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Abdel-Atty, Khaled

An Experimental and Theoretical Evaluation of the Environmental Protection Provided by the Composite Liner Systems

An Experimental program has been developed to investigate the environmental protection provided by composite liner systems. The research program has two components, the first involves the development of tests to examining the effect of moisture transfer (during hydration) and chemical diffusion associated with the placing of a GCL either in direct contact with, or near to, a calcium rich soil from which the calcium can migrate by diffusion. The second component involves modelling the migration of contaminants through a hole in a geomembrane that rests on a GCL. Consideration will be given to the effects of holes size, applied stress and head. The results will be compared with the experimental data that is being developed.

Cooke, Andrew

A Model for the Prediction of Clogging in Landfill Leachate Collection Systems

A numerical model has been developed for predicting the rate of clogging of granular drainage layers caused by biological growth and biochemically driven precipitation in landfill leachate collection systems. The model is being applied to model field conditions, mesocosms and column experiments. The model predicts the substrate utilization, growth and decay of biofilm, and accumulation of inert biomass and calcium carbonate on the granular media at any time, or position, in the drainage layer and the effect of this on porosity and hydraulic conductivity.

Goveas, Len

Effect of 3-D Geometry and Dissolved Gas on the Geotechnical Performance of Excavations in

Clayey Till

Theoretical and experimental studies are focussed on assessing the effect of the 3-D geometry of the excavation and the ex-solution of dissolved gas on unloading upon the stability of excavation in clay and clayey till. Emphasis is placed on understanding the effect on the stability and performance of recent excavations near Sarnia, Ontario.

Islam, M. Zahirul

Service Life of Geosynthetic Liners

High Density Polyethylene (HDPE) geomembranes are extensively used as primary or secondary landfill. This research uses laboratory-accelerated aging of geomembrane liners under different exposure conditions to predict the service life of these geomembranes. A time-temperature superposition model and three-stage degradation model will be used in predicting the service life of HDPE geomembrane liners. Finally, the results will be used to provide guidelines for the design of cost-effective landfill lining systems.

Lange, Karina

An Examination of GCLs as a potential barrier to the migration of metals leaching from mine tailings and municipal solid waste

The efficiency of GCL's to attenuate potentially hazardous metals and metalloids that are leached from municipal solid waste and mine waste is being examined. Particular attention is being paid to the containment of As-rich, neutral-pH solutions typical of gold mine leachate. The sensitivity of GCL performance to changes in pH is being examined together with the mechanism of metal attenuation and the adsorption onto bentonite, sorption onto Fe and Mn hydroxides, the effect of reducing conditions on the long-term stability of these hydroxides, and metal precipitation as carbonates, oxides, and sulfates. (Co-supervised with Prof. H. Jamieson).

McIsaac, Reagan

Biologically Induced Clogging in an Unsaturated Leachate Collection Layer

Experiments are being conducted to examine the biologically induced clogging in an unsaturated collection layer consisting of clear stone. The effect of thickness of stone, overlying filter material (e.g. geotextile, sand, etc.), and stone size are being examined.

Hoor, Azadeh

Thermal behavior of landfill lining system

Heat generated within landfills creates thermal gradients that have the potential to cause outward moisture movement and desiccation of mineral components of composite lining system. Studies are being carried out in order to assess the behaviour of lining system subjected to thermal gradients. Several issues affecting the behaviour of the medium are being explored based on numerical models and experimental studies.

Kalinovich, Indra

Investigating the Design and Applications of a Funnel and Gate Barrier System for PCB Remediation in the Canadian Arctic

The application of geosynthetics as filters and sorbents in a funnel and gate barrier system is being investigated for use on Resolution Island, Nunavut. Laboratory experiments will take into consideration design challenges such as climate, historical and geological properties of the site in question as well as the chemical properties of the contaminant (polychlorinated biphenyls). Soil-water-geotextile interface kinetics will be determined and applied along with technical properties of the geosynthetics as criteria for determining the best choice of materials for the barrier system. (Co-supervised by Dr. J. Poland and Dr. A. Rutter).

Mabrouk, Ahmed

The analysis of a deep excavation in a gassy soil

Develop a finite element model to represent the behavior of gassy soils and to model complex three-dimensional excavations in these soils (with particular reference to two failures that occurred near Sarnia in 1990s which will be used as case histories to verify the predicative capability of the model). This project will involve (a) building a 3D finite element model using Abaqus (b) developing and implementing a 3 phase gassy soil constitutive model which accounts for the behavior and interaction of the soil particles (solid phase), the pore water (liquid phase) and the methane (gas phase); (c) modeling the transition from the initial conditions two phase conditions (with the gas dissolved in the pore water) to the final three phase conditions; (d) modeling the effect of complex three dimensional unloading conditions on the dissolution of gas and the consequent changes in the soils effective stress and strength response.

Quinn, Pete

Management of Quick Clay Landslide Hazards for Transportation and Communication Corridors

The work will examine the hazard and risk of landslides in highly sensitive clays in eastern Canada, with a view to developing an effective system for managing the risk of this unique natural hazard for communications, transportation and other linear infrastructure. The work will explore several issues associated with these slides, which tend to be very rapid and destructive, and which can retrogress substantially to affect a very large area in comparison with the initial triggering slide. Some elements will include: pore pressure response of sensitive soils; time and rate behaviour of sensitive clays; initiation of quick clay earthflows (fast retrogressive slides); spatial distribution of quick clay slides (GIS linkage); temporal distribution of quick clay slides (potential GIS linkage); triggering of slides in sensitive clays; and, retrogression of slides in sensitive clays. The work will support government and industry demands for more effective management approaches.

Rimal, Santosh

Ageing of geosynthetic liners

The ageing study on High Density Polyethylene (HDPE) geomembrane is being carried out under a range of conditions and different liner configurations. Accelerated ageing experiments are conducted to primarily examine the ageing of geomembrane as a part of composite liner system. Different liner configurations are used in the study which comprises of geosynthetic and granular materials such as HDPE Geomembrane, Geosynthetic Clay Liner (GCL), Geotextile compacted soil, and gravel. The composite liner is exposed to synthetic landfill leachate. Another study involves examination of the second stage of ageing of geomembrane exposed to various media in accelerated oven-ageing experiments. A study on the effect of sunlight exposure on geomembrane is also carried out. Experiments on the durability of HDPE geomembranes and fluorinated HDPE geomembranes exposed

to Jet Fuel A-1 is also being conducted.

Taechakumthorn, Chalermpol

The Study of Embankment and Reinforced Wall Behaviour on Rate-Sensitive Clay Foundation Using Finite Element Analysis

Apply the time-dependent elastic-viscoplastic constitutive model using state-dependent viscosity parameters to study the behaviour of embankment and reinforced walls on rate-sensitive clay foundations using Finite Element Analysis. The constitutive model is coupled with Biot consolidation theory formulated using the theory of overstress viscoplasticity, an elliptical cap yield surface, the Drucker-Prager failure envelop and critical state soil concept. The use of techniques such as reinforcement, prefabricated vertical drains and stage construction technique are being examined separately and in combination.

McWatters, Rebecca

Diffusion of Contaminants through Barrier Systems

The diffusion of volatile organic compounds through different barrier systems used in engineered landfills contributes to contamination of the surrounding groundwater, soil and air. The extent and mechanisms of gas transport through geomembranes liners is not well known. An experimental program involving both computer modelling and laboratory testing has been developed to better understand these mechanisms through both High Density Polyethylene (HDPE) and Polyvinyl Chloride (PVC) geomembranes. Analysis will be directed at understanding the migration of contaminants, in both the gas and liquid phase, through new and aged liners and assessing the potential service life of these liners. Tests will determine the diffusion and sorption properties of geomembranes and the effect of aging on these properties. Results from these experiments will be used to extend the current modelling program to allow prediction of gaseous contaminant migration rates through any landfill system. In addition, results from this research will be used to assess how aging influences long-term contaminant transport through geomembranes.

M.Sc. STUDENTS

Paudyn, Krysta

Investigation and Implementation of a Hydrocarbon Contaminant Remediation Solution in the Canadian Arctic

The application of both bioremediation and a barrier system for contaminant remediation is being investigated for implementation on Resolution Island, Nunavut. Preliminary investigations include site delineation and investigation of spill extent, CCME hydrocarbon chemical analysis and an in situ bioremediation study. The project will include an investigative approach to employing Canada-wide Standards for Petroleum Hydrocarbons in soil and ultimately a project proposal for an environmental cleanup solution. Prospective solutions include soil bioremediation and barrier construction. Experimental design will consider challenges such as chemical properties of the hydrocarbon contaminant and character of the diesel spill; including geographic location, history, geology and climatology of the site. Technical properties of geosynthetics will be assessed as criteria for incorporation in the barrier design. Laboratory experiments will include but not be limited to ex situ bioremediation of indigenous soil and a molecular investigation and characterization of degraded vs. new spill diesel. (Co-supervised by Dr. J. Poland and Dr. A. Rutter).

Current Post-Doctoral Fellows and Visiting Researchers

Dr. Dalinaidu Arnepalli - Long-term Performance of Geosynthetics

Supervised Students (1991 - present)

Ph.D.

Mylleville[1,2,3]**, B. L.J** Ph.D., 1991 Journal Papers: 2 Book Chapter: 1 Conference Papers: 7 Associate and Office Manager, Golder Associates, Vancouver
Thesis: Behaviour of heavily reinforced embankments on soft foundations
Publication: Rowe, R.K. and Mylleville, B.L.J. (1993). "The stability of embankments reinforced with steel," *Canadian Geotechnical Journal*, **30**(5): 768-780.

Ho, S.K. [4] Ph.D., 1993 Journal Papers: 4 Conference Papers: 2
Senior Lecturer, Hong Kong Technical College, Hong Kong
Thesis: A numerical investigation into the behaviour of reinforced soil walls
Publication: Ho, S.K. and Rowe, R.K. (1994). "Predicted behaviour of two centrifugally modelled soil walls," ASCE *Journal of Geotechnical Engineering*, **120**(10): 1845-1873

Gnanendran, C.T. [5] Ph.D., 1993 Journal Papers: 4 Conference Papers: 3
Senior Lecturer (Associate Professor), University of New South Wales, Canberra, Australia
Thesis: Observed and calculated behaviour of a geotextile reinforced embankment on a soft compressible soil
Publication: Rowe, R.K., Gnanendran, C.T., Landva, A.O. and Valsangkar, A.J. (1995) "Construction and performance of a full scale geotextile reinforced test embankment Sackville, New Brunswick," *Canadian Geotechnical Journal*, **32**(3): 512-534

Nadarajah , P. Ph.D., 1994 Journal Papers: 4 Conference Papers: 4
Senior Design Engineer (Geotechnical & Tunneling), Land Transport Authority, Singapore
Thesis: Applications for modelling in landfill design
Publication: Rowe, R.K. and Nadarajah, P. (1993). "Evaluation of the hydraulic conductivity of aquitards," *Canadian Geotechnical Journal*, **30** (5): 781-800.

Badv, K. Ph.D., 1995 Journal Papers: 5 Conference Papers: 1
Assistant Professor, Faculty of Engineering, Urmia University, Iran
Thesis: Diffusive and advective transport in saturated and unsaturated soils in saturated and unsaturated soils
Publication: Rowe, R.K. and Badv, K. (1996). "Advective-diffusive contaminant migration in unsaturated sand and gravel," ASCE *Journal of Geotechnical Engineering*, **122**(12): 965-975.

Hinchberger, S.D. Ph.D., 1996 Journal Papers: 3 Conference Papers: 1
Assistant professor, University of Western Ontario, ON
Thesis: The behaviour of reinforced and unreinforced embankments on rate sensitive clayey foundations
Publication: Rowe, R.K. and Hinchberger, S.D. (1998). "The significance of rate effects in modelling the Sackville test embankment," *Canadian Geotechnical Journal*, **35**(3): 500-516

Fleming, I.R. [6, 7 & 8] Ph.D., 1999 Journal Papers: 3 Conference Papers: 9
Associate Professor, Dept. of Civil Engineering, University of Saskatchewan.
Thesis: Biogeochemical processes and clogging of landfill leachate collection systems
Publication: Fleming, I.R., Rowe, R.K. and Cullimore, D.R. (1999). "Field observations of clogging in a

landfill leachate collection system, "*Canadian Geotechnical Journal,* **36**(4): 685-707.

Brachman, R.W.[9] Ph.D., 1999 Journal Papers: 5, Book Chapter: 1, Conference Papers: 4
Assistant Professor, Queen's University, Kingston, Canada
Thesis: Mechanical performance of landfill collection pipes (co-supervised with I.D. Moore)
Publication: Brachman, R.W.I., Moore, I.D., and Rowe, R.K. (1999) "The Design of a Laboratory Facility for Evaluating the Structural Response of Small Diameter Buried Pipes", *Canadian Geotechnical Journal*, **37**(2):281-295.

Dittrich, P. Ph.D., 2000 Journal Papers: 1 Conference Papers: 3
Senior Engineer, Golder Associates, Mississauga.
Thesis: Slope behaviour during excavation of the Sarnia approach to the St. Clair tunnel
Publication: Dittrich, J.P., Becker D.E. Rowe, R.K., and Lo, K.Y. (2000) "Analysis of the 1890's Excavation of the Sarnia Approach to the St. Clair River Tunnel", Proceedings of the 53rd Canadian Geotechnical Conference, Montreal, October, 2: 759-768

Lake, C.B. Ph.D., 2000 Journal Papers: 5, Book Chapter: 1, Conference Papers: 7
Assistant Professor, Dalhousie University, Halifax, NS
Thesis: Contaminant transport through geosynthetic clay liners and a composite liner system
Publication: Lake, C.B. and Rowe, R.K. (2000). "Diffusion of Sodium and Chloride Through Geosynthetic Clay Liners" *Geotextiles and Geomembranes*, **18**(2):102-132.

Li, A.L. Ph.D., 2000 Journal Papers: 6, Conference Papers: 6
Project Engineer, AMEC, Toronto
Thesis: The time dependent behaviour of reinforced embankmentson soft foundations
Publication: Li, A.L. and Rowe, R.K. (2002) "Some design considerations for embankments on rate sensitive soils" ASCE *Journal of Geotechnical and Geoenvironmental Engineering,* 128(11):885-897.

Hrapovic, L. Ph.D., 2001 Journal Papers: 3 Conference Papers: 4
Research Associate, University of Toronto
Thesis: Laboratory Study of Intrinsic Biodegradation of Organic Pollutants in Compacted Clayey Soil
Publication: Rowe, R.K., Hrapovic, L., Kosaric, N. and Cullimore, D.R. (1997). "Anaerobic degradation of dichloromethane diffusing through clay," ASCE Journal of Geotechnical and Geoenvironmental Engineering, **123**(12): 1085-1095.

Sangam, H.P. Ph.D., 2001 Journal Papers: 6 Conference Papers: 8 Thesis: Performance of HDPE Geomembrane Liners in Landfill Applications
Publication: Sangam, H.P. and Rowe, R.K (2001) "Migration of dilute aqueous organic pollutants through HDPE geomembranes", *Geotextiles and Geomembrane,* 19(6): 329-357.

Skinner, G. Ph.D., 2002 Journal Papers: 3 Conference Papers: 2
Assistant Professor, Queen's University, Kingston
Thesis: Reinforced walls on yielding foundations
Publication: Rowe, R.K and Skinner, G.D (2001) "Numerical analysis of geosynthetic reinforced retaining wall constructed on a layered soil foundation" *Geotextiles and Geomembranes* , **19**(7):387-412.

Abdel-Meguid, M. Journal Papers: 2 Conference Papers: 2 Kingston
Thesis: Selected 3-D Aspects of Tunnelling (Co-supervised with K.Y. Lo, UWO)[10]
Publication: Abdel-Meguid, M.A., Rowe, R.K., and Lo, K.L. (2002) "3-D effects of surface construction over existing subway tunnels", *International Journal of Gemechanics,* **2** (4): 447-469.

Van Gulck, J. Journal Papers: 5 Book Chapter: 1 Conference Papers: 7
Assistant Professor, University of Manitoba, Winnipeg
Thesis: Biodegradation and clogging in gravel size material[11]
Publication: VanGulck, J.F., Rowe, R.K., Rittmann, B.E. and Cooke, A.J. (2003) "Predicting biogeochemical calcium precipitation in landfill leachate collection systems" *Biodegradation,* **14**:

331-346.

Iryo, T. Ph.D., 2003 Journal Papers: 2
Post Doctoral Fellow, Queen's University, Kingston, ON
Thesis: Hydraulic performance of geosynthetics in soil structures
Publication: Iryo, T. and Rowe, R.K. (2003) "On the hydraulic behaviour of unsaturated nonwoven geotextiles", *Geotextiles and Geomembranes,* **21** (6):381-404.

Southen, J Ph.D., 2005 Journal Papers: 4 Conference Papers: 4
Assistant Professor, University of Western Ontario, ON
Thesis:Thermally driven moisture movement within and beneath geosynthetic clay liners
Publication: Southen, J. M. and Rowe, R. K. (2005) **"**Laboratory investigation of GCL desiccation in a composite liner subjected to thermal gradients", ASCE *Journal of Geotechnical and Geoenvironmental Engineering,* (in press).

M.E.Sc.

San, K.W.E. M.E.Sc. 1991 Journal Papers: 2 Conference Papers: 1
Senior Engineer, Gartner Lee Ltd., Markham
Thesis: Stochastic considerations in contaminant migration studies
Publication: San, K.W.E. and Rowe, R.K. (1993). "Effect of sand lenses on groundwater flow and contaminant migration," International Journal for Analytical and Numerical Methods in Geomechanics, **17**(4): 217-242

Hrapovic, L. M.E.Sc. 1994 Journal Papers: 2 Conference Papers: 4
Post-Doctoral Fellow, University of Toronto
Thesis: Diffusion of DCM & chloride through an HDPE
Publication: Rowe, R.K., Hrapovic, L. and Kosaric, N. (1995). "Diffusion of chloride and dichloromethane through an HDPE geomembrane," Geosynthetics International, **2**(3): 507-536.

Fraser, M. M.E.Sc. 1994 Journal Papers: 1 Book Chapter: 1 Conference Papers: 4
President, GAEA Technologies Ltd., Toronto
Modelling the impact resulting from failure of engineered systems in landfills from failure of engineered systems
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.

Petrov, R. M.E.Sc. 1995 Journal Papers: 4 Conference Papers: 2
Senior Engineer, Trow Geotechnical Ltd, Brampton
Thesis: Swelling and compatibility characteristics of a geosynthetic clay liners
Publication: Petrov, R.J. and Rowe, R.K. (1997). "Geosynthetic clay liner compatibility by hydraulic conductivity testing: Factors impacting performance," Canadian Geotechnical Journal, **34**(6): 863-885
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.

Cooke, A.J. [6] M.E.Sc. 1997 Journal Papers: 3 Conference Papers: 5
Ph.D. Student UWO
Thesis: Modelling of clogging in columns permeated by synthetic leachate
Publication: Cooke, A.J., Rowe, R.K., Rittmann, B.E. and Fleming, I.R. (1999). "Modelling biochemically driven mineral precipitation in anerobic biofilms," *Water Science & Technology*, **39**(7): 57-64.

MacKay, P. J. M.E.Sc. 1998 Journal Papers: 1 Conference Papers: 1
Project Engineer: Environmental Management Solutions (EMS)Inc., Nepean.

Thesis: Oxygen diffusion through clay covers (Co-supervised with E.K. Yanful)
Publication: MacKay, P.C., Yanful, E.K., Rowe, R.K. and Badv, K. (1999). "A new apparatus for measuring oxygen diffusion and water retention in soils," ASTM *Geotechnical Testing Journal*, **21**(4): 289-296.

Armstrong, M.D. [6] M.E.Sc. 1998 Journal Papers: 2 Conference Papers: 8
Project Engineer, Acres International, Oakville
Thesis: Laboratory program to study clogging in a leachate collection systems
Publication: Rowe, R.K., Armstrong, M.D. and Cullimore, D.R. (2000). "Mass Loading and the Rate of Clogging due to Municipal Solid Waste Leachate" *Canadian Geotechnical Journal,* **37**(2):355-370
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.

Bennett, P.J. [6] M.Sc. 1998 Journal Papers: 1 Conference Papers: 2
Project Scientist, Conor Pacific Environmental Technologies, Mississauga
Thesis: The stable isotope characterization of carbon and water cycling in municipal solid waste landfills (Co-supervised with F. Longstaffe)
Publication: Bennett, P.J., Longstaffe, F.J. and Rowe, R.K. (2000). "The stability of dolomite in landfill leachate collection systems" *Canadian Geotechnical Journal,* **37**(2):371-378.

Tognon, A.R.M. M.E.Sc. 1999 Journal Papers: 2 Conference Papers: 1
Project Engineer, Foster Wheeler Environmental, Boston, U.S.A.
Thesis: Laboratory testing of geosynthetics used in landfill barrier systems (co-supervised with I.D. Moore)
Publication: Tognon, A.R.M., Rowe, R.K., and Brachman, R.W.I. (1999) Evaluation of side wall friction for a buried pipe testing facility" *Geotextiles and Geomembranes*, **17**(4):193-212.

Sholte, J.W. M.E.Sc. 1999 Journal Papers: 3 Conference Papers: 1
Senior Engineer, Golder Associates, Vancouver
Thesis: The complex permittivity of compacted Halton Till (co-supervised with J.Q. Shang)
Publication: Shang, J.Q., Rowe, R.K., Umana, J.A. and Sholte, J.W. (1999). "A complex permittivity measurement system for undisturbed/compacted soils," ASTM *Geotechnical Testing Journal*, **22**(2): 165-174.

Xie, Y. M.E.Sc. 1999 Journal Papers: 2 Conference Papers: 1
Program Analyst, Ontario Research Center for Computer Algebra
Thesis: Complex permittivity of contaminated clays (co-supervised with J.Q. Shang)
Publication: Rowe, R.K., Shang, J.Q., and Xie, Y. (2001) "Complex permittivity measurement system for detecting soil contamination", *Canadian Geotechnical Journal,* **38**(3): 498-506.

Krol, M. M.E.Sc. 2000 Journal Papers: 1 Conference Papers: 1
Project Engineer, GZA GeoEnvironmental Inc., Norwood, MA
Thesis: Trichloroethylene Diffusion in Soil-Bentonite Slurry Walls using cut-off walls
Publication: Krol, M.M. and **Rowe**, R.K (2003) "Diffusion of TCE through soil-bentonite slurry walls", *Soil and Sediment Contamination* (in press).

Millward, S.C. M.E.Sc. 2000 Journal Papers: 2 Conference Papers: 2
Senior Engineer, Golder Associates, London
Thesis: Diffusion through composite liners and underlying unsaturated soil
Publication: Cooke, A.J., Rowe, R.K., Rittmann, B.E., VanGulck, J. and Millward, S. (2001) "Biofilm growth and mineral precipitation in synthetic leachate columns" ASCE *Journal of Geotechnical and Geoenvironmental Engineering,* **127**(10): 849-856.

Orsini, C. M.E.Sc. 2001 Journal Papers: 1 Conference Papers: 3
Project Engineer, Golder Associates, Mississauga.

Thesis: Selected Factors Affecting the Performance of Bentonite Liners.
Publication: Rowe, R.K., and Orsini, C. (2003) "Effect of GCL and subgrade type on internal erosion in GCLs" *Geotextiles and Geomembrane*, **21** (1): 1-24.

Josic, L. M.E.Sc. 2002
Project Engineer, AMEC, Toronto
Thesis: Complex Permittivity of Water and Soil Contaminated by Heavy Metals and Organic Compounds (Co-supervised with J.Q. Shang, UWO)
Publication: Rowe, R.K. and Fraser, M.J. (1996). "Waste disposal facility site selection and design considerations," Geosciences Canada, **23**(1):1-8.

Hurst, **P.** M.Sc. (Eng) 2005 Journal Papers: 3 Conference Papers: 4
Project Engineer, Golder Associates, Ottawa
Thesis: Performance of GCLs exposed to Jet fuel A-1 between +20 and -20oC
Publication: Rowe, R.K., Hurst, P. and Mukunoki, T. (2005) "Permeating Partially Hydrated GCLs with Jet Fuel at Temperatures from -20°C and 20°C", *Geosynthetics International*

Babcock, **D.** M.Sc. (Eng) 2005
Project Engineer, Golder Associates, London
Thesis: An evaluation of model parameters for clogging of coarse drainage material and tire shreds in landfill LCS

Lindsay, **H.** M.Sc. (Eng) 2005 Conference Papers: 1
Project Engineer, AMEC, Toronto
Thesis: Permeation of hydrocarbons through HDPE and f-HDPE Geomembranes
Publication : Lindsay, H. and Rowe, R.K. (2005) "Diffusion of hydrocarbons from HDPE and f- HDPE geomembranes", 58th Canadian Geotechnical Conference, Saskatoon CD ROM, 7p.

M.Eng.

Markle, J. M.Eng. 1993 Journal Paper: 1 Conference Papers: 0
Senior Hydrogeologist, Ontario Ministry of Environment, London.
Thesis: Hydraulic response of fractured systems
Publication: Markle, J.M., Rowe, R.K. and Novakowski, K.S. (1995). "A model for the constant-head pumping test conducted in vertically fractured media," International Journal for Numerical and Analytical Methods in Geomechanics, Vol. 19, No. 7, pp. 457-474.

Footnotes:

1. In 1990 the paper "Some considerations in the design of geosynthetic reinforced embankments on clayey foundations" by **B.L.J. Mylleville** and R.K. Rowe. Proceedings of 3rd Canadian Symposium on Geotextiles, Kitchener, 1988, pp. 29-33 was awarded the International Geotextile Society "Special Recognition" for an outstanding contribution to the "fundamental understanding of the behaviour of geosynthetic reinforced embankments.
2. In 1991 the paper "On the design of reinforced embankments on soft brittle clays. "By **Mylleville, B.L.J**. and Rowe, R.K. (1991). Proceedings of Geosynthetics 91, Vol. 1, Atlanta, February, pp. 395-408 was awarded the North American Geosynthetics Society Grand Award., Atlanta, Georgia.
3. 1997: Canadian Geotechnical Society: Honourable Mention (Runner up for Best Paper prize) for the paper: "A geogrid reinforced embankment on peat over organic silt: a case history" by R.K. Rowe & **B.L.J. Mylleville,** Canadian Geotechnical Journal, Vol. 33, No. 1, pp. 106-122.
4. In 1993 the paper "Finite element analyses of geosynthetic reinforced soil walls", by **Ho, S.K.**

and Rowe, R.K. (1993). Proceedings of Geosynthetics '93, Vancouver, pp. 203-216. Was recognised as a Finalist in North American Geosynthetic Society Award of Excellence Vancouver, April.

5. 1996: Canadian Geotechnical Society: **Honourable Mention for R. M. Quigley Award** for the paper: "Construction and performance of a full scale geotextile reinforced test embankment - Sackville, New Brunswick" by R. Kerry Rowe, **C.J. Gnanendran**, A. Landva and A. Valsangkar, Canadian Geotechnical Journal, Vol. 32, No. 3, pp. 512-534.
6. Part of the team awarded the 1999 **Ontario Ministry of Environment Award of Excellence** for Research and Development for the Multidisciplinary Research Project "Clogging of Leachate Collection Systems".
7. 2000: Canadian Society for Civil Engineering: **Honourable mention for Keefer Medal** for the paper "Field observations of clogging in a landfill leachate collection system", by **I. R. Fleming**, R.Kerry Rowe and D.R. Cullimore, *Canadian Geotechnical Journal*, **36**(4): 685-707.
8. 2000: Canadian Geotechnical Society: **Honourable Mention for R.M. Quigly Award** for a paper "Field observations of clogging in a landfill leachate collection system," by **I.R. Fleming**, R. Kerry Rowe and D.R. Cullimore, *Canadian Geotechnical Journal*, **36**(4): 685-707.
9. 2002: Canadian Society for Civil Engineering: **Honourable Mention for Casmir Gzowski Medal** for the paper "The performance of a laboratory facility for evaluating the structural response of small-diameter buried pipes",by **R.W.I. Brachman**, I.D. Moore and R.K. Rowe, *Canadian Geotechnical Journal*, **38**(2):260-275.
10. 2002: Awarded **First Prize** in the Tunnelling Association of Canada 2001-2002 Thesis Competition.
11. 2003: Awarded *First Prize* in the Canadian Geotechnical Society Graduate Student Paper Competition.
12. 2004: International Geosynthetics Society Award and Gold Medal
13. 2004: Canadian Society for Civil Engineering: Honourable Mention for Thomas C. Keefer Medal for the paper "Evaluation of an HDPE geomembrane after 14 years as a leachate lagoon liner" co-authored by R.K. Rowe, H.P. Sangam and C.B. Lake
14. 2004: Canadian Geotechnical Society: Honourable Mention (Runner up for R.M. Quigley Best Paper Award) for the paper "Evaluation of an HDPE geomembrane after 14 years as a leachate lagoon liner" co-authored by R.K. Rowe, H.P. Sangam and C.B. Lake

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