David Elton
Past-Editor, IGS News

Geosynthetics System – Noise Barrier Application Motorway A12, Netherlands

The new housing development of Veldhuizen near De Meem, Netherlands, is located next to Motorway A12, one of the busiest motor routes be-

tween Utrecht and The Hague. To reduce vehicular noise levels in the new housing development, the city of Vleuten/De Meem planned a 10 m-high noise

barrier with an additional approximate 3 m-high wall on the wall crest. The noise barrier runs parallel to Motorway A12 and is approximately 1,500 m long. The



design, including the stability calculations, was carried out by a consulting company in coordination with the housing development owner.

The barrier was built with approximately 650,000 tons of cinder from incineration plants. According to the *Dutch Guideline for Construction Materials* the cinders may be considered as a secondary construction material. When using this secondary construction material, various requirements for the protection of the environment must be fulfilled. For example, the law states that the incineration cinders must not come into contact with groundwater.

The technical requirements for the entire project were stringent and were defined as follows:

- D The stability of the construction must be ensured in the long term.
- D After final consolidation, the secondary construction material must be at least 0.5 m above the average highest groundwater level.
- D No precipitation may get into the

noise barrier.

- D An expert company should carry out the sealing with approved materials and in accordance with the quality-control measures.

One company was able to meet all of the necessary requirements and was awarded the contract to supply the entire sealing and reinforcement system.

The core of the noise barrier wall consists of cinders. A composite seal, comprising a geosynthetic clay liner and a 2 mm-thick structured geomembrane made from chemically resistant high-density polyethylene, was installed directly on the compacted cinders. The structure on both sides of the geomembrane ensures the necessary friction performance in the shear plane.

The polypropylene nonwoven protection geotextile (installed on the sealing system) has two functions in this application: primarily, it serves to safely protect the underlying geomembrane against mechanical damage; and secondarily, it enables

seepage water to discharge from the top-soil layer.

To ensure the stability of the 1.5 m-thick top-soil layer and to take up the forces directed down the slope, a polyester (PET) geogrid was installed. The resin PET ensures a low creep factor. The monolithic, extruded flat bars of the geogrid have high tensile properties, even at $\leq 2\%$ elongation and ensure optimum protection against on-site installation loads. The geogrid also provides an immediate interlocking effect with the top soil. For anchoring, the geogrid was embedded into the fill crest.

All of the geosynthetics used in this construction project were manufactured by the same company according to DIN EN ISO 9001. Installation was carried out by an installation company certified to ISO 9001. Approximately 1,000 m²/day was installed. The noise barrier was constructed in two sections: one 600 m long and the other 900 m long.

*reported by Andries Steerenberg
Secretary, Netherlands IGS Chapter*

Geosynthetics International

An Official Journal of the IGS

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

The Editor of *Geosynthetics International* (Prof. T.S. Ingold), Co-Editor (Prof. R.J. Bathurst), and Chair of the Editorial Board (Dr. J.P. Giroud) have more than 30 years of combined experience with the publication of technical journals. They are assisted by a first-rate Editorial Board composed of international experts that are appointed to four-year terms and who represent a broad range of geosynthetics expertise.

Special issues devoted to specific, state-of-the-art topics have included "Design of Geomembrane Applications", "Liquid Migration Control Using Geosynthetic Liner Systems", "Geosynthetics in Earthquake Engineering", and "Liquid Collection Layers".

Geosynthetics International is dedicated to the mission of the IGS, which is to promote the scientific and engineering development of geotextiles, geomembranes, related products, and associated technologies. *Geosynthetics International* offers a reduced subscription rate to Individual IGS Members. Individual IGS Members can subscribe for US\$150 per 6 issues. *Geosynthetics International* is offered to university and college libraries at US\$180 per 6 issues. The standard rate of US\$272 applies to all others.

Papers should be work not published in full elsewhere and should be sent to any of the following individuals:

*Dr. T.S. Ingold, Editor
Geosynthetics International
Mulberry Lodge, St. Peters Close
St. Albans, AL1 3ES, United Kingdom
Tel.: 44/1727 842433
Fax: 44/1727 845266*

*Professor R. J. Bathurst, Co-Editor
Geosynthetics International
(see p. 15 for complete address)*

*Dr. J.P. Giroud, Chair
Geosynthetics International
GeoSyntec Consultants
621 N.W. 53rd Street, Suite 650
Boca Raton, Florida 33487, USA
Tel.: 1/561 995 0900
Fax: 1/561 995 0925*

For subscriptions, contact:

Ms. Susan Smeed
Geosynthetics International
Assistant Circulation Manager, IFAI
Tel.: 1/612 222 2508
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Recent Contents

Volume 7, No. 1 (2000)

"Behavior of EPS Geofoam as Flexible Pavement Subgrade Material in Model Tests", Y. Zou, J.C. Small, and C.J. Leo

"Comparison of Geotextile Durability to Outdoor Exposure Conditions in the Peruvian Andes and Southeastern USA", D.G. Grubb, W.E. Diesing III, S.C.J. Cheng, and R.M. Sabanas

"Using a Reduced Equivalent Diameter

for a Prefabricated Vertical Drain to Account for Smear", A.L. Welker, R.B. Gilbert, and J.J. Bowders

"Experimental Study of Bearing Capacity of a Strip Foundation on Geogrid-Reinforced Sand", E.C. Shin and B.M. Das

Volume 7, No. 2 (2000)

"Investigation of the Isochrone Concept for Predicting Relaxation of Geogrids", V.N. Kaliakin, M. Dechasakulsom, and D. Leshchinsky

"Permeability of Damaged Geosynthetic Clay Liners", F. Mazzieri and E. Pasqualini

"Discharge Capacity of a Prefabricated Vertical Drain Confined in Clay", N. Miura and J.C. Chai

"Finite Element Study of a Geosynthetic-Reinforced Soil Retaining Wall With Concrete-Block Facing", H.I. Ling, C.P. Cardany, L.-X. Sun, and H. Hashimoto

Volume 7, No. 3 (2000)

Note from the Editors: Reprinting of the Technical Paper "Finite Element Study of a Geosynthetic-Reinforced Soil Retaining Wall With Concrete-Block Facing", H.I. Ling, C.P. Cardany, L.-X. Sun, and H. Hashimoto

"Effect of Prefabricated Vertical Drain Clogging on the Rate of Consolidation: A Numerical Study", D. Basu and M.R. Madhav

"Effect of the Foundation Quality on a Geotextile-Reinforced, Brick-Faced Soil Retaining Wall", M.I.M. Pinto and T.W. Cousens

"Shear-Induced Changes in Smooth HDPE Geomembrane Surface Topography", T.E. Zettler, J.D. Frost, and J.T. DeJong

"A Theoretical Model for Anchored Geosynthetics in Pull-Out Tests", N. Gurung

Geotextiles and Geomembranes

An Official Journal of the IGS

Geotextiles and Geomembranes is ahead of schedule. Volume 18 (2000) will include a special issue on GCLs with Dr. Malek Bouazza as Special Editor.

Dr. Jean-Pierre Gourc is planning to prepare a Special Issue on Erosion. If you are interested in contributing to this special issue, please contact Dr. Gourc at the address on p. 15, or by e-mail: gourc@ujf-grenoble.fr

The Editorial Board Members and reviewers have worked very hard over the past year to provide detailed, constructive reviews in a very timely manner. The average review period is less than three months. Papers come from a wide range of countries with approximately a third of the papers coming from the Americas, Europe, and the rest of the world. The rejection rate is 44%. The Journal's Editor and Board Members are extremely appreciative of the authors' hard work in addressing the reviewers' comments and the quick return of revised papers.

All technical contributions and inquiries should be directed to:

Professor R. Kerry Rowe, Editor
Geotextiles and Geomembranes
Department of Civil Engineering

Queen's University
Kingston, Ontario, K7L 3N6, Canada
Fax: 1/613 533 2128
E-mail: rowek@post.queensu.ca

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

Recent Contents

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"Database of field incidents used to establish HDPE geomembrane stress crack resistance specifications", Y.G. Hsuan

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"Analysis of tension development in geomembranes placed on landfill slopes", J. Kodikara

"Discussion: Back analyses of geosynthetic reinforced embankments on soft soils", C.T. Gnanendran, R.K. Rowe, and A.J. Valsangkar

"Reply to 'Discussion: Back analyses of geosynthetic reinforced embankment on soft soils'", E.M. Palmeira, J.H.F. Pereira, and A.R.L. Da Silva

"Discussion: Back analyses of geosynthetic reinforced embankments on soft soils", D. Bergado

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"Swelling characteristics of needle-punched, thermally treated geosynthetic clay liners", C.B. Lake and R.K. Rowe

"Diffusion of sodium and chloride through geosynthetic clay liners", C.B. Lake and R.K. Rowe

"Evaluating the hydraulic conductivity of GCLs permeated with non-standard liquids", C.D. Shackelford, C.H. Benson, T. Katsumi, T.B. Edil, and L. Lin

"Field evaluation of hydraulic performances of geosynthetic clay liners by small and large-scale tests", D. Cazaux and G. Didier

"Hydraulic performance of geosynthetic clay liners under gravel cover soils", P.J. Fox, D.J. De Battista, and D.G. Mast

"Comparison of peel bond and sheartensile test methods for needle-punched geosynthetic clay liners", K.P. von Maubeuge and H. Ehrenberg

"Evaluation of diffusive gas flux through covers with a GCL", M. Aubertin, M. Aachib, and K. Authier

"Gas permeability of geosynthetic clay liners", G. Didier, A. Bouazza, and D. Cazaux

"Measurement of air permeability of geosynthetic clay liners", H. Y. Shan and J. T. Yao

"Installation and monitoring of a geosynthetic clay liner as a canal liner in a major waterway", K.P. von Maubeuge, J. Witte, and M. Heibaum

Corporate Profile

Corporate Members of the IGS are encouraged to publish a Corporate Profile in IGS News. A maximum of three profiles can be published in each issue of IGS News. The criteria for the preparation and submission of Corporate Profiles are available from the Editor. There is no charge for having a Corporate Profile published; it is a benefit of corporate membership.

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provides practical solutions to today's environmental problems. A full-service, global, environmental company, CETCO is backed by more than 70 years of bentonite mining and manufacturing experience. We are committed to providing quality products that are both cost effective and sensitive to the preservation of the environment.

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GCLs provide an economical alternative to compacted clay liner systems. With a typical hydraulic conductivity of 5×10^{-9} cm/s, GCLs provide seepage protection equivalent to more than 0.9 m of compacted clay. In addition, GCLs are economical and easy to install: simply unroll and overlap to form a perfect seam.

CETCO offers five standard GCLs: Claymax[®] 200R and Claymax[®] 600CL, which are used for flat areas; Bentomat[®] ST, Bentomat[®] DN, Bentomat[®] CL, and Bentomat[®] CLT, which are used for designs requiring high internal shear strength.

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Bentomat CL and Claymax CL GCL liners used for City of Pangburn, Arizona, USA sewage pond construction.



Bentomat ST GCL used at the defunct Gary, Indiana, USA landfill.



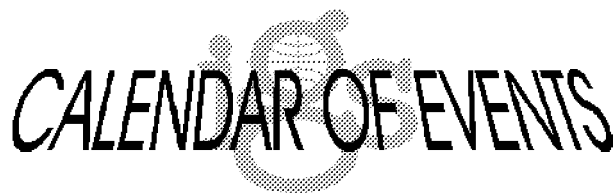
Bentomat ST and Claymax 200R GCLs used for the Mt. Airy, North Carolina, USA landfill.

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15-16 December 2000*
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Tel: 1/610 522 8440
Fax: 1/610 522 8441
E-mail: marilyn.ashley@coe.drexel.edu

*10th International Conference of
IACMAG
Tucson, Arizona, USA
7-12 January 2001*
Contact: Engineering Professional
Development
Tel: 1/520 621 3054
Fax: 1/520 621 1443
E-mail: epd@enr.arizona.ed
<http://www.u.arizona.edu/~tkundu/10IA>

Geosynthetics 2001
*Portland, Oregon, USA
12-14 February 2001*
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Tel: 1/651 225 6942
Fax: 1/651 631 9334
E-mail: drfettig@ifai.com

*3rd Austrian Geotechnical Conference
Vienna, Austria
26-27 February 2001*
Contact: Dr. M. Fross
Fax: 43/1 58801 22198
E-mail: m.fross@tuwien.ac.at

*FS - KGEO 01
Kunststoffe in der Geotechnik
Munich, Germany
20-21 March 2001*
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Tel: 49/89 289 27131
Fax: 49/89 289 27189
E-mail: fs-kgEO@lrz.tu-muenchen.de

*Fourth International Conference on Re-
cent Advances in Geotechnical Earth-
quake Engineering and Soil Dynamics
San Diego, California, USA
26-31 March 2001*
Contact: Dr. Shamsher Prakash
Tel: 1/573 341 4489

Fax: 1/573 341 4729
E-mail: prakash@novell.civil.umr.edu
<http://www.umr.edu/~conted/conf8767.html>

*2001: A Geo-Odyssey
Foundations and Ground Improvement
Blacksburg, Virginia, USA
9-13 June 2001*
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Tel: 1/540 231 5103
Fax: 1/540 231 7532
E-mail: jmd@vt.edu
<http://www.geoinstitute.org>

*XVth International Conference on Soil
Mechanics and Geotechnical Engineering
Istanbul, Turkey
27-31 August 2001*
Contact: Prof. Ergün Togrol
Tel: 90/212 285 3747
Fax: 90/212 285 3582
E-mail: 15icsmge@itu.edu.tr
<http://www.itu.edu.tr/2001/>

*54th Annual Canadian Geotechnical
Conference
Calgary, Alberta, Canada
16-19 September 2001*
Contact: Mr. Mahmoud Mahmoud
E-mail: mmahmoud@golder.com
<http://www.cgygeosociety.org/2001.html>
Abstracts due 15 December 2000

*Ghent Environmental Geotechnics
Specialty Conference, Underwater
Geoenvironmental Issues
Ghent, Belgium
29-31 October 2001*
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Tel: 32/0 9 264 57 17
Fax: 32/0 9 264 58 49
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Abstracts due 15 December 2000
Papers due 15 May 2001

**International Symposium on Earth
Reinforcement (IS Kyushu 2001)**
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Tel. and Fax: 81/92 642 3285
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Abstracts due 29 December 2000
Papers due 29 April 2001

*International Deep Foundations
Congress: Down to Earth Technology
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*4th International Congress on
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E-mail: 4iceg@pec.coppe.ufrj.br
Abstracts due 1 June 2001

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

Vice-President

Ing. Daniele A. Cazzuffi
ENEL.Hydro
Via G. Pozzobonelli, 6
20162 Milano
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E-mail: cazzuffi.daniele@enel.it

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Prof. Colin J.F.P. Jones
Department of Civil Engineering
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UNITED KINGDOM
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THE NETHERLANDS
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Mr. Peter E. Stevenson
226 Sitton Rd.
Easley, SC 29642-8393
USA
Tel.: 1/864 855 0504
Fax: 1/864 859 1698
E-mail: igspete@aol.com

The IGS News Editors

Ms. Karina Labinaz

Editor

IGS News

Department of Civil Engineering
Royal Military College of Canada
P.O. Box 17000 STN Forces
Kingston, Ontario K7K 7B4 CANADA
Tel: 1/613 541 6000, Ext. 6347
Fax: 1/613 545 8336
E-mail: labinaz-k@rmc.ca

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IGS News

Grenoble University
IRIGM-Lgm
B.P. 538041 Grenoble Cedex 9
FRANCE
Tel: 33/76 51 49 46
Fax: 33/76 51 49 00
E-mail: gourc@ujf-grenoble.fr

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The International Geosynthetics Society

OBJECTIVES OF THE IGS



The International Geosynthetics Society was formed with the following objectives:

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

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First, to contribute to the development of our profession.

By becoming an IGS Member you can:

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- contribute to the advancement of the art and science of geotextiles, geomembranes, related products, and associated technologies; and
- participate in a forum for designers, manufacturers, and users, where new ideas can be exchanged and contacts improved.

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The following benefits are now available to all IGS Members:

- a directory of Members, the IGS Directory, published every year, with addresses, telephone, e-mail, and fax numbers;
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For editorial enquiries contact: Ms. Karina Labinaz

Department of Civil Engineering, Royal Military College of Canada

P.O. Box 17000, STN Forces, Kingston, Ontario, CANADA K7K 5L0

Tel: 1/613 541 6000, Ext. 6347 or 1/613 533 3108, Fax: 1/613 541 6218, E-mail: labinaz-k@rmc.ca