



KWAZULU-NATAL LANDFILL INTEREST GROUP

LANDFILL 2005

6th Biennial LIG Seminar
21 & 21 October 2005

Seminar: "Landfilling in Challenging Environments"



IWMSA

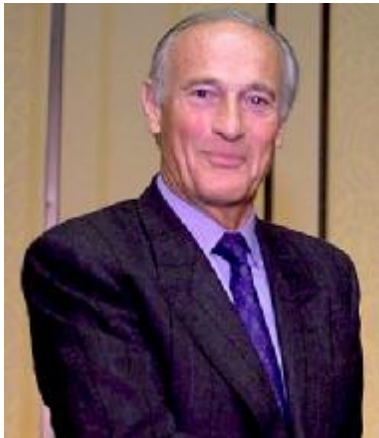
In Association With
**The Geosynthetics
Interest Group of South Africa**



Landfill 2005 Programme Features First Mercer Lecture To Be Presented In Africa

The Mercer Lecture is a biennial lecture that is sponsored by Tensar International with the endorsement of the International Geosynthetics Society and ISSMGE. The aim of the lecture is to promote cooperation and information exchange between geotechnical engineering and geosynthetics engineering. Dr. J.P. Giroud will present the Mercer Lecture during the opening session on 21 October.

"Contribution Of Geosynthetics To The Geotechnical Aspects Of Waste And Liquid Containment"



Dr. J.P. Giroud

Dr. Giroud is Past President of the International Geosynthetics Society (IGS) and Chairman Emeritus of GeoSyntec Consultants of the USA. A practicing engineer with extensive field experience, he has developed and published many of the methods used to design applications of geosynthetics in landfills. Dr. Giroud has presented keynote lectures to numerous international conferences. In February 2005, he delivered the Vienna Terzaghi Lecture.

Introduction to this Mercer Lecture

Geosynthetics are indispensable in modern waste containment and, more generally, in geotechnical and geoenvironmental engineering. They provide new solutions and, at the same time, pose new challenges to geotechnical engineers. The two main geotechnical goals in waste containment design are the control of liquids that transport contaminants and the short- and long-term integrity of landfills. The lecture will show how geosynthetics are used to achieve these geotechnical goals and will identify areas where research and development are needed.

The first part of the lecture will address the contribution of geosynthetics to liquid control. Composite liners, which associate clay (and/or bentonite geocomposites) with geomembranes, are orders of magnitude more effective than clay alone. However, it will be shown that geotechnical engineers are challenged by aspects of material behaviour that are unusual in traditional geotechnical engineering, such as: desiccation of clay or bentonite even when these materials are covered with a geomembrane, and geomembrane wrinkling due to thermal expansion, two mechanisms that may impair the effectiveness of composite liners. Another aspect of liquid control is the use of drainage layers to collect and remove leachate. The benefits that result from the use of geosynthetic drainage materials will be mentioned. At the same time, the challenges associated with these materials will be discussed, such as the use of time-temperature superposition to predict the long-term compressive creep and the resulting decrease in hydraulic transmissivity of geosynthetic drainage materials.

The second part of the lecture will address the contribution of geosynthetics to short- and long-term integrity of landfills. The steep slopes needed to increase waste storage capacity lead to stability problems. Geosynthetics are extensively used in landfills to reinforce slopes, but their use is associated with numerous challenges. On one hand, geotechnical engineers are well prepared to deal with stability problems. On the other hand, they have to face new challenges such as: the development of slip planes in slopes with multiple interfaces, the

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influence of pore pressure on the behaviour of waste, and the influence of gas pressure on the stability of landfill covers. Also, it will be shown that geosynthetic drainage materials, which appear to be equivalent to granular drainage materials from the viewpoint of the impact of drainage on slope stability based on traditional steady-state flow calculations, are in fact not equivalent as shown by transient flow calculations. Thus, a greater factor of safety regarding flow capacity is required from geosynthetic drainage materials to achieve the same safety regarding stability as granular drainage materials.

The examples mentioned above are only a few of the geosynthetics benefits and associated challenges that will be presented in the lecture. Field situations, including failures, will be shown using numerous photographs. Technology transfer from the use of geosynthetics in waste containment applications to the use of geosynthetics in liquid containment applications will be illustrated by applications of geosynthetics in large dams. The lecture will provide useful information to practicing engineers and the challenges presented will inspire researchers.



Dr. Jean-Piere Giroud receives an International Geosynthetics Society's Hero Award, and the IGS Award for exceptional innovation and leadership in the geo-technology industry, from IGS President Daniele Cazzuffi.

This award was presented at the The Geo-Frontiers Congress, a joint venture with the Geosynthetic Materials Association (GMA) and the Industrial Fabrics Association International (IFAI), was held in Austin, Texas, January 23-26, 2005. The show was a great success with more than 1850 attendees and 126 exhibitors.